Indigenous research of personality from perspectives of globalization and glocalization

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Indigenous research of personality from perspectives of globalization and glocalization

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Editorial: Indigenous Research of Personality From Perspectives of Globalization and Glocalization

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Editorial on Research Topic

Indigenous Research of Personality From Perspectives of Globalization and Glocalization

A long-term challenge in studying personality has been to strike a balance between seeking the universality of structure and describing the rich variety in personality due to cultural and background differences (Cheung et al., 2011). In the past, personality research has been dominated by Western-based theories, and self-construction has been the major emphasis (Cheek and Cheek, 2018). However, due to the neglect of the cultural particularity of personality (e.g., interpersonal relatedness), Western-based theories have been challenged in theory and practice when used in non-western contexts (e.g., Fan et al., 2011; Thalmayer et al., 2020). Accordingly, beyond those traditional Western-based studies, non-Western-based personality research focusing on the indigenously addressing personality in non-Western contexts started since the 1970s (McAdams and Pals, 2006). There are two basic types of indigenous research in non-Western personality. If we regard the imported-etic research on the personality of mainstream Western psychology in non-Western contexts as a manifestation of globalization, then understanding the construct of Western-based personality with non-Western thinking can be regarded as glocalization in indigenous research of personality. This involves the transport and test paradigm with the usual path from Western to non-Western cultures. The other type of indigenous personality research is, beyond those Western-based personality constructs, to construct and explore the personality embedded in specific non-Western cultural contexts. This usually involves a bottom up approach when local observations give rise to theory building and testing. Over the past five decades, a substantial amount of indigenous research has been devoted to addressing personality in non-Western, for example, Chinese and South African communities, and specifically investigating how Western-based personality constructs, or indigenous personality constructs in explaining ones' behaviors in specific non-Western settings (e.g., Cheung et al., 2011). Furthermore, with the worldwide interactions among various cultures (e.g., between Eastern and Western cultures), some indigenous personality constructs proposed in non-Western backgrounds have also been paid attention to in Western backgrounds (e.g., Lin and Church, 2004; Thalmayer et al., 2020). This may be considered to be another type of the glocalization from non-West to West in indigenous personality research. However, neither the abovementioned two types of indigenous personality research nor the glocalization research of non-Western personality in Western contexts has been adequately represented in the mainstream international personality research community. Accordingly, as we hoped in the proposal, the articles in this special issue explored some important topics in relation to theory and application of personality constructs from perspectives of globalization and glocalization.

Based on a review of the broad dualistic model of self and relatedness supported in both western and eastern cultural settings, Fan, Li, Leong, et al. reconstructed a new two polarities personality model including not only self and relatedness but also the independent and interdependent functions. They argued that, in terms of the cultural-relevant feature, both self and relatedness and their specific aspects may be variously highlighted in different cultural settings by either independent or interdependent function. This updated model may function better when used in cross-cultural studies since some cultures are individualistic and other cultures are collectivistic. Specifically, in three empirical studies, the validities of interpersonal relatedness personality have been empirically examined in a sample of Chinese entrepreneurs (Zhou, Huang et al.) and two samples of Chinese adolescents (Fan, Li, and Chen et al.; Li). In contrast, with a perspective of globalization, Zhang highlighted the universal natures of personality in light of a review on personality-based intellectual style models including the Jungian personality and Holland hexagonal personality.

In terms of how to reflect and measure indigenous personalities in specific contexts, two articles are published in this special issue. Zhou, Mu et al. examined the reliability and validity of the Short Forms of the Cross-Cultural (Chinese) Personality Assessment Inventory, which was originally developed in a Chinese cultural setting with a combined emic–etic approach (Cheung et al., 2011) and reflected a dualistic personality model including both intrapsychic and interpsychic dimensions of personality traits. Thalmayer et al. described the creation of a personality inventory tailored to a specific population—Khoekhoegowab speakers in Namibia—and assesses its psychometric properties and predictive ability for physical and mental health, religious practice and attitudes, and income.

The final three articles addressed western-derived personality in Chinese cultural contexts from a perspective of glocalization. Hence those personality constructs, originally derived in western-based individualist backgrounds, may have culturally-relevant understanding and predictive ability in Eastern backgrounds. Liu et al. examined how dark triad traits contribute to eudaimonic well-being. Yue et al. explored the relationships among self-appraisals, reflected appraisals and peers' actual appraisals of the Big Five Personality. Finally, Peng et al. used the systematic review method to identify 25 short versions of the ZTPI and used these to investigate the structural validity and internal consistency of three short forms of the Zimbardo Time Perspective Inventory in Chinese samples.

To sum up, within the context and current era of globalization and glocalization, ten articles in this Research Topic provide a showcase for recent advances in indigenous research of personality. We believe the Research Topic in this special issue contributes to a more inclusive understanding of personality and will inspire new thinking for personality research from both perspectives of globalization and glocalization under either western or eastern cultural settings.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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REFERENCES

Cheek, N. N., and Cheek, J. M. (2018). Aspects of identity: From the inner-outer metaphor to a tetrapartite model of the self. *Self Identity*. 17, 467–482. doi: 10.1080/15298868.2017.1412347

Cheung, F. M., van de Vijver, F. J., and Leong, F. T. (2011). Toward a new approach to the study of personality in culture. *Am Psychol*. 66, 593–603. doi: 10.1037/a0022389

Fan, W., Cheung, M. C., Zhang, J. X., and Shu, F. C. (2011). A combined emic-etic approach to personality: CPAI and cross-cultural applications. *Acta Psychologica Sinica*. 43, 1418–1429.

Lin, E. J., and Church, A. T. (2004). Are indigenous Chinese personality dimensions culture-specific? An investigation of the Chinese personality assessment inventory in Chinese American and European American samples. *J. Cross-Cult. Psychol*. 35, 586–605. doi: 10.1177/0022022104268390

McAdams, D. P., and Pals, J. L. (2006). A new big five: Fundamental principles for an integrative science of personality. *Am. Psychol*. 61, 204–217. doi: 10.1037/0003-066X.61.3.204

Thalmayer, A. G., Saucier, G., Ole-Kotikash, L., and Payne, D. (2020). Personality structure in east and west Africa: Lexical studies of personality in Maa and Supyire-Senufo. *J. Pers. Soc. Psychol*. 119, 1132–1152. doi: 10.1037/pspp0000264

A Systematic Review Approach to Find Robust Items of the Zimbardo Time Perspective Inventory

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The Zimbardo Time Perspective Inventory (ZTPI) is one of the most well-known and widely used measures of time perspective. Various short versions were proposed to resolve the psychometric problems of the ZTPI. The present study conducted a systematic review to obtain 25 short versions, calculated the frequency of each item of the ZTPI in short versions, and hypothesized that the more frequent the item is, the more robust it becomes. The hypothesis was tested by assessing the structural validity and internal consistency of short forms with high, medium, and low frequent items in Chinese samples (575 children, 407 undergraduates, and 411 older adults). Structural validity and internal consistency analyses showed that the form with more frequent items had better psychometric properties; item frequencies were positively correlated with factor loadings. The results suggest that the systematic review is an effective approach to identify the robust items of the ZTPI. This approach is general and can be the basis to improve the psychometric properties of scales in social science.

Keywords: time perspective, ZTPI, systematic review, psychometric problems, structural validity, internal consistency

INTRODUCTION

Time perspective is considered one of the most powerful influences on human behavior (Carstensen, 2006; Zimbardo et al., 2012). Time perspective originated from Lewin's life space model, which included the influence of both the past and the future on current behavior. Time perspective corresponds to an individual's view on his or her past and future at any given time (Lewin, 1942, 1951). Time perspective can be defined as the manner in which individuals partition the flow of their personal and social experiences into distinct temporal categories, which affects decision-making by locating the primary set of psychological influences within the temporal frames of either the present, past, or future (Zimbardo et al., 1997; Zimbardo and Boyd, 1999).

The Zimbardo Time Perspective Inventory (ZTPI) was developed to assess individual differences in time perspective (Zimbardo and Boyd, 1999). The scale was based on a conceptual model of the characteristic cognitive style and attitudes of those believed to be past-, present-, or future-oriented. The ZTPI measures time perspective in five factors: past negative (PN), past positive (PP), present fatalistic (PF), present hedonistic (PH), and future (F). PN reflects a negative or aversive

attitude toward the past; PP represents a warm, sentimental, and nostalgic attitude toward their past; PH reflects an orientation toward present pleasure with little concern for future consequences; PF describes a helpless and hopeless belief about life; and F indicates behavior dominated by striving for future goals and rewards. The ZTPI has been translated into several languages, adapted in more than 20 countries and regions (Sircova et al., 2014), and cited more than 1,400 times in Scopus (Perry et al., 2020).

Previous studies reported mixed evidence regarding the psychometric properties of the ZTPI. The five-factor structure of time perspective not only has been replicated with exploratory factor analysis (EFA) in samples from France (Apostolidis and Fieulaine, 2004), Spain (Díaz-Morales, 2006), Romania (Cretu and Negovan-Zbăganu, 2013), as well as 23 countries (Sircova et al., 2014) but also has been confirmed with confirmatory factor analysis (CFA) in samples from the United States (Worrell and Mello, 2007), China (Wang et al., 2015), and Hungary (Orosz et al., 2017). However, several studies reported poor structural validity of the ZTPI, e.g., in a sample of 815 American adolescents (comparative fit index, CFI = 0.64) (Worrell and Mello, 2007), a sample of 476 American adults (CFI = 0.65) (Shipp et al., 2009), a sample of 247 Brazilian university students (CFI = 0.70) (Milfont et al., 2008), a sample of 419 Swedish adults (CFI = 0.63) (Carelli et al., 2011), and a sample of 303 Chinese university students (CFI = 0.48) (Wang et al., 2015). Previous studies also showed that internal consistency estimates for the ZTPI were not consistent. For example, Cronbach's α of PP was below 0.70, and the α values of other subscales were above 0.70 (Worrell and Mello, 2007); the α values of all subscales were above 0.70 (Shipp et al., 2009); the α values of all subscales were below 0.70 (Milfont et al., 2008).

Several authors have attempted to overcome the limitations of the ZTPI by shortening the scale. Researchers proposed that short scales provide several important distinct advantages, such as reducing the fatigue of participants and better psychometric properties (Zhang et al., 2013; Orosz et al., 2017). Most of the short versions were developed based on samples in different countries, such as Greece (Anagnostopoulos and Griva, 2012), China (Chan et al., 2016), Romania (Cretu, 2012), and Germany (Danner et al., 2019) (**Supplementary Table 1**). However, previous research demonstrates that the factor structure and items of the short versions depend on the nationality of the sample (Przepiorka et al., 2016), that is, short scales usually have poor psychometric properties for samples independent from which they were developed (Temple et al., 2019).

A data-driven approach based on global data and a theory-driven approach were proposed to resolve the psychometric problems of the ZTPI. Sircova et al. (2014) assessed the structural equivalence of the ZTPI across 26 samples from 24 countries ($N = 12,200$). The study obtained a 36-item version of the ZTPI using EFA and CFA and found the five-factor structure of the ZTPI across 23 countries. The internal consistency and structural validity of the 36-item version of the ZTPI were examined in samples from the United Kingdom, the United States, and Australia, which provided support for the internal consistency, but revealed poor structural validity (McKay et al., 2015). Worrell

et al. (2018) proposed a theory-driven approach to enhance the psychometric validity of the ZTPI, in which only items with a specific temporal content were retained (e.g., "past," "tomorrow," "future," etc.). The study reported acceptable cross-cultural indexes for a new 25-item version of the ZTPI in the samples from the United Kingdom, the United States, Australia, and Slovenia. However, the CFA indexes were below the acceptable threshold for the short version from Worrell et al. (2018) study in samples from the United Kingdom, the United States, Australia, and Slovenia (CFI < 0.9, TLI < 0.9). Therefore, the data-driven approach based on global data (Sircova et al., 2014) and a theory-driven approach (Worrell et al., 2018) did not resolve the psychometric problems of the ZTPI satisfactorily.

Shortening the ZTPI is not an effective way to resolve the psychometric problems of the scale (McKay et al., 2015; Temple et al., 2019), and a new collaborative strategy is needed to address conceptual and measurement concerns with the ZTPI (Perry et al., 2020). As the first step, it is valuable to identify which item is "good" and which item is "bad" for the psychometric properties of the ZTPI. The present study aimed to converge the finding of previous short versions of the ZTPI and to identify the robust items of the ZTPI using a systematic review. The systematic review provides a method to combine findings from empirical studies using strict methodological requirements. Psychology can benefit from the systematic review because the systematic review summarizes the outcomes of many studies on a particular topic and identifies variables explaining differences (van Hemert, 2011; Furtado et al., 2019). Here, we firstly summarized short versions of the ZTPI using a systematic review and then calculated the frequency of each item appearing in the short versions. We hypothesized that the items with higher frequency are more robust to measure time perspective, that is, the short versions composed of more frequent items would have better psychometric properties. Finally, the hypothesis was tested in samples of Chinese adolescents and old adults. The aim of our studies was not to provide a new short version of the ZTPI but rather to provide a basis to improve the concept and measurement of time perspective in future work.

STUDY 1

To obtain three short forms with high, medium, and low frequent items, we summarized the short versions of the ZTPI using a systematic review and calculated the frequency of items in the short versions.

Materials and Methods

We performed the systematic review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (Liberati et al., 2009). Published studies were identified by four research assistants on PsycINFO, PubMed, Web of Science, and Google Scholar. The last search was run on October 31, 2020. Search terms were "Zimbardo Time Perspective Inventory" and "ZTPI."

English language studies reporting short versions of the ZTPI were included in the systematic review. We excluded studies

in which the short versions included new items not in the original ZTPI (e.g., D'Alessio et al., 2003). In order to exclude potentially low-quality studies, only papers published in peer-reviewed journals were included.

Results and Discussion

The procedure of study identification and selection is illustrated in **Figure 1**. In total, 1,826 records were retrieved; 651 records were excluded due to duplications; 1,133 records were excluded because the studies were not in English, not related to the structure validity of the ZTPI, or not published in peer-reviewed journals. Forty-two full texts were checked, and 20 records were excluded because of no new short version or new short versions including new items not in the original ZTPI. Finally, 22 studies were identified for inclusion in the systematic review. Countries, participant age, structure factors, and items of 25 short versions of the ZTPI were presented in **Supplementary Table 1**. Short versions were developed in Greece, China, Romania, Germany, Chile, Latvia, Russia, Czech and Slovak Republics, Italy, Lithuania, Israel, Hungary, Japan, Poland, Estonia, Spain, Australia, the United Kingdom, the United States, and Slovenia. Participant ages ranged from 13 to 90 years. The number of structure factors ranged from three to six. We first counted the number of items in the **Supplementary Table 1** and then calculated the frequency of each item. The frequency of an item is the ratio of the number of the item and the number of the short versions (**Table 1**).

We obtained high, medium, and low frequent forms of the ZTPI based on the frequency of items (**Table 1**). Wang et al. (2015) revealed that the five-factor model had better fit indexes than the three-factor model (past, present, and future) in the Chinese context. Furthermore, Sircova et al. (2014) assessed the structural equivalence of the ZTPI across 26 samples from 24 countries and found the five-factor structure of the ZTPI across 23 countries (95.8%). Similarly, our systematic review showed that 19 out of 25 short versions included the five-factor structure (76%, **Supplementary Table 1**). Therefore, the three short forms include five factors the same as the original ZTPI. Besides, the number of items is equal for three short forms in one factor, and the frequencies of items in the high frequent form are all larger than 0.6. Thus, each short form has 16 items (**Table 1**).

STUDY 2

To test the hypothesis that the items with higher frequency are more robust to measure time perspective, we assessed the psychometric properties of three short forms of the ZTPI based on the frequency of items in samples from Chinese children, undergraduates, and old adults.

Materials and Methods
Participants
Data from three Chinese samples were analyzed. Participants in sample 1 consisted of 575 children from a middle school in Guangdong (aged 11–14, 45.7% female). Participants in sample 2 consisted of 407 undergraduates from two universities in Chongqing (aged 17–26, 64.6% female). Participants in sample 3 consisted of 411 adults in Chongqing (aged 62–94, 59.3% female). The study was conducted in accordance with the Declaration of Helsinki and was approved by the ethical board of the Southwest University.

Measures
The ZTPI contains 56 items (ZTPI-56). The ZTPI measures time perspective in five factors: PN, PP, PF, PH, and F (Zimbardo and Boyd, 1999). Participants were required to rate all items on a five-point Likert scale from 1 (very uncharacteristic) to 5 (very characteristic) according to their own situation. The Cronbach's α ranges from 0.74 to 0.82 for each subscale (Zimbardo and Boyd, 1999). The Chinese version of the ZTPI was adapted from a Chinese translation of Zimbardo and Boyd (2010). The Chinese translation was translated back to English by a bilingual graduate student in English translation. A committee consisted of the graduate student, a bilingual professor, and a bilingual graduate student in psychology. The committee discussed discrepancies until they reached a consensus on a common version.

Procedure and Statistical Analyses
Time perspective was measured using the Chinese ZTPI for 575 children, 412 undergraduates, and 411 old adults. Determining sample size requirements for CFA remains a challenge, as the requirements are impacted by the number of factors and indicators, as well as the magnitude of factor loadings (Wolf et al., 2013). Researchers proposed several recommendations including a minimum sample size of 100, 200 (Boomsma, 1985), or 500 (Tabachnick and Fidell, 2013), and 5–20 cases per variable (Furr,

FIGURE 1 | The procedure of study identification and selection.
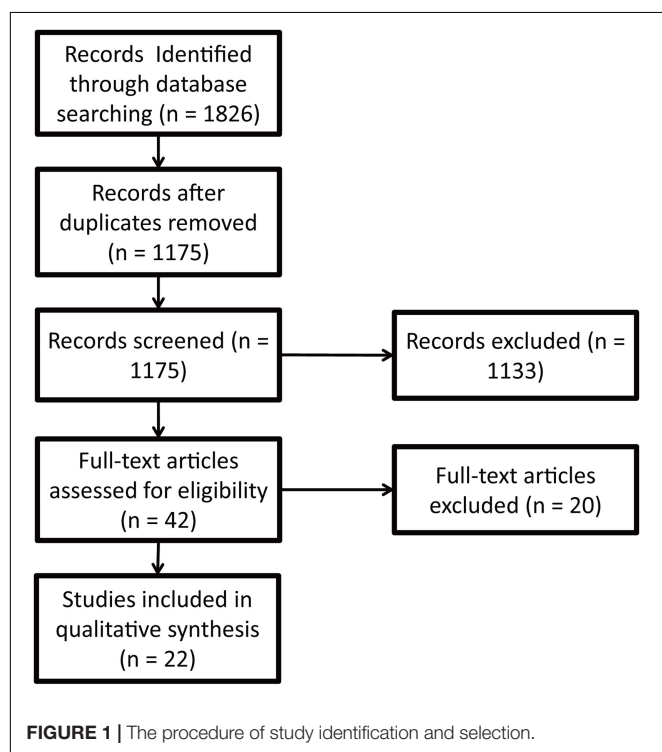
2018). To avoid the possible influence of insufficient sample size on conclusions, we separately analyzed the data from samples of children (sample size is 575, with about 10.3 cases per indicator for the ZTPI-56), undergraduates (407, with about 7.3 cases per indicator), and old adults (411, with about 7.4 cases per indicator), as well as the merged data (1,393, with about 24.9 cases per indicator).

R software with lavaan (Rosseel, 2012) and semTools (Jorgensen et al., 2020) was used for CFA. Ordinal variables were obtained with the five-point Likert scale. Previous studies reported that the Likert variables were not normally distributed (e.g., Flora and Curran, 2004; Li, 2016; Li et al., 2018). As maximum likelihood (ML) estimation assumes that the observed indicators follow a continuous and multivariate normal distribution, the ML is not appropriate for ordinal observed variables (Li, 2016). A WLSMV estimator is designed for ordinal data, which uses diagonally weighted least squares with robust variants to estimate the model parameters (Muthén, 1993; Rosseel, 2021). Thus, we used the WLSMV estimator to assess the ZTPI-56 and three short forms with high, medium, and low frequent items (**Table 1**). Since ML estimation was frequently used in previous studies, we also conducted a supplementary analysis using ML estimation (**Supplementary Table 2**). The Chi-square degree of freedom ratio (χ^2/df), the CFI (comparative fit index), the TLI (Tucker Lewis index), and the RMSEA (root mean square error of approximation) and its 90% confidence interval (90% CI) were adopted to the criteria (Schreiber et al., 2006). We adopted Hu and Bentler's (1999) recommended cutoffs: CFI and TLI greater than 0.95 and RMSEA below 0.06 as acceptable models.

Results and Discussion

The structural validity of the ZTPI-56 and three short forms was assessed by conducting CFA on data from Chinese children, undergraduate, and old adult samples, as well as the merged data (**Table 2**). The high frequent form had the best fit indexes (CFI = 0.966–1.000, TLI = 0.957–1.002, RMSEA = 0.000–0.038), followed by the medium frequent form (CFI = 0.803–0.949, TLI = 0.748–0.935, RMSEA = 0.039–0.072) then the low frequent form (CFI = 0.659–0.909, TLI = 0.565–0.883, RMSEA = 0.038–0.078), and the worst was the ZTPI-56 (CFI = 0.634–0.829, TLI = 0.618–0.821, RMSEA = 0.060–0.081). Fit indexes of the low frequent form were not obtained for the merged data, which may be because the model was not identified. According to the cutoff values (CFI > 0.95, TLI > 0.95, RMSEA < 0.06), the

high frequent form had acceptable fit indexes in three samples (Chinese children, undergraduates, and old adults) as well as the merged data.

The factor loadings of the items were obtained for the ZTPI-56 and three short forms in samples of Chinese children, undergraduates, and old adults, as well as the merged data. To further reveal the reason why the short form with higher frequent items had better fit indexes, the correlation analysis was performed on data from three Chinese samples as well as the merged data (**Supplementary Figure 1**). The item frequencies were positively correlated with the standardized factor loadings for the ZTPI-56 and three short forms in the samples of children, undergraduates, and old adults, as well as the merged data ($r = 0.293–0.565$, p values < 0.05).

The internal consistency of the ZTPI-56 and three short forms was assessed using Cronbach's α and omega (**Table 3**). The ZTPI-56 had the best internal consistency ($\alpha = 0.619–0.770$, $\omega = 0.620–0.778$), followed by the high frequent form ($\alpha = 0.516–0.798$, $\omega = 0.533–0.799$), then the medium frequent form ($\alpha = 0.177–0.672$, $\omega = 0.243–0.712$), and the worst was the low frequent form ($\alpha = 0.062–0.443$, $\omega = 0.001–0.444$). Employing a value of 0.70 as acceptable, only 16 out of the 20 α coefficients and 15 out of the 20 ω coefficients were acceptable for the ZTPI-56; 8 out of the 20 α coefficients and 8 out of the 20 ω coefficients were acceptable for the high frequent form; no α coefficient and 1 out of the 20 ω coefficients was acceptable for the medium frequent form; no α coefficient and no ω coefficient was acceptable for the low frequent form.

GENERAL DISCUSSION

The purpose of these present studies was to identify the robust items of the ZTPI based on the systematic review. The structural validity and internal consistency of the ZTPI-56 and the high, medium, and low frequent forms were assessed in samples of Chinese children, undergraduates, and old adults. We found that the high frequent form had the best structural validity, followed by the medium frequent form, then the low frequent form, and the ZTPI-56; the item frequencies were positively correlated with the factor loadings; the ZTPI-56 had the best internal consistency, followed by the high frequent form, then the medium frequent form, and the low frequent form. The results supported

TABLE 1 | Frequency of each item of the ZTPI in 25 short versions and three short forms with high, medium, and low frequent items.

	Past negative	Past positive	Present hedonistic	Present fatalistic	Future
ZTPI-56	4 (0.60), 5 (0.16), 16 (0.76), 22 (0.64), 27 (0.52), 33 (0.32), 34 (0.80), 36 (0.56), 50 (1), 54 (0.56)	2 (0.76), 7 (0.72), 11 (0.60), 15 (0.52), 20 (0.84), 25 (0.48), 29 (0.60), 41 (0.16), 49 (0.44)	1 (0.28), 8 (0.52), 12 (0.20), 17 (0.48), 19 (0.32), 23 (0.48), 26 (0.72), 28 (0.44), 31 (0.80), 32 (0.44), 42 (0.80), 44 (0.48), 46 (0.44), 48 (0.44), 55 (0.36)	3 (0.40), 14 (0.72), 35 (0.32), 37 (0.84), 38 (0.76), 39 (0.84), 47 (0.40), 52 (0.32), 53 (0.40)	6 (0.36), 9 (0.24), 10 (0.72), 13 (0.84), 18 (0.36), 21 (0.72), 24 (0.40), 30 (0.56), 40 (0.88), 43 (0.40), 45 (0.84), 51 (0.48), 56 (0.32)
High	16, 34, 50	2, 7, 20	26, 31, 42	37, 38, 39	13, 21, 40, 45
Medium	4, 22, 54	11, 15, 29	8, 23, 44	14, 47, 53	10, 30, 43, 51
Low	5, 27, 33	25, 41, 49	1, 12, 19	3, 35, 52	6, 9, 18, 56

TABLE 2 | Fit indexes of CFA for ZTPI-56 and three short forms with high, medium, and low frequent items.

	χ^2	df	χ^2/df	CFI	TLI	RMSEA (90% CI)
Children						
ZTPI-56	5.377.321	1,474	3.648	0.771	0.760	0.068 (0.066, 0.070)
High	91.072	94	0.969	1.000	1.002	0.000 (0.000, 0.021)
Medium	226.940	94	2.414	0.923	0.901	0.050 (0.041, 0.058)
Low	199.816	94	2.126	0.882	0.850	0.044 (0.036, 0.053)
Undergraduates						
ZTPI-56	5.272.536	1.474	3.577	0.651	0.636	0.080 (0.077, 0.082)
High	109.151	94	1.161	0.986	0.982	0.020 (0.000, 0.034)
Medium	292.589	94	3.113	0.803	0.748	0.072 (0.063, 0.082)
Low	274.952	94	2.925	0.659	0.565	0.078 (0.068, 0.089)
Older adults						
ZTPI-56	3.680.770	1.474	2.497	0.829	0.821	0.060 (0.058, 0.063)
High	150.144	94	1.597	0.966	0.957	0.038 (0.026, 0.049)
Medium	153.434	94	1.632	0.949	0.935	0.039 (0.028, 0.050)
Low	150.042	94	1.596	0.909	0.883	0.038 (0.026, 0.049)
Merged data						
ZTPI-56	14,850.104	1.474	10.075	0.634	0.618	0.081 (0.080, 0.082)
High	244.496	94	2.601	0.967	0.958	0.034 (0.029, 0.039)
Medium	647.761	94	6.891	0.829	0.781	0.065 (0.060, 0.070)
Low*						

lavaan WARNING: could not compute standard errors! The information matrix could not be inverted. This may be a symptom that the model is not identified.

TABLE 3 | Cronbach's α and ω estimates for ZTPI-56 and three short forms with high, medium, and low frequent items.

	Past negative		Past positive		Present hedonistic		Present fatalistic		Future	
	α	ω	α	ω	α	ω	α	ω	α	ω
Children										
ZTPI-56	0.735	0.745	0.735	0.738	0.735	0.720	0.714	0.718	0.770	0.778
High	0.762	0.762	0.691	0.699	0.798	0.799	0.583	0.589	0.629	0.640
Medium	0.370	0.401	0.578	0.605	0.668	0.712	0.451	0.464	0.549	0.561
Low	0.294	0.306	0.414	0.441	0.183	0.346	0.342	0.340	0.340	0.334
Undergraduates										
ZTPI-56	0.755	0.762	0.731	0.738	0.738	0.739	0.674	0.687	0.675	0.674
High	0.737	0.737	0.689	0.694	0.687	0.687	0.537	0.560	0.574	0.576
Medium	0.177	0.243	0.549	0.546	0.639	0.668	0.373	0.335	0.564	0.565
Low	0.443	0.444	0.347	0.377	0.190	0.140	0.184	0.193	0.132	0.004
Older adults										
ZTPI-56	0.723	0.733	0.727	0.757	0.746	0.756	0.619	0.620	0.658	0.636
High	0.656	0.658	0.767	0.782	0.783	0.785	0.516	0.533	0.572	0.575
Medium	0.421	0.434	0.672	0.674	0.536	0.635	0.296	0.313	0.535	0.542
Low	0.302	0.328	0.206	0.271	0.266	0.272	0.305	0.281	0.062	0.001
Merged data										
ZTPI-56	0.735	0.741	0.723	0.686	0.734	0.743	0.715	0.716	0.711	0.700
High	0.731	0.731	0.716	0.719	0.780	0.781	0.585	0.585	0.622	0.622
Medium	0.350	0.383	0.594	0.595	0.611	0.664	0.388	0.366	0.543	0.544
Low	0.338	0.335	0.272	0.237	0.258	0.285	0.344	0.336	0.219	0.092

our hypothesis that the items with higher frequency are more robust to measure time perspective.

The present study showed that the Chinese version of the ZTPI-56 was inadequate in structural validity. The CFI was from 0.63 to 0.83 for the Chinese version of the ZTPI-56 in samples of Chinese children, undergraduates, and old adults, as well as the merged data. This result was consistent with a sample of American adolescents (CFI = 0.64) (Worrell and Mello, 2007), a sample of American adults (CFI = 0.65) (Shipp et al., 2009), and a sample of Swedish adults (CFI = 0.63) (Carelli et al., 2011).

Especially, using the ML estimation, we found that the CFI was 0.49 for the Chinese ZTPI-56 in a sample of Chinese undergraduates (**Supplementary Table 2**), which was almost the same with a previous study (CFI = 0.48) (Wang et al., 2015). Our study and Wang et al.'s (2015) study both adapted the Chinese ZTPI-56 from a Chinese translation of Zimbardo and Boyd (2010), but two studies conducted the adaptation independently. The above similar results suggested that the revision of the Chinese ZTPI-56 was appropriate in this study. Furthermore, we found that the structural validity of the ZTPI-56 was poorer than those of the short forms. This result was widely reported by previous studies, which is the reason why several authors attempt to resolve the psychometric problems of the ZTPI by shortening the scale (Wang et al., 2015; Orosz et al., 2017; Temple et al., 2019; Perry et al., 2020).

For the internal consistency of the Chinese ZTPI-56, Cronbach's α was from 0.62 to 0.77, and ω was from 0.62 to 0.78. This result was consistent with the internal consistency of the ZTPI-56 in an American sample (α = 0.61–0.82), a British adolescent sample (α = 0.63–0.82), and a British university sample (α = 0.61–0.82) (Perry et al., 2020). Furthermore, we found that the internal consistency of the ZTPI-56 was better than those of the three short forms. The result was consistent with a previous finding that the lower the number of items are, the lower the Cronbach's α will be (Cortina, 1993; Orosz et al., 2017). Thus, shortening the scale is not an ideal way to improve psychometric properties, especially for internal consistency.

A central finding of the present study was that the structural validity and internal consistency of short forms got better with an increase in item frequency (**Tables 2**, **3** and **Supplementary Table 2**). The frequency of each item was calculated based on 25 short versions, which were collected using a systematic review. We found that the factor loading increased as an increase in the item frequency for the ZTPI-56 and three short forms in samples of children, undergraduates, and old adults, as well as the merged data (**Supplementary Figure 1**). As factor loadings represent correlations between the indicators and the latent factors (Brown, 2015), the correlations between the indicators and the latent factors were stronger in the short form with higher frequent items. Thus, the short form with higher frequent items had better structural validity and internal consistency. Most of the short versions of the scale were created by data-driven approaches in specific samples, which improved the structural validity rather than the internal reliability, generalizability, and ability to detect individual differences in the construct (Perry et al., 2020). A theoretically driven, empirically tested approach could provide solutions for the above limitations. Worrell et al. (2018) reported that the short version including only explicit temporally phrased items had better structural validity and internal consistency compared with the ZTPI-56. The systematic review provides an effective way to integrate all the data-driven and theory-driven studies and provide information on which item is "good" and which item is "bad." For example, item 50 is "I think about the bad things that have happened to me in the past" whose frequency is 1. Item 5 is "My decisions are mostly influenced by people and things around me" whose frequency is 0.16. Item 50 is "good," and item 5 is "bad" to measure PN,

which supports the Worrell et al. (2018) study that "good" items were accompanied by a specific temporal content (e.g., "past," "tomorrow," "future," etc.).

One limitation of this study was that we cannot completely rule out the influence of cultures on the study. We hypothesized that the items with higher frequency are more robust to measure time perspective. The hypothesis is extracted from the systematic review. Twenty-five short versions were collected by the systematic review. The frequency of each item was calculated based on 25 short versions. The short versions were developed in samples from more than 20 countries, 17 out of 25 versions were developed in European samples, and only 6 out of 25 versions were developed in Asian, American, and Oceanian samples. Although Zimbardo's five-factor structure of the time perspective was widely replicated in samples from different nations, such as France (Apostolidis and Fieulaine, 2004), Spain (Díaz-Morales, 2006), Japan (Pigott, 2018), and China (Wang et al., 2015), time perspective is also shaped by cultures (Jones and Brown, 2005). Hofstede and Bond (1988) found that people in nations with high Confucian dynamism (such as Thailand, China, Korea, and Japan) tend to be more hard work-, perseverance-, and future-oriented, while members of low Confucian dynamism cultures (such as Canada, Pakistan, and the United States) tend to be more past- and present-oriented. Therefore, cultural differences in the time perspective may lead to bias in the item selection. Furthermore, our hypothesis was only tested in the Chinese samples. Although the hypothesis is not specific to the Chinese sample, it still needs to be tested in samples from other countries.

CONCLUSION

To sum up, the present study conducts a systematic review to calculate the frequency of items in 25 short versions of the ZTPI. The high, medium, and low frequent forms were developed based on the frequency of items. The psychometric properties of the three forms were assessed in Chinese samples. The results showed that the short form with higher frequent items yield more acceptable CFA results and stronger internal consistency estimates. The present study provided an approach to identify the "good" items and the "bad" items for psychometric properties, which would be the basis for further work to resolve the psychometric problems of scales.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of the Southwest University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

YC designed the studies. CP and CY performed the studies. YC and CP analyzed the data. CP, YC, and AA wrote the manuscript. All authors approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.627578/full#supplementary-material

Supplementary Figure 1 | The correlations between item frequencies and factor loadings in samples of **(A)** Chinese children, **(B)** undergraduates, and **(C)** old adults, as well as **(D)** the merged data.

Supplementary Table 1 | Structure factors and items of 25 short versions of the Zimbardo time perspective inventory (ZTPI).

Supplementary Table 2 | Fit indexes of CFA with maximum likelihood estimation for the ZTPI-56 and three short forms with high, medium, and low frequent items.

Supplementary Table 3 | Test of normality for Likert response of the ZTPI-56.

Supplementary Table 4 | Fit indexes for multigroup CFAs testing measurement invariance of the five-factor structure of the high frequent form.

REFERENCES

Anagnostopoulos, F., and Griva, F. (2012). Exploring time perspective in greek young adults: validation of the zimbardo time perspective inventory and relationships with mental health indicators. *Soc. Indic. Res.* 106, 41–59. doi: 10.1007/s11205-011-9792-y

Apostolidis, T., and Fieulaine, N. (2004). Validation française de l'échelle de temporalité. *Eur. Rev. Appl. Psychol.* 54, 207–217. doi: 10.1016/j.erap.2004.03.001

Boomsma, A. (1985). Nonconvergence, improper solutions, and starting values in lisrel maximum likelihood estimation. *Psychometrika* 50, 229–242. doi: 10.1007/BF02294248

Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research*. Second Edn. New York, NY: The Guilford Press.

Carelli, M. G., Wiberg, B., and Wiberg, M. (2011). Development and construct validation of the Swedish Zimbardo Time Perspective Inventory. *Eur. J. Psychol. Assess.* 27, 220–227. doi: 10.1027/1015-5759/a000076

Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science* 312, 1913–1915. doi: 10.1126/science.1127488

Chan, S. M., Kwok, W. W., and Fung, T. W. (2016). Psychometric properties of the Zimbardo time perspective inventory in Hong Kong adolescents. *Time Soc.* 28, 33–49. doi: 10.1177/0961463X16678250

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *J. Appl. Psychol.* 78, 98–104. doi: 10.1037/0021-9010.78.1.98

Cretu, R. Z. (2012). A confirmatory approach of the structure of Zimbardo's time perspective concept. *Cogn. Brain Behav.* 16, 481–494.

Cretu, R. Z., and Negovan-Zbăganu, V. (2013). An exploratory approach of the structure of Zimbardo's time perspective concept. *Procedia Soc. Behav. Sci.* 78, 753–757. doi: 10.1016/j.sbspro.2013.04.389

D'Alessio, M., Guarino, A., Pascalis, V. D., and Zimbardo, P. G. (2003). Testing zimbardo's stanford time perspective inventory (STPI)—short form. *Time Soc.* 12, 333–347. doi: 10.1177/0961463X030122010

Danner, D., Treiber, L., and Bosnjak, M. (2019). Development and psychometric evaluation of a short version of the time perspective inventory. *Eur. J. Psychol. Assess.* 35, 172–181. doi: 10.1027/1015-5759/a000382

Díaz-Morales, J. F. (2006). Estructura factorial y fiabilidad del Inventario de Perspectiva Temporal de Zimbardo. [Factorial structure and reliability of Zimbardo Time Perspective Inventory.]. *Psicothema* 18, 565–571.

Flora, D. B., and Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychol. Methods* 9, 466–491. doi: 10.1037/1082-989X.9.4.466

Furr, R. M. (2018). *Psychometrics: An Introduction*, 3rd Edn. Los Angeles, CA: SAGE Publications, Inc.

Furtado, R., Nazari, G., and MacDermid, J. C. (2019). A systematic review of the cross-cultural adaptations and measurement properties of the Shoulder Pain and Disability Index. *Hand Therapy* 24, 107–115. doi: 10.1177/1758998319876953

Hofstede, G., and Bond, M. H. (1988). The confucius connection: from cultural roots to economic growth. *Organ. Dyn.* 16, 5–21. doi: 10.1016/0090-2616(88)90009-5

Hu, L., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equ. Modeling* 6, 1–55. doi: 10.1080/10705519909540118

Jones, J. M., and Brown, W. T. (2005). "Any time is Trinidad time! Cultural variations in the value and function of time," in *Understanding Behavior in the Context of Time: Theory, Research, and Application*, eds A. Strathman and J. Joireman (New York, NY: Psychology Press), 305–323.

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., and Rosseel, Y. (2020). *semTools: Useful Tools for Structural Equation Modeling. R Package Version 0.5-3*. Available online at: https://CRAN.R-project.org/package=semTools (accessed January 11, 2021).

Lewin, K. (1942). "Time perspective and morale," in *Civilian Morale*, ed. G. Watson (Boston, MA: Houghton Mifflin), 48–69.

Lewin, K. (1951). *Field Theory in Social Science: Selected Theoretical Papers*. Oxford: Harpers.

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: comparing robust maximum likelihood and diagonally weighted least squares. *Behav. Res.* 48, 936–949. doi: 10.3758/s13428-015-0619-7

Li, M., Wang, M. C., Shou, Y., Zhong, C., Ren, F., and Zhang, X. (2018). Psychometric properties and measurement invariance of the brief symptom inventory-18 among Chinese insurance employees. *Front. Psychol.* 9:519. doi: 10.3389/fpsyg.2018.00519

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., et al. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Med.* 6, e1000100. doi: 10.1371/journal.pmed.1000100

McKay, M. T., Worrell, F. C., Temple, E. C., Perry, J. L., Cole, J. C., and Mello, Z. R. (2015). Less is not always more: the case of the 36-item short form of the Zimbardo Time Perspective Inventory. *Pers. Individ. Dif.* 72, 68–71. doi: 10.1016/j.paid.2014.08.018

Milfont, T. L., Andrade, P. R., Belo, R. P., and Pessoa, V. S. (2008). Testing zimbardo time perspective inventory in a Brazilian sample. *Interam. J. Psychol.* 42, 49–58.

Muthén, B. (1993). "Goodness of fit with categorical and other non-normal variables," in *Testing Structural Equation Models*, eds K. A. Bollen and J. S. Long (Newbury Park, CA: Sage Publications), 205–243.

Orosz, G., Dombi, E., Tóth-Király, I., and Roland-Lévy, C. (2017). The less is more: the 17-item zimbardo time perspective inventory. *Curr. Psychol.* 36, 39–47. doi: 10.1007/s12144-015-9382-2

Perry, J. L., Temple, E. C., Worrell, F. C., Zivkovic, U., Mello, Z. R., Musil, B., et al. (2020). Different version, similar result? A critical analysis of the multiplicity of shortened versions of the zimbardo time perspective inventory. *SAGE Open* 10:2158244020923351. doi: 10.1177/2158244020923351

Pigott, J. (2018). A zimbardo time perspective inventory (ZTPI) survey of Japanese university students. *Int. J. Soc. Sci. Interdiscip. Stud.* 3, 55–66.

Przepiorka, A., Sobol-Kwapinska, M., and Jankowski, T. (2016). A polish short version of the Zimbardo Time Perspective Inventory. *Per. Individ. Dif.* 101, 78–89. doi: 10.1016/j.paid.2016.05.047

Rosseel, Y. (2012). lavaan: an R package for structural equation modeling. *J. Stat. Softw.* 48, 1–36. doi: 10.18637/jss.v048.i02

Rosseel, Y. (2021). *The Lavaan Tutorial*. Available online at: https://lavaan.ugent. be/tutorial/tutorial.pdf (accessed March 10, 2021).

Schreiber, J. B., Stage, F. K., King, J., Nora, A., and Barlow, E. A. (2006). Reporting structural equation modeling and confirmatory factor analysis results: a review. *J. Educ. Res.* 99, 323–337. doi: 10.3200/JOER.99.6.323-338

Shipp, A. J., Edwards, J. R., and Lambert, L. S. (2009). Conceptualization and measurement of temporal focus: the subjective experience of the past, present, and future. *Organ. Behav. Hum. Decis. Process.* 110, 1–22. doi: 10.1016/j.obhdp. 2009.05.001

Sircova, A., van de Vijver, F. J. R., Osin, E., Milfont, T. L., Fieulaine, N., Kislali-Erginbilgic, A., et al. (2014). A global look at time: a 24-country study of the equivalence of the zimbardo time perspective inventory. *SAGE Open* 4:2158244013515686. doi: 10.1177/2158244013515686

Tabachnick, B. G., and Fidell, L. S. (2013). *Using Multivariate Statistics*, 6th Edn. Boston, MA: Pearson.

Temple, E., Perry, J. L., Worrell, F. C., Zivkovic, U., Mello, Z. R., Musil, B., et al. (2019). The Zimbardo time perspective inventory: time for a new strategy, not more new shortened versions. *Time Soc.* 28, 1167–1180. doi: 10.1177/0961463X17718102

van Hemert, D. A. (2011). "Cross-cultural meta-analysis," in *Cross-Cultural Research Methods in Psychology* (Cambridge University Press), 348–377.

Wang, Y., Chen, X., Cui, J., and Liu, L. (2015). Testing the Zimbardo Time Perspective Inventory in the Chinese context. *Psych J.* 4, 166–175. doi: 10.1002/pchj.103

Wolf, E. J., Harrington, K. M., Clark, S. L., and Miller, M. W. (2013). Sample size requirements for structural equation models: an evaluation of power, bias, and solution propriety. *Educ. Psychol. Meas.* 76, 913–934. doi: 10.1177/0013164413495237

Worrell, F. C., and Mello, Z. R. (2007). The reliability and validity of Zimbardo Time Perspective Inventory scores in academically talented adolescents. *Educ. Psychol. Meas.* 67, 487–504. doi: 10.1177/0013164406296985

Worrell, F. C., Temple, E. C., McKay, M. T., Živković, U., Perry, J. L., Mello, Z. R., et al. (2018). A theoretical approach to resolving the psychometric problems associated with the Zimbardo Time Perspective Inventory: results from the USA, Australia, Slovenia, and the United Kingdom. *Eur. J. Psychol. Assess.* 34, 41–51. doi: 10.1027/1015-5759/a000313

Zhang, J. W., Howell, R. T., and Bowerman, T. (2013). Validating a brief measure of the Zimbardo Time Perspective Inventory. *Time Soc.* 22, 391–409. doi: 10.1177/0961463X12441174

Zimbardo, P., and Boyd, J. (2010). *The Time Paradox: The New Psychology of Time That Will Change Your Life. (Original Work Published 2009 by Free Press, New York)*. Liaoning: Wanjuan Press.

Zimbardo, P. G., and Boyd, J. N. (1999). Putting time in perspective: a valid, reliable individual-differences metric. *J. Pers. Soc. Psychol.* 77, 1271–1288. doi: 10.1037/0022-3514.77.6.1271

Zimbardo, P. G., Keough, K. A., and Boyd, J. N. (1997). Present time perspective as a predictor of risky driving. *Pers. Individ. Dif.* 23, 1007–1023. doi: 10.1016/S0191-8869(97)00113-X

Zimbardo, P., Sword, R., and Sword, R. (2012). *The Time Cure: Overcoming PTSD with the New Psychology of Time Perspective Therapy*. San Francisco, CA: Jossey-Bass.

The Khoekhoegowab Personality Inventory: The Comparative Validity of a Locally Derived Measure of Traits

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Objective: This study explores a personality inventory derived from the results of an indigenous lexical study of personality. From the 272 most commonly used personality descriptors in Khoekhoegowab, the most-spoken of extant *Khoesan* click languages of southern Africa, an 11-factor model of personality-trait structure was identified. Here, the Khoekhoegowab Personality Inventory (KPI) was created based on those results. Its psychometric properties, the convergent and divergent validity of its scales, and its incremental validity over Big Five and Six traits for predicting physical and mental health, religious practice and attitudes, and income are reported.

Methods: Two to five key terms were selected for each of 10 KPI scales: Temperance, Prosocial Diligence, Gossip, Honesty/Morality, Temper, Implacability, Humility, Vanity, Resiliency vs. Agitation, and Courage vs. Fear. These 38 total items were administered to a large sample of adult speakers of Khoekhoegowab in Namibia ($N = 632$), together with five imported inventories translated into Khoekhoegowab: the 30-item Questionnaire Big Six (QB6), General Self-Reported Health, the Cascades Mental Health Assessment, the Satisfaction with Life Scale, the Duke Religion Index. The properties and intercorrelations of KPI subscales are explored, and their predictive ability for the other variables is compared to that of the QB6.

Results: Due to the small number of items on each scale, poor internal consistency was anticipated, but the KPI scales' properties were somewhat better than those of the QB6. R-square change by the inventories as a whole, after accounting for age and gender, indicted that the KPI scales explained more variance than the QB6 scales in almost all criterion variables. Replication of established associations for Big Six traits was mixed: associations were largely as expected for Resiliency, Conscientiousness, and Honesty, but less so for Agreeableness and Extraversion.

Conclusions: The KPI had some advantages over the QB6 in predicting physical and mental health. In particular, the four items of Resiliency vs. Agitation predicted lower scores on all physical and mental problem scales. Given psychological-care needs in Namibia, this might be used as a non-intrusive screener. Measurement challenges common to both surveys are discussed, possible solutions, and the utility of higher-order structures are discussed.

Keywords: Africa, Namibia, majority world, indigenous research, Questionnaire Big Six, comparative validity, psychological disorders, HEXACO

INTRODUCTION

The most common way to measure personality traits around the world now is with Big Five inventories. Inventories based on this model, including dimensions of Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness, have been translated and imported throughout the world, even to hunter-gatherer groups in the Amazon (Gurven et al., 2013). The model, however, was based on lexical studies of personality in the United States, Germany, and the Netherlands (Hofstee et al., 1997), three closely related languages and cultural contexts. The lexical methodology is uniquely well-suited to cross-cultural comparisons that might address the complex question of universality. However, subsequent studies in over a dozen other languages often only tested for the Big Five (as summarized by Thalmayer et al., 2020a, Supplementary Table 1), perhaps to avoid contradicting influential members of the field who insisted on the universality of this model (e.g., McCrae and Costa, 1997). Unsurprisingly, large recent survey studies indicate measurement validity problems for Big Five inventories in the majority world, outside industrialized Western countries (e.g., Ludeke and Larsen, 2017; Laajaj et al., 2019). A six-factor structure (called HEXACO or the Big Six) adding a scale with content related to honesty and integrity vs. taking advantage of others, demonstrated better convergence among a larger group of lexical studies (Ashton et al., 2004; Saucier, 2009), but later evidence suggests this model does not arise everywhere (Thalmayer et al., 2020a,b). The current study explores an alternative approach, creating an "indigenous" personality inventory based on the results of a local lexical study, and comparing it directly to an imported inventory of Big Five and Big Six traits. This builds on prior efforts to assess the significance of local content, for example, the Chinese Personality Inventory, which has been found to provide incremental validity beyond Big Five scales in predicting life, career, and health outcomes in Chinese and Western samples (Cheung et al., 2013).

A recent lexical study of personality explored the most commonly used person-descriptive terms in Khoekhoegowab (Thalmayer et al., 2020a). Khoekhoegowab, literally "the Khoekhoe language," also referred to as Nama, Damara, or Nama/Damara, is the most widely-spoken of ∼15 extant Khoesan (also *Khoisan*) click languages of southern Africa (Haacke, 2011; Güldemann and Fehn, 2014). Two main groups in Namibia, with differing cultural and ethnic backgrounds, speak Khoekhoegowab today. The Damara were hunter-gatherers and later pastoralists related genetically to Bantu speakers (Pickrell et al., 2012; Pakendorf, 2014) who may have lived in the area now known as Namibia before the arrival of Khoisan groups, including the Nama, from other parts of southern Africa (Barnard, 1992). Compared to the Damara, the Nama traditionally had larger clans, more elaborate political organization, and more emphasis on hierarchy and the role of chiefs (Barnard, 1992). Clan memberships and the royal families associated with each are still important in Nama culture. During apartheid, Damara people were restricted to a central and north-western part of the country, and Nama to the southern part of the country around Keetmanshoop and Mariental. While this

separation is no longer maintained by law, it is still largely in place culturally. Currently, Khoekhoe-speakers comprise about 11% of the population in Namibia (Namibia Statistics Agency, 2013), making this the second most-commonly spoken "home language" of the 10 languages that are available in schools and at the university level (Frydman, 2011; Namibia Statistics Agency, 2013).

The exploration of personality description in Khoekhoegowab was initially motivated by basic science, rather than practical, questions. The goal was to build a local model of personality, in addition to those built in Maa and in Supyire-Senufo (Thalmayer et al., 2020b), in order to compile evidence from at least one each of the roughly three main language families in Sub-Saharan Africa, among cultural groups with different ethnographic characteristics in far-separated regions. This approach enabled researchers to represent some of Africa's great linguistic and cultural diversity. These three lexical studies used the same methods that led to the Big Five in English, German and Dutch, so that the replication and "universality" of this and other proposed structural models could be directly tested. However, community samples rather than college students, and a more systematic approach to data analysis, comparing data treatments and rotation strategies directly rather than relying on arbitrary traditions, were implemented. In addition to these important tests of replication for the imported models, the local models identified in these three studies provide insight into the particular concerns and interests of the local populations. The ways that these differ from the Big Five shed light on contextual differences. For example, Extraversion, considered a key distinction in the United States, appears to be of much less importance in African languages. This trait is more likely to be talked about in contexts where there is a lot of interaction with strangers and high relational mobility. Instead, in Supyire-Senufo society, horticulturalists living in small villages in Mali, Diligence vs. Laziness emerged as an important local trait, including a cluster of commonly-used words to denote subtle differences in degree (Thalmayer et al., 2020b). This is the something that a lexical study can tell us: What individual differences have people tended to discuss in this particular context? In North America and Northern Europe we have seen that people discuss qualities related to Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness. But even if these traits can be translated and imported into other contexts, the evidence is that these are not the traits that arise naturally outside a small cluster of Western industrialized societies.

In Khoekhoegowab, a systematic process of comparing potential models of the 272 most-commonly-used person-descriptive terms for robustness led to identification of an "optimal emic model" of 11 factors. The first factor, termed Intemperance (renamed Temperance for the KPI) contrasts substance abuse and other externalizing behaviors with being a religious person. The second, Prosocial Diligence, contrasts readiness to help and work, and attentive, orderly, clean conduct with work avoidance, sloppiness, and laziness. It was moderately correlated with marker scales for Big Five and Big Six Conscientiousness and Agreeableness. Gossip contrasts asking too many questions, spreading lies and rumors, and talking

others down, with being a good and wise person. It had small negative correlation with Agreeableness and Honesty/Propriety marker scales. Immorality (renamed Honesty/Morality here) contrasts being deceitful and dishonest with being trustworthy; it was moderately negatively correlated with Honesty. Bad Temper (renamed Temper) captures a tendency for reactive aggression and anger. This is related to Implacability, which contrasts being envious, difficult, and dissatisfied with being a helpful, humble person, but seems to capture a quieter, rather than openly hostile, side of disagreeableness. They are both moderately correlated with Big Five Agreeableness, but Temper more specifically with Big Six low Agreeableness, which functions to distinguish reactive from predatory aggression (at the low end of Honesty/Propriety; Thalmayer, 2018). Implacability is also moderately negatively correlated with Conscientiousness, suggesting more passive aggression.

A factor termed Predatory Aggression included criminal, sinister, and violent content. Unsurprisingly, this factor was uncorrelated with any imported scales because such evaluative content has typically been excluded from lexical studies and personality inventories. It was also excluded from the KPI for this reason and because the relevant terms are rather offensive; all were deemed unsuitable for a self-report inventory. The eighth and ninth factors made a rather specific distinction. Haughty Self-Respect (renamed Humility here), contrasts pride, haughtiness, arrogance, and positive aspects of self-respect with peripheral loadings related to religiousness, compassion and humility. This factor suggests some ambivalence among Khoekhoe speakers: an appreciation of the merits of dynamic self-confidence, coupled with awareness that such qualities can conflict with a desire to show humility. It was largely uncorrelated with marker scales, suggesting quite culture-specific content. Vanity/Egotism (renamed Vanity here), including terms for vanity, boastfulness, and pretentiousness, indicates a more clearly negative egocentrism and was moderately negatively correlated with Big Five Conscientiousness and Agreeableness, and Big Six Honesty. Resilient vs. Agitated contrasts having a good and happy character with being restless and anxious, was moderately positively correlated with Agreeableness and Resiliency. Courage vs. Fear contrasts positive dynamic courage with being withdrawn, mistrustful, and timid, and was correlated with Big Six Resiliency and Big Five Emotional Stability.

The current study makes an exploration of the potential practical utility of this structural model for traits that were identified in Khoekhoegowab. The 10-factor, 38-item Khoekhoegowab Personality Inventory (KPI) was created drawing on key terms for these dimensions, and its psychometric properties and convergent and divergent validity are assessed and contrasted with those of the 30-item Questionnaire Big Six translated into Khoekhoegowab. We hypothesized in a preregistered analysis plan that overall, the KPI would more strongly associate with criterion variables for physical and mental health (psychological disorders, well-being, physical health) and with religiosity than the Questionnaire Big Six (QB6). Specific associations were hypothesized for the QB6 based on the prior literature for associations with Big Five and Big Six traits from

other cultural contexts, and for KPI based on face validity, detailed below.

MATERIALS AND METHODS

Participants
Participants were 645 adult native speakers of Khoekhoegowab in Namibia. They were recruited from throughout the country, including central, eastern, northern and southern Namibia. Demographic information collected included age, gender, home language, participant and parents' level of schooling, household income, employment level, and location of survey-interview. Details are provided in **Table 1**.

Materials
Aside from the Khoekhoegowab Personality Inventory, the other surveys used in this study were originally created in English. These surveys are the Questionnaire Big Six (QB6), the Duke University Religion Index (DUREL), the Satisfaction with Life Scale (SWLS), the Cascades Mental Health Assessment (CMHA), and General Self-Reported Health (GSRH). They were translated into Khoekhoegowab for this project, involving multiple professional translators, linguists, and native speaker psychologists, following a process using expert panels as defined by the World Health Organization (https://www.who.int/substance_abuse/research_tools/translation/en/).

Khoekhoegowab Personality Inventory (KPI)
To develop this inventory for the current project, 38 terms were chosen from among the 272 administered in the 2018 lexical study. Two to five were chosen for each of 10 factors of the optimal emic model identified in that project (described above). Item selection was from among terms with a loading of 0.30 or higher on the relevant factor; the number of possible items for each factor thus ranged from 7 to 21, with an average of 13.7. Choices within the pool for each factor emphasized the highest loadings on the dimension, and univocal terms (those with cross loadings never above 50% of the main loading), with consideration for the balance of forward and reverse-keyed items—scales were either unipolar (all items loading the same direction) or they included an equal number of forward and reverse-keyed items. We avoided selecting two terms with the same root and we sought coverage of each dimension's content, seeking to incorporate all key aspects.

An instruction was given, a translation version of: "I will read you statements people can use to describe themselves. Each time say how true this is for you." Items were framed into statements using three possible stems depending on the word type: adjective (I am …); verb (I like to …); or noun for a quality (I have …). Items were answered on the same six-point scale used for the QB6, in terms of how true the item is for describing oneself: very untrue, moderately untrue, slightly untrue, slightly true, moderately true, very true.

Given the lack of prior research using this measure, analyses were largely exploratory. Hypotheses were developed based on face validity leading to the following expectations for significant associations:

TABLE 1 | Sample Characteristics.

	Participant		Female-Caregiver		Male-Caregiver	
	n	(%)	*n*	(%)	*n*	(%)
Gender						
Male	303	(47.0)				
Female	342	(53.0)				
Employment status						
Not currently working	236	(36.6)				
Students	139	(21.6)				
Work at home or other unpaid work	67	(10.4)				
Seeking paid work	120	(18.6)				
Occasional paid work	96	(14.9)				
Regular part-time paid work	51	(7.9)				
Regular full-time paid work	226	(35.0)				
Monthly Income in Namibian Dollars						
None	98	(15.3)				
Between N$1 and 500	165	(25.7)				
Between N$500 and 1,500	105	(16.4)				
Between N$1,500 and 3,000	86	(13.4)				
Between N$3,000 and 5,000	56	(8.7)				
Between N$5,000 and 10,000	73	(11.4)				
Over N$10,000	59	(9.2)				
Not reported	3	(0.5)				
Level of Education						
Did not finish primary	28	(4.4)	222	(35.9)	193	(31.7)
Grade 7 primary	67	(10.4)	94	(15.2)	92	(15.1)
Grade 10 secondary	213	(33.1)	139	(22.5)	117	(19.2)
Grade 12 secondary	178	(27.7)	113	(18.3)	117	(19.2)
Vocational after grade 10 or 12	30	(4.7)	18	(2.9)	29	(4.8)
University or diploma	86	(13.4)	12	(1.9)	22	(3.6)
University Bachelor's degree	35	(5.4)	13	(2.1)	20	(3.3)
Masters/post-graduate degree	6	(0.9)	8	(1.3)	18	(3.0)
Not reported	2	(0.3)	26	(4.0)	37	(5.7)

N = 645, aged 18–62 years (M = 34.8; SD = 11.1).

- Temperance: negative with Substance Abuse and being male, positive with DUREL scales and possibly GSRH.
- Prosocial Diligence: positive with Work Engagement, SWLS, possibly GSRH.
- Gossip: positive with Conflict scales.
- Honesty/Morality: positive with DUREL scales, and SWLS.
- Temper: positive with Anger and GSRH.
- Implacability: positive with Anger, negative with DUREL scales and SWLS.
- Humility and Vanity: positive with both Conflict scales.
- Resiliency vs. Agitation and Courage vs. Fear: both positive with CMHA Total, Depression and Anxiety; negative with SWLS and GSRH.

Questionnaire Big Six (QB6)

The 30-item cross-cultural QB6 (Thalmayer and Saucier, 2014) is an inventory assessing six broad personality traits (Conscientiousness, Agreeableness, Honesty/Propriety, Resiliency, Extraversion, Originality/Openness) with five items each. The items were chosen based on evidence of their cross-cultural applicability in a study comparing responses from 26 countries and languages. The instruction before the items were read and the response options were the same as for the KPI.

Prior research with Big Five/Six traits in other cultural contexts provided hypotheses to test for replication in the current study. These are listed here and are graphically displayed in the tables below. In terms of gender, women have been seen to score higher on Extraversion, Agreeableness, Neuroticism (Lippa, 2010). In terms of age, cross-sectional studies of Big Five traits show older people to score higher on Agreeableness, Conscientiousness, and Emotional Stability (Soto et al., 2011). Income and work success have been seen to be higher in those with higher Conscientiousness and Emotional Stability (Ozer and Benet-Martínez, 2006). A meta-analysis of association between religiousness and Big Five traits from 19 countries reported consistent small positive correlations with

Agreeableness, Conscientiousness, and Extraversion (Saroglou, 2010); studies including HEXACO Honesty found it to be positively associated with religiousness generally and with DUREL Intrinsic Religiosity specifically (Aghababaei et al., 2014). The Satisfaction with Life Scale has been shown to positively associate with Emotional Stability and Extraversion (Schimmack et al., 2004). Self-reported health has been associated positively with Conscientiousness and negatively with Neuroticism (Kööts–Ausmees et al., 2016). Associations with common psychological problems reported in large meta-analyses (Malouff et al., 2005; Kotov et al., 2010) include mood disorders with lower Emotional Stability and Extraversion, and substance abuse with lower Conscientiousness and higher Extraversion. Extraversion has been associated with attention problems (Nigg et al., 2002), and low Honesty with substance abuse (Saucier, 2009), aggression toward romantic partners (Mogilski et al., 2019), and violent behavior (Pailing et al., 2014).

The Duke University Religion Index (DUREL)

This 5-item measure of religious engagement was designed to assess religiosity in regards to health and epidemiological outcomes (Koenig and Büssing, 2010). Its three subscales distinguish between three aspects of religiosity: Organized Religious Activity, Non-Organized Religious Activity, and Intrinsic Religiosity. The index has been shown to be a valid and reliable in diverse contexts (Lucchetti et al., 2012; Chen et al., 2014; Hafizi et al., 2014). Responses are on a six-point Likert scale with slightly different terminology linked to numerical values for each question. The total score had good reliability in this sample, $\alpha = 0.82$.

The Satisfaction With Life Scale (SWLS)

This 5-item measure assesses well-being in terms of global cognitive judgments of satisfaction with one's life (Diener et al., 1985). The scale had acceptable reliability in this sample, $\alpha = 0.74$.

General Self-Reported Health (GSRH)

Physical health was rated with one item "In general, would you say your health is...?" on a 5-point scale from poor to excellent. A meta-analysis of 22 studies has shown this one-item self-assessment to correlate highly with longer or more invasive measures of health status and to be strongly associated with risk of death over 5 years (DeSalvo et al., 2006).

Cascades of Mental Health Assessment (CMHA)

The Cascades Mental Health Assessment [CMHA; Thalmayer et al. (in preparation)] is a 59-item, 9-subscale measure of common psychological problems designed for screening in a normal adult population. Items are specific and behavioral, and the response scale assesses concrete frequency in terms of days out of the last month. These qualities are intended to help avert reference group effects to maximize validity in particular when comparing across groups (linguistic, national, gender, education level, etc.). The items can be combined into a total score or divided into 10 subscales: Substance Abuse, Anxiety, Depression, Post-Traumatic Stress, Stress, Sleep Issues, Anger, Work Disengagement, Interpersonal Conflict, and

Partner Conflict. For this study, additional items to measure attention problems (5 items) and psychosis (2 items) were adapted from other inventories and included for a total of 64 items administered.

Procedure

This study was part of a larger data collection effort in three languages conducted in Namibia in 2019. The full project administered surveys also to speakers of English and of Oshiwambo, but the KPI was only administered to Khoekhoegowab-speakers and only this sample is reported on here. Ethical review of the study plan was made by University of Namibia and a research permit was issued by Namibia's National Commission on Research Science and Technology. A team of 15 interviewers recruited participants and collected 20–100 surveys each. Interviewers were graduates of the psychology programs of the University of Namibia and primary- or secondary-level schoolteachers of the Khoekhoe language. Almost all interviewers had previously collected data with the same research team. Data collection occurred in the 8-week period following a training weekend. Written informed consent was obtained from all participants. The surveys were conducted as private interviews of $\sim$40 min each, with the interviewer reading the questions to participants and referring to response options both verbally and in a written form, on a sheet shown to participants. This is because while Khoekhoe is the mother tongue spoken by participants and commonly used in social and business contexts in the areas where interviews occurred, schooling is often in English (Afrikaans until 1990), and thus many participants are not highly literate in their mother tongue. Interviewers noted on surveys their own name, the area in which the interview occurred, and the gender they perceived the participant to be. They asked participants to report their home language, age, employment status, and household income and their own and their parents' (or caregivers') level of schooling. No other identifying information was recorded.

Analyses
Data Exclusions

Based on criteria described in the pre-registered analysis plan, 37 of 682 total cases were excluded from analysis. This was due to: being marked for exclusion by the interviewer, either because it was not completed or because the interviewer felt that it was not reliably completed ($n = 2$); participant under age 18 ($n = 2$); more than 15% of responses missing ($n = 7$); all CMHA items given same response ($n = 13$); standard deviation on QB6 <0.50, indicating virtually no variation in responses ($n = 2$); extreme outlier on person-to-total correlations for QB6 and CMHA, indicating likely random responding ($n = 11$). This left an analytic sample of 645 cases.

Scale Exploration

The properties of the KPI and the QB6 were assessed and explored using standard psychometric indices, parallel analysis (O'Connor, 2000), and principal components analysis (PCA). The fit of each inventory to its intended structure was additionally assessed using confirmatory factor analysis (CFA).

Associations and Comparative Validity

The zero-order Pearson correlations among the personality scales and between personality scales and the other measures are reported. In multiple regression analyses for each criterion, age and gender were entered at step one and the set of scales for the KPI and separately for the QB6 were entered at step two. Prediction was at the level of scores on each inventory in part to minimize Type I error. Results are reported in terms of an overall change in R^2 after accounting for age and gender. Scales within each inventory with a coefficient significant at $p < 0.01$ or 0.05 are noted. Additionally, incremental validity for the KPI over the QB6 was directly tested by entering age, gender, and all QB6 scales at step one, and KPI scales at step two.

RESULTS

Scale Properties and Exploration

Psychometric properties of the KPI and QB6 are reported in **Table 2**. Due in part to the small number of items on each scale, poor internal consistency was anticipated. In fact, the KPI scales' alpha values for eight of the 10 scales (0.34 to 0.66) were generally better than those of the slightly longer QB6 scales (0.26 to 0.53). Two KPI scales had quite low alpha values: Resiliency vs. Agitation (0.27) and Courage vs. Fear (0.03). Resiliency vs. Agitation included two moderately-correlated pairs of items: two forward-keyed items, referring to being tolerant and of a happy disposition, and two reverse-keyed items, about being restless, fidgety and anxious. These pairs were virtually uncorrelated with each other. Courage vs. Fear had the same structure, with two items referring to being adept and brave, and two to being jumpy and standoffish. In this case, however, all correlations were quite low (0.00–0.14).

Although 10 factors were expected for the 38 items of the KPI and six for the 30 items of the QB6, in both cases parallel analysis suggested that only five factors in raw data and eight factors in ipsatized data were larger than would be expected by chance in a dataset of this size. Inspection of the rotated factors in PCA for models of the intended and suggested sizes indicated that many respondents appeared to have had a tendency to "perseverate" on a specific response. The items for both inventories were presented in a set order from a printed page. In both cases, items from different subscales were separated, such that, for example, Agreeableness items on the QB6 appeared next to Extraversion and Resiliency items, but never next to each other. However, PCA results revealed a tendency for items with subsequent numbers to appear on the same components. This suggests that some participants may have tended to repeat an answer, perhaps because the items were hard to relate to themselves or out of a lack of an opinion on what answer to give. After calculating an indicator of perseveration (by summing the squared differences between every pair of adjacent items, for an overall indicator in which lower scores indicate a higher degree of perseveration across items), *post hoc* exploration suggested that removing the 20% of cases with the most extreme scores reduced this pattern to some extent. However, subsequent analyses reported here used the original intended data.

CFA fit for the QB6 in Khoekhoegowab, χ^2 (390) = 2109.01, RMSEA 0.086 (CI: 0.083, 0.090), SRMR = 0.085 CFI = 0.688, TLI = 0.652, was slightly poorer than that of the KPI χ^2 (620) = 3,550, RMSEA 0.088 (CI: 0.085, 0.091), SRMR = 0.095 CFI = 0.764, TLI = 0.733. Neither met standard benchmarks for good fit (e.g., Hu and Bentler, 1999) but they compare favorably to those typically seen for multi-dimensional personality inventories, even in the language of their original development (Hopwood and Donnellan, 2010) and to the QB6 in other translations (Thalmayer and Saucier, 2014).

The correlations and intercorrelations of the KPI and the QB6 subscales are reported in **Table 3**. KPI scales were in some cases moderately associated with each other, with intercorrelations of <0.10 to just over 0.50 in magnitude. These patterns of correlation suggest "clusters." Five subscales, namely Temperance, Prosocial Diligence, Gossip, Honesty/Morality, and Implacability inter-correlate with magnitudes of about 0.33 to 0.55 with each other. Humility and Vanity form a moderately correlated pair ($r = 0.51$). To a lesser extent, Resiliency vs. Agitation belongs to the first group, and Temper associates with both groups.

Moderate correlations of 0.30 to 0.50 between KPI and QB6 scales suggest similar patterns to those reported by Thalmayer et al. (2020a, Table 3), in that case between the full factor scores from the lexical PCA analyses, with marker scales for the Big Five and Six drawn from Khoekhoegowab terms. In the current data, Temperance is again moderately correlated with Conscientiousness, here also with Honesty but not with Extraversion. Prosocial Diligence is again moderately correlated with Conscientiousness, but less so here with Agreeableness; Gossip again with Honesty, now also Conscientiousness; Honesty/Morality again with Honesty, now also Conscientiousness but not Agreeableness; Temper again with Agreeableness but not Extraversion; Implacability again with Conscientiousness, now also Honesty, but not Agreeableness. The four remaining scales had no moderate correlations with Big Six scales, although in the prior data Resiliency vs. Agitation and Courage vs. Fear correlated with Resiliency. Moderate correlations were also seen in the prior study for Vanity with Big Five (but not Big Six) Conscientiousness, and for both Vanity and Resiliency vs. Agitation with Big Five (but not Big Six) Agreeableness. Humility was not correlated with outside traits in either study.

Associations and Comparative Validity

Zero-order Pearson correlations between the KPI and QB6 scales and demographic and criterion variables are reported in **Table 4**. R^2 change for predicting criterion variables with the personality inventories after accounting for age and gender are reported in **Table 5**. For all outcome variables with both personality inventories, the change in R^2 was always significant at $p < 0.001$. Together, the KPI scales predicted from a low of 6% (income) to a high of 34% (CMHA total score) of the variance in criterion variables. The range for the QB6 scales as a whole was slightly lower, from 5% (life satisfaction) to 25% (CMHA Total Score). The change in R^2 values for the two inventories for the 18 criterion variables/scales is displayed graphically in **Figure 1**. For

TABLE 2 | Psychometric Properties of the Khoekhoegowab Personality Inventory (KPI) and Questionnaire Big Six (QB6) in Translation to Khoekhoegowab.

	N	items	*M*	*SD*	α	α standardized	v.i *r*
Khoekhoegowab Personality Inventory							
Temperance	640	5	2.35	1.00	0.634	0.631	0.024
Prosocial Diligence	639	4	4.87	0.96	0.595	0.602	0.007
Gossip	642	2	2.10	1.20	0.644	0.644	-
Honesty/Morality	640	4	2.23	1.04	0.652	0.657	0.005
Temper	639	4	3.08	1.22	0.664	0.665	0.007
Implacability	638	5	2.31	0.83	0.465	0.471	0.007
Humility	642	3	3.50	1.10	0.344	0.340	0.007
Vanity	641	3	3.12	1.26	0.572	0.572	0.000
Resiliency vs. Agitation	640	4	4.21	0.85	0.285	0.273	0.044
Courage vs. Fear	639	4	3.66	0.86	0.031	0.034	0.010
Questionnaire Big Six							
Agreeableness	632	5	3.37	0.87	0.371	0.370	0.010
Extraversion	633	5	3.85	0.82	0.255	0.253	0.008
Originality	629	5	4.13	0.77	0.270	0.292	0.012
Resiliency	641	5	3.38	0.84	0.335	0.326	0.020
Conscientiousness	634	5	4.25	0.94	0.533	0.532	0.003
Honesty	637	5	4.34	0.97	0.497	0.501	0.008

v.i.r, variance of inter-item correlations, where lower values indicate better unidimensionality (Clark and Watson, 1995).

almost all criteria, the KPI scales explained more variance than the QB6 scales. Direct tests of incremental validity for the KPI over the QB6, also shown in **Table 5** and **Figure 1**, indicate that this was significant for all outcome criteria except for income. The KPI predicted from a low of 4% (life satisfaction) to a high of 14% (Substance Abuse) over and above the QB6 scales, age, and gender.

In **Tables 4**, **5**, the hypotheses detailed above in methods are indicated along with the observed associations. In **Table 5**, the significant scale coefficients are shown graphically. There it can be seen that in total, 35 "face valid" predictions were made for specific KPI scales. Of these, 16 were supported, and 19 were not. Temperance was indeed positively associated with the DUREL scales and negatively with Substance Abuse, but not with GSRH. Additionally, Temperance was positively associated with life satisfaction and negatively associated with income, CMHA total, and Sleep. Prosocial Diligence was indeed positively associated with GSRH, but not with SWLS or Work Disengagement, and it also associated positively with Intrinsic Religiosity and Sleep. Gossip was indeed correlated with Interpersonal, but not with Partner Conflict. Honesty/Morality was not associated with the DUREL scales or SWLS, but instead it predicted fewer problems on the CMHA: total score, Work Disengagement, Substance Abuse, Anger, both conflict scales, and Psychosis. Temper was not associated with Anger or GSRH, but instead with poorer Sleep. Implacability was indeed negatively associated with two of the three DUREL scales, but not with life satisfaction or Anger, and instead predicted more Partner Conflict. Humility did predict more Interpersonal but not more Partner Conflict, and additionally CMHA total and Stress. Vanity predicted less rather than more Interpersonal Conflict, and did not associate with Partner Conflict. Resiliency vs. Agitation had more significant

coefficients for criterion variables than any other KPI scale, suggesting its relevance to mental health. As predicted, scores on this scale associated with better self-reported health and lower CMHA total, Depression, and Anxiety scores. They did not associate significantly with life satisfaction, but instead associated with higher income and with lower scores on every CMHA scale. Courage vs. Fear was indeed positively associated with self-reported health and life satisfaction, but not with any CMHA scales; instead, with all DUREL scales.

A total of 35 predictions were also made for specific QB6 scales based on associations established in prior literature. The six of these related to age and gender are only visible in **Table 4**; all others are interpreted based on the regression results in **Table 5**. Of these predictions, 21 were supported and 14 were not. Women in Namibia did not score higher on Extraversion, Agreeableness, or Neuroticism, and older people did not score higher on Agreeableness, Conscientiousness, or Emotional Stability. Income, however, was indeed higher for those higher in Conscientiousness, though not for Resiliency, and it was also higher for those higher in Originality/Openness. Self-reported health was associated as expected with Conscientiousness and Resiliency, and it was also associated with Originality/Openness and Honesty/Propriety. Life satisfaction was positively associated with Resiliency, as expected, but not with Extraversion and instead with Conscientiousness. For religiousness, hypotheses were largely met—there were positive associations for the DUREL total score (also for Religious Activity, though specific hypotheses had not been made for that scale) with Agreeableness, Conscientiousness, and Honesty, though not with Extraversion, though Extraversion was associated with the Intrinsic Religiosity subscale. The specific association between DUREL Intrinsic Religiosity with Honesty was also replicated; this subscale was

TABLE 3 | Khoekhoegowab Personality Inventory (KPI) and Questionnaire Big Six (QB6) Scale Correlations and Intercorrelations.

KPI	Khoekhoegowab Personality Inventory										QB6				
	1	2	3	4	5	6	7	8	9	10	A	E	O	R	C
1 Temperance															
2 Prosocial Diligence	**0.50**														
3 Gossip	**−0.38**	**−0.41**													
4 Honesty/Morality	**−0.51**	**−0.55**	**0.54**												
5 Temper	**−0.33**	−0.26	0.28	**−0.48**											
6 Implacability	**−0.48**	**−0.54**	**0.37**	**−0.48**	**0.38**										
7 Humility	−0.16	−0.05	0.16	−0.24	**0.34**	0.15									
8 Vanity	−0.19	−0.12	0.27	−0.30	**0.33**	0.26	**0.51**								
9 Resiliency vs. Agitation	**0.32**	**0.31**	−0.24	**0.34**	**−0.34**	**−0.41**	−0.03	−0.13							
10 Courage vs. Fear	0.09	0.15	−0.07	0.11	0.00	−0.07	0.05	0.10	0.21						
QB6															
Agreeableness	0.15	0.12	−0.07	0.17	**−0.48**	−0.20	−0.17	−0.11	0.18	−0.01					
Extraversion	0.10	0.21	−0.05	0.11	−0.04	−0.15	0.04	0.04	0.12	0.15	0.03				
Originality	0.28	**0.32**	−0.19	0.22	−0.12	−0.26	0.07	0.07	0.28	0.14	0.15	0.17			
Resiliency	0.01	−0.09	0.02	0.06	−0.17	−0.05	−0.07	−0.07	0.30	0.20	0.17	0.01	0.09		
Conscientiousness	**0.44**	**0.50**	**−0.32**	**0.39**	−0.15	**−0.39**	−0.05	−0.13	0.27	0.15	0.06	0.09	**0.32**	0.08	
Honesty	**0.42**	**0.46**	**−0.33**	**0.46**	−0.25	**−0.39**	−0.14	−0.21	0.28	0.09	0.12	0.13	0.29	0.07	**0.43**

Moderate correlations ≥0.30 in magnitude are bolded for emphasis.

additionally positively associated with Conscientiousness, and negatively with Resiliency.

For psychological problems, the six expected negative associations with Resiliency were found (CMHA total, Sleep, Stress, Depression, Anxiety, and Post-Traumatic Stress); not surprisingly, associations with Resiliency were also significant for Work Engagement, Interpersonal Conflict and attention problems. Likewise both Conscientiousness and Honesty associated negative as expected with three (Work, Substance Abuse, Attention) and four (Substance Abuse, Anger, Interpersonal and Partner Conflict) subscales, respectively, in addition to seven others each: Lower CMHA total score, Depression, Anxiety, and Psychosis for both, additionally the anger and conflict scales for Conscientiousness and Stress, Post-Traumatic Stress, and Attention for Honesty. Agreeableness did not associate negatively with Conflict and Anger, but instead positively with Stress. Extraversion did not associate with Substance Abuse, nor with any other disorder scale. Openness, as expected, was not associated with any psychological disorder scales.

DISCUSSION

This study describes the development and exploration of an indigenous personality inventory tailored to a specific context, Khoekhoegowab-speakers in Namibia. The 10-factor, 38-item Khoekhoegowab Personality Inventory (KPI) was derived from the results of an indigenous lexical study, and thus theoretically should capture domains of more relevance to the local society. The KPI was compared to Big Five and Big Six traits in terms of

their explanatory power for physical health, mental health, well-being and religious engagement, and in terms of demographic items including income. It was hypothesized that the KPI would have better measurement properties in this local context, as well as better predictive validity, similar to the incremental validity seen for the Chinese Personality Inventory, beyond imported scales in predicting important life outcomes in both Chinese and in Western samples (Cheung et al., 2013).

The KPI scales' internal consistency was generally slightly better than that of the QB6 scales, supporting this hypothesis. However, two KPI scales, Resiliency vs. Agitation and Courage vs. Fear, had very low internal consistency. As noted above, each of these scales had two separate content components, which were virtually uncorrelated with each other. Low interitem correlations are not necessarily disqualifying for a short unidimensional scale, and do not harm predictive ability. As a case in point, Resiliency vs. Agitation had more significant associations with outcome criteria (16 total) than any other KPI scale, suggesting that these items are strongly predictive of the physical and mental health outcomes of interest in this study. Courage vs. Fear also had five significant coefficients with regard to outcome criteria: with self-reported health, life satisfaction, and the three DUREL scales. These were not the associations anticipated for this scale, however. Future work should better explore the local meaning and usage of the terms on the Courage vs. Fear scale. Notably, one of its items |aexa was translated in the dictionary as "fiery, ardent," but qualitative exploration by Thalmayer et al. (2020a) suggested that the term has taken on contemporary meaning of "adept, skilled, exceptional, masterful, in relation to a domain of expertise." While this new definition was derived from informants throughout the country, they

TABLE 4 | Correlations Between Personality Scales and Demographic and Criterion Variables.

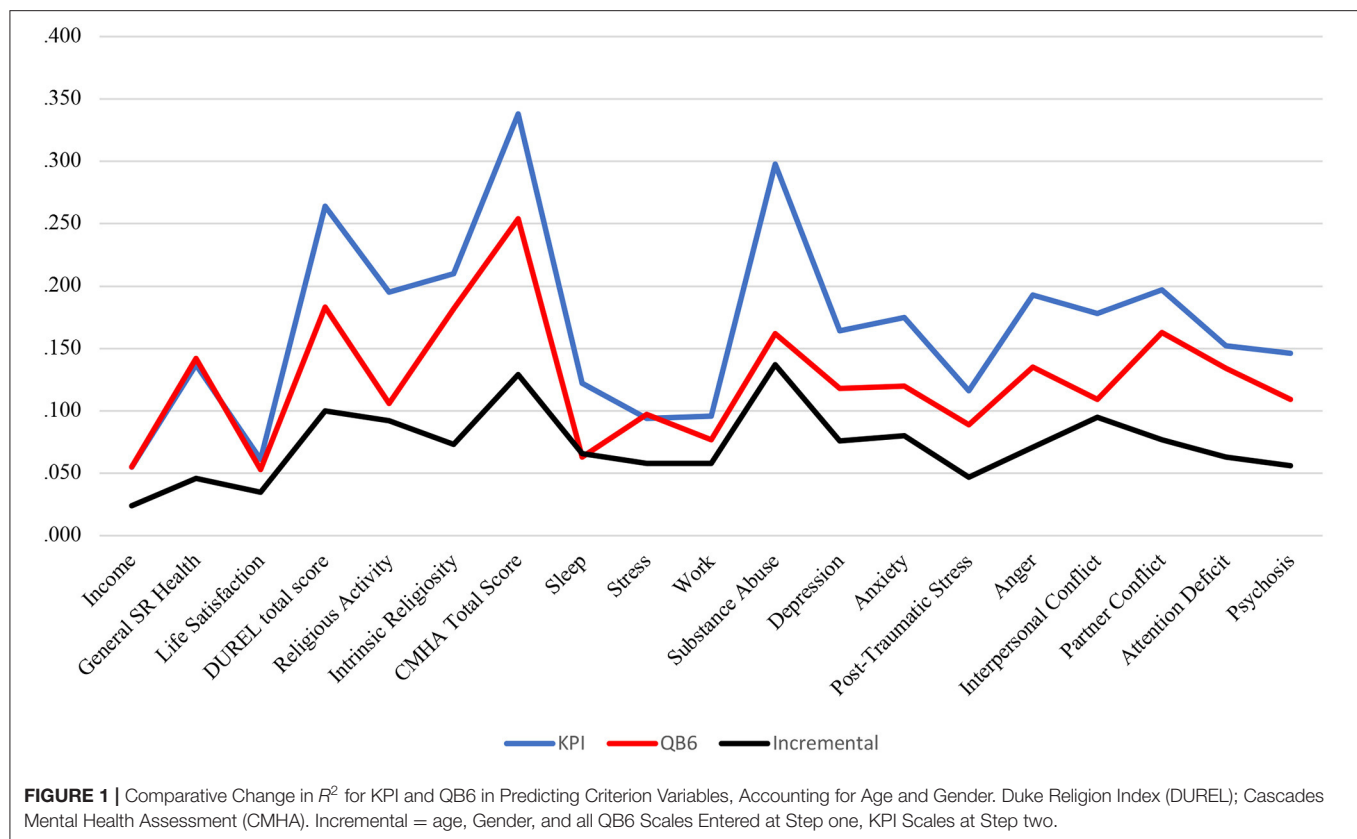|	Khoekhoegowab Personality Inventory										Questionnaire Big Six					
	1	2	3	4	5	6	7	8	9	10	A	E	O	R	C	H
Age	0.10	0.03	0.03	0.10	−0.12	−0.06	−0.21	−0.11	0.03	0.13	0.06	0.05	−0.04	0.13	0.05	0.08
Gender	−0.17	−0.13	−0.08	−0.12	0.02	0.06	0.11	0.02	0.00	0.01	−0.05	−0.06	−0.05	0.16	−0.08	−0.14
Income	0.17	0.08	−0.03	0.13	−0.06	−0.13	−0.05	0.00	0.17	0.13	0.03	0.02	0.15	0.11	0.18	0.15
Education	0.14	0.05	−0.07	0.13	−0.12	−0.07	−0.01	0.01	0.14	0.04	0.03	−0.02	0.28	0.12	0.18	0.13
General SR Health	0.18	0.24	−0.22	0.17	−0.07	−0.21	0.08	0.03	0.25	0.17	0.00	0.04	0.23	0.14	0.29	0.20
Life Satisfaction	0.17	0.08	−0.05	0.11	−0.06	−0.10	0.07	0.05	0.13	0.14	0.03	0.02	0.13	0.11	0.18	0.13
DUREL Total Score	**0.48**	**0.38**	−0.22	**0.36**	−0.18	**−0.35**	−0.06	−0.12	0.27	0.18	0.13	0.12	0.21	−0.02	**0.38**	**0.37**
Religious Activity	**0.44**	0.29	−0.17	0.28	−0.16	−0.24	−0.04	−0.08	0.22	0.16	0.13	0.06	0.20	0.03	**0.31**	0.26
Intrinsic Religiosity	**0.38**	**0.37**	−0.20	**0.34**	−0.14	**−0.36**	−0.06	−0.12	0.24	0.15	0.09	0.14	0.16	−0.06	**0.33**	**0.38**
CMHA Total Score	**−0.38**	**−0.33**	**0.33**	**−0.42**	0.29	**0.37**	0.15	0.17	**−0.46**	−0.15	−0.05	−0.07	−0.20	−0.23	**−0.42**	**−0.38**
Sleep	−0.11	−0.02	0.09	−0.14	0.19	0.11	0.08	0.07	−0.29	−0.12	−0.07	−0.03	−0.06	−0.25	−0.11	−0.10
Stress	−0.03	−0.02	0.09	−0.07	0.11	0.11	0.07	0.04	−0.25	−0.10	0.07	−0.03	−0.02	−0.27	−0.06	−0.09
Work Disengagement	−0.12	−0.10	0.12	−0.19	0.17	0.14	0.09	0.06	−0.23	−0.08	0.03	−0.05	−0.05	−0.16	−0.21	−0.13
Substance Abuse	**−0.53**	**−0.35**	0.28	**−0.38**	0.20	**0.31**	0.11	0.14	−0.28	−0.08	−0.06	−0.07	−0.21	0.00	**−0.33**	**−0.37**
Depression	−0.19	−0.21	0.18	−0.25	0.17	0.25	0.09	0.08	**−0.37**	−0.11	−0.04	−0.10	−0.17	−0.22	−0.24	−0.22
Anxiety	−0.21	−0.18	0.17	−0.26	0.22	0.23	0.12	0.14	**−0.37**	−0.16	−0.06	−0.08	−0.09	−0.25	−0.20	−0.25
Post-Traumatic Stress	−0.16	−0.16	0.13	−0.23	0.21	0.17	0.15	0.16	−0.28	−0.14	−0.06	−0.02	−0.08	−0.23	−0.16	−0.21
Anger	**−0.31**	**−0.33**	0.26	**−0.37**	0.27	**0.33**	0.08	0.11	−0.27	−0.12	−0.07	−0.12	−0.13	−0.03	−0.29	**−0.31**
Interpersonal Conflict	−0.26	−0.22	0.27	**−0.32**	0.24	0.28	0.14	0.09	**−0.31**	−0.08	−0.03	−0.09	−0.14	−0.14	−0.25	−0.25
Partner Conflict	−0.24	−0.26	0.27	**−0.34**	0.19	**0.34**	0.01	0.12	−0.28	−0.12	−0.04	−0.09	−0.16	−0.07	**−0.33**	**−0.34**
Attention Deficit	−0.28	−0.21	0.20	−0.28	0.26	0.23	0.16	0.15	−0.29	−0.12	−0.10	0.00	−0.17	−0.21	−0.29	−0.23
Psychosis	−0.25	−0.24	0.24	**−0.33**	0.18	0.26	0.12	0.11	−0.25	−0.14	−0.02	−0.07	−0.11	−0.08	−0.25	−0.28

Khoekhoegowab scales: 1 Temperance; 2 Prosocial Diligence; 3 Gossip; 4 Honesty/Morality; 5 Temper; 6 Implacability; 7 Humility; 8 Vanity; 9 Resiliency vs. Agitation; 10 Courage vs. Fear. QB6 Scales: A, Agreeableness; E, Extraversion; O, Originality; R, Resiliency; C, Conscientiousness; H, Honesty. Moderate correlations ≥0.30 in magnitude are bolded for emphasis. Hypothesized associations are underlined.

constitute a small sample ($n = 14$). It is possible that more than one meaning was understood for this term, if not for others, among the current study's participants. Using terms with more stable meanings on the KPI might improve measurement properties and lead to more logical and consistent associations.

A measurement issue common to both the KPI and QB6 was revealed by PCA: many respondents appear to have "perseverated," giving the same response for several subsequent items before changing to a new response. Future analyses should compare this tendency to that in other inventories administered to this and similar samples, where survey research is less familiar than in Western contexts. For a unidimensional inventory such as the SWLS or one with subscales that are expected to correlate and together form a relevant total score, such as the CMHA or DUREL, such a response bias might conceivably improve measurement characteristics rather than attenuate them. This bias would also be nearly invisible where items are administered in a random order, for example in an online survey. The true extent of this tendency may thus be best diagnosed in exactly this context, where items from scales that should not theoretically correlate are presented next each other in a fixed format. Future work could explore this and other response biases (acquiescence, extremeness, moderacy, social desirability, random responding) further. For example, more extensive qualitative piloting could be helpful. Participants could be administered surveys like the

KPI and QB6 orally, asking for open-ended responses about how items are perceived and how an answer was arrived at. This might reveal which items are understood as intended and which lead to answers that are basically "guesses" because they are difficult for many participants to relate to their lives. Additionally, qualitative work that asks for free expression in the description of the self and others could make it more obvious how terms are understood and used in context. Strategies that use behavior observations instead of self-report would also be fruitful to explore further.

Along these lines, it is worth considering some particular issues related to the QB6. This inventory was built from items of the International Personality Item Pool (IPIP; https://ipip.ori. org/). This research collaborative was founded in 1992 at the time of the "birth" of the Big Five, and it was based on a goal, to make personality research more open and collaborate across cultures, likely shared by the authors of articles in this special issue. However, like the research base of the Big Five, the international component of the IPIP in practice meant inclusion of German and Dutch items and researchers along with those from North America. Not surprisingly then, IPIP items show themselves to have significant limitations when translated to non-Western contexts; they do not appear to offer particular "international" advantages. They use double negatives, terms such as "rarely" to indicate negation, and colloquialisms, i.e., key terms understood in peculiar ways by contemporary Westerners, all of which are

FIGURE 1 | Comparative Change in R^2 for KPI and QB6 in Predicting Criterion Variables, Accounting for Age and Gender. Duke Religion Index (DUREL); Cascades Mental Health Assessment (CMHA). Incremental = age, Gender, and all QB6 Scales Entered at Step one, KPI Scales at Step two.

hard to translate effectively. In our case, these items appeared to be hard for participants to consistently understand despite exhaustive efforts to translate them well. An alternative to complex items was tried here, in the form of the single adjectives used on the KPI. It is possible that the lower internal consistencies for QB6 scales could be due to the complexity of the items, and/or due to the concepts being imported and therefore less relevant and understandable to participants. It is not possible to disentangle those effects in this study, but future work should seek to do so.

Five KPI subscales, Temperance, Prosocial Diligence, Gossip, Honesty/Morality, Implacability, inter-correlate with magnitudes of about 0.37 to 0.55 with each other. Humility and Vanity are also a moderately correlated pair. This is not disqualifying for the retention of the 10 KPI subscales: in fact it is the same level at which Big Five Agreeableness, Conscientiousness, and Neuroticism often correlate with each other (e.g., 14 correlation matrices analyzed by Digman, 1997), which is discussed further below, in terms of its facilitation of useful higher order structures, and how these might provide an integrative framework for highly diverse local inventories. At this early stage of scale development, however, it could also be a topic worthy of future work. A limitation of this project to develop the KPI is the small pool of items that were used—with only two items on one scale and only three on two other scales, there is limited potential to drop items to improve psychometric properties. In this sense this study might be viewed as a "pilot" effort to assess the potential for a KPI,

and a future study might include a much larger pool of items, and perhaps also short phrases that can more precisely represent the combinations of content in the factor.

As noted, however, orthogonal factors may not be a reasonable standard for a personality inventory, and it is not one that the Big Five meets. The regular pattern of correlations among the Big Five factors has led to their association in two-factor models (e.g., Digman, 1997; DeYoung, 2006). A higher-order structure of the KPI might be similarly logical. Moderate support in the Khoekhoe lexical study (Thalmayer et al., 2020a) for the Big Two (Saucier et al., 2014) and a Pan-Cultural Three model (De Raad et al., 2014) suggest the potential for a higher order structure of the KPI to converge with that of the Big Five/Six, and/or that of lexical studies in many languages. We made a *post hoc* assessment to compare factor scores for a two-factor model of KPI items to a "Big Two" derived from the QB6 scales. Agreeableness, Honesty, and Conscientiousness were combined to estimate Social Self-Regulation, which correlated $r = 0.52$ with the first rotated factor of KPI items; Extraversion and Originality/Openness were combined to estimate Dynamism, which correlated $r = 0.38$ with the second rotated factor of KPI items, indicating some potential.

Future work should assess the relation between the KPI and higher-order models using a more appropriate measure of the Big Two, and should additionally explore its association with cross-cultural three-factor models. Additional KPI items might be added to improve this capability for integrating results. Despite the loss of predictive capability when going to fewer

TABLE 5 | R-Square Change for Criterion Variables After Age, Gender for Inventories as a Whole, Indicating Significant Coefficients by Scale.

	KPI	QB6	Incr.	Khoekhoegowab Personality Inventory												Questionnaire Big Six							
				Age	Male	1	2	3	4	5	6	7	8	9	10	Age	Male	A	E	O	R	C	H
Income	**0.055**	**0.055**	*0.024*	++	+	–								+		++					++	+	
General SR Health	**0.137**	**0.142**	**0.046**	—	++		+							++	++	—	++				++	++	++
Life Satisfaction	**0.061**	**0.053**	*0.035*	–		++									+					+		+	++
DUREL Total Score	**0.264**	**0.183**	**0.100**			++					–			+	+	++	–	+					++	++
Religious Activity	**0.195**	**0.106**	**0.092**	–		++								+	+		–	+					++	+
Intrinsic Religiosity	**0.210**	**0.182**	**0.073**			++	+				—			+			+			+	–	++	++
CMHA Total Score	**0.338**	**0.254**	**0.129**	–		—			–			+		—		–					—	—	—
Sleep	**0.122**	**0.063**	**0.066**				+			+				—							—		
Stress	**0.094**	**0.097**	**0.058**									+		—				++			—		–
Work Disengagement	**0.096**	**0.077**	**0.058**					–						—							—	—	
Substance Abuse	**0.298**	**0.162**	**0.137**		+	—		–						—			+				—	—	—
Depression	**0.164**	**0.118**	**0.076**											—							—	—	—
Anxiety	**0.175**	**0.120**	**0.080**											—							—	–	—
Post-Traumatic Stress	**0.116**	**0.089**	*0.047*	–										—		—					—		—
Anger	**0.193**	**0.135**	**0.071**				–					–											—
Interpersonal Conflict	**0.178**	**0.109**	**0.095**	–	–				+	–		+	–				–				–	—	
Partner Conflict	**0.197**	**0.163**	**0.077**	–					—		++			–								—	
Attention Deficit	**0.152**	**0.134**	**0.063**	–			–							—		—						—	–
Psychosis	**0.146**	**0.109**	**0.056**					—						—		–						—	—

Khoekhoegowab scales: 1 Temperance; 2 Prosocial Diligence; 3 Gossip; 4 Honesty/Morality; 5 Temper; 6 Implacability; 7 Humility; 8 Vanity; 9 Resiliency vs. Agitation; 10 Courage vs. Fear. QB6 Scales: A, Agreeableness; E, Extraversion; O, Originality; R, Resiliency; C, Conscientiousness; H, Honesty. Bolding for change in R^2 indicates it was significant at $p < 0.01$, italics indicate that it was significant at $p < 0.05$. Incr. = age, gender, and all QB6 scales entered at step one, KPI scales at step two. Hypothesized associations are shaded in gray. For coefficients, ++ / — means it was significant at $p < 0.01$; +/– = coefficient suggestive at $p < 0.05$.

factors, the potential for comparing results with such an approach is important. A disincentive to using indigenous personality inventories is the difficulty of comparing results across contexts. Their integration into simpler, higher-order structures that can be compared at a broad level would provide a key to cross cultural personality research, and a practical alternative to simply exporting the Big Five. This might help personality psychologists to more warmly welcome the rich diversity that naturally arises among contexts, and which illustrates the fascinating ways that human beings have adapted to varied contexts.

For almost all criteria, the group of KPI scales explained more variance than the group of QB6 scales. This is natural given its larger number of items (38 instead of 30). The KPI also had more variables, 10 instead of six. Does this make for an unfair comparison? It has been established that narrower facets have better predictive power (e.g., Mõttus et al., 2017), and we believe that more specific subscales are an advantages of the KPI over the Big Five/Six traits. We believe, however, that this advantage for specificity and more subscales would only temper the results to the extent that more items are used in order to have narrower scales. For predictive efficiency, what's important is the number of items and not the number of variables into which those items are aggregated (illustrated, for example, in Saucier et al., 2020). Including more variables that are relatively independent of one another is an established way to improve prediction; this is an important argument in favor of higher-dimensionality models of personality attributes beyond five or six traits (Saucier and Iurino, 2020).

Hypotheses for specific associations for the KPI, based on face validity and tested in terms of significant regression coefficients, were less likely to be met than those for the QB6, which were based on prior literature. This is unsurprising given that the Big Five and the Big Six have been explored and honed in hundreds if not thousands of studies; personality psychologists know their contours well. The KPI is based on the results of a single prior study and as such is experimental and not yet well-defined. Thus, the tests of associations for the KPI were exploratory and they serve now to better inform us better what these scales capture.

We see, for example, that higher scores on the four items of Resiliency vs. Agitation impressively predicted lower scores on all 14 physical and mental problem scales, in addition to predicting higher income and higher overall religious engagement. Given the significant mental health needs in Namibia (e.g., Feinstein, 2002; Haidula et al., 2003; Shifiona et al., 2006; Bartholomew, 2016), with a suicide rate in the top quartile globally (https://apps.who.int/gho/data/node.main.MHSUICIDE), this scale might be explored as a simple, non-intrusive screener for distress and disorders.

Other scales with strong predictive ability for the criteria used in this study include Temperance, which contrasts religious engagement with substance use and abuse. This scale reflects the significance of religious engagement in Namibia, and the tendency of religious leaders to strongly discourage drinking. As anticipated, higher scores on this scale predicted higher scores on all aspects of religious engagement and fewer problems with substance abuse, also predicting fewer overall psychological disorders, and sleep quality. Temperance

additionally had a negative association with income. Based on recent qualitative work, we suspect that this is due to the high cost of alcohol in Namibia relative to wages (and high unemployment). While many people avoid drinking due to their personal and/or religious values, a lack of disposable income is also a reason, especially for young people who might otherwise be interested in trying moderate or social drinking.

Another scale with many associations was Honesty/Morality. Higher scores predicted fewer problems on seven psychological disorder scales, including Work Engagement, Substance Abuse, Anger, both conflict scales, and Psychosis, as well as the overall score. Honesty/Morality scores did not predict religiosity, as was initially expected. The scale's items mostly capture the low end of this trait, referring to being cunning, wicked, and roguish, dishonest, and crooked, and to tormenting others. Indeed this "dishonest-illegal" aspect of moral issues has been shown to associate more with legal codes in the World Values Survey, while "personal-sexual" moral issues are more associated with religions attitudes (Vauclair and Fischer, 2011). This dimension was given the name "Immorality" in the lexical study, but its name was updated here for the KPI to better reflect its content. Interestingly, Temper only associated with sleep problems, not with Anger, although its items focus on anger, temper, aggression and insolence, and its internal consistency was reasonably high for a four-item scale (0.67). Another scale that might benefit from further examination is Vanity, which predicted less rather than more conflict.

Hypotheses for significant regression coefficients for the QB6 based on prior literature are interpreted differently. Where hypotheses are met, they indicate two things: that these scales are valid in Namibia, as they function well enough to pick up expected and appropriate associations; and that these associations between the Big Five and Six traits hold true across cultural contexts. Where the hypotheses are not supported, however, it is not possible to distinguish between these interpretations, and future work will be needed to disentangle them. In many cases they were indeed met, especially for Resiliency, which performed largely as expected, and for Conscientiousness and Honesty, where all hypotheses were met, in addition to many additional, logical associations. Agreeableness and Extraversion, on the other hand, underperformed, mostly failing to associate with scales that they logically should have. Instead of predicting scores on Anger or Conflict scales, higher Agreeableness predicted more Stress. These constructs may have important differences in less individualistic, Western contexts (described further in Thalmayer et al., 2020a). Openness/Originality should be further explored in future work—this dimension was not expected to relate to health-related criteria in the current study, and this it was largely untested here. Of the Big Five and Big Six traits, this may be the least translatable outside the West (e.g., Cheung et al., 2001; Rossier et al., 2017; Thalmayer et al., 2020a).

An important question that this project did not address directly was the extent of the local need for an instrument like the

KPI. Our goals in creating this inventory were largely scientific, as described above, to address general questions in personality psychology about the universality vs. cultural specificity of models and measures. It was also developed to provide a locally relevant assessment in the context of a large survey study on mental health. For mental health, the practical needs are clear, and the support for and interest in such work from local leaders and psychologists is strong. More general personality assessment may also be of interest—anecdotally, Namibian labor-ministry psychologists note the lack of local assessment measures for any topic, and their reliance on inventories imported from North America (sometimes after being adapted and modified in South Africa). Future work that seeks to improve the measurement properties or incremental validity of the KPI would ideally be driven by community interests, considering the need and concerns of Khoekhoe-speakers in Namibia, and any values and uses identified by community members and local psychologists.

DATA AVAILABILITY STATEMENT

A preregistered analysis plan and the data used in this study are available on the Open Science Framework: https://osf.io/pbka4/.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University Research Ethics Commission, University of Namibia. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

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REFERENCES

Aghababaei, N., Wasserman, J. A., and Nannini, D. (2014). The religious person revisited: cross-cultural evidence from the HEXACO model of personality structure. *Mental Health Relig. Cult.* 17, 24–29. doi: 10.1080/13674676.2012.737771

Ashton, M. C., Lee, K., Perugini, M., Szarota, P., de Vries, R. E., Di Blas, L., et al. (2004). A six-factor structure of personality-descriptive adjectives: solutions from psycholexical studies in seven languages. *J. Pers. Soc. Psychol.* 86, 356–366. doi: 10.1037/0022-3514.86.2.356

Barnard, A. (1992). *Hunters and Herders of Southern Africa: A Comparative Ethnography of the Khoisan Peoples.* Cambridge University Press.

Bartholomew, T. T. (2016). Mental health in Namibia: connecting discourses on psychological distress, western treatments and traditional healing. *Psychol. Dev. Soc. J.* 28, 101–125. doi: 10.1177/0971333615622909

Chen, H., Wang, Z., Phillips, M. R., Sun, Y., and Cheng, H. G. (2014). Internal consistency and test-retest reliability of the Chinese version of the 5-item Duke University Religion Index. *Shanghai Arch. Psychiatry* 26, 300–309. doi: 10.11919/j.issn.1002-0829.214088

Cheung, F. M., Cheung, S. F., and Fan, W. (2013). "From Chinese to cross-cultural personality inventory: a combined emic-etic approach to the study of personality in culture," in *Advances in Culture and Psychology,* eds M. J. Gelfand, C. Chiu, and Y. Hong (New York, NY: Oxford University Press), 117–180.

Cheung, F. M., Leung, K., Zhang, J., Sun, H., Gan, Y.-Q., Song, W.-Z., et al. (2001). Indigenous Chinese personality constructs: is the five-factor model complete? *J. Cross Cult. Psychol.* 32, 407–433. doi: 10.1177/0022022101032004003

Clark, L. A., and Watson, D. (1995). Constructing validity: basic issues in objective scale development. *Psychol. Assess.* 7, 309–319. doi: 10.1037/1040-3590.7.3.309

De Raad, B., Barelds, D. P. H., Timmerman, M. E., De Roover, K., Mlačić, B., and Church, A. T. (2014). Towards a pan-cultural personality structure: input from 11 psycholexical studies. *Eur. J. Pers.* 28, 497–510. doi: 10.1002/per.1953

DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., and Muntner, P. (2006). Mortality prediction with a single general self-rated health question: a meta-analysis. *J. Gen. Intern. Med.* 21, 267–275. doi: 10.1111/j.1525-1497.2005.00291.x

DeYoung, C. G. (2006). Higher-order factors of the Big Five in a multi-informant sample. Psycnet.Apa.Org. 91, 1138–1151. doi: 10.1037/0022-3514.91.6.1138

Diener, E., Emmons, R. A., Larsen, R. J., and Griffin, S. (1985). The satisfaction with life scale. *J. Pers. Assess.* 49, 71–75. doi: 10.1207/s15327752jpa4901_13

Digman, J. M. (1997). Higher-order factors of the Big Five. *J. Pers. Soc. Psychol.* 73, 1246–1256. doi: 10.1037/0022-3514.73.6.1246

Feinstein, A. (2002). Psychiatry in post-apartheid Namibia: a troubled legacy. *Psychiatr. Bull.* 26, 310–312. doi: 10.1192/pb.26.8.310-a

Frydman, J. (2011). "A critical analysis of Namibia's English-only language policy," in *Selected Proceedings of the 40th Annual Conference on African Linguistics*, 178–189. Available online at: www.lingref.com, document #2574 (accessed December, 2020).

Güldemann, T., and Fehn, A.-M. (2014). "Beyond "Khoisan": historical relations in the Kalahari Basin," in *Current Issues in Linguistic Theory* eds Güldemann, T and Fehn A-M (Amsterdam: John Benjamins Publishing Company).

Gurven, M., von Rueden, C., Massenkoff, M., Kaplan, H., and Lero Vie, M. (2013). How universal is the Big Five? Testing the five-factor model of personality variation among forager–farmers in the Bolivian Amazon. *J. Pers. Soc. Psychol.* 104, 354–370. doi: 10.1037/a0030841

Haacke, W. H. G. (2011). "Nama als Sprachbenennung in der Koloniallinguistik Deutsch-Südwestafrikas: zwischen Endonym und Exonym," in *Kolonialzeitliche Sprachforschung. Die Beschreibung afrikanischer und ozeanischer Sprachen zur Zeit der deutschen Kolonialherrschaft*, eds T. Stolz, C. Vossmann and B. Dewein (Berlin: Akademie Verlag), 139–160.

Hafizi, S., Tabatabaei, D., and Koenig, H. G. (2014). Borderline personality disorder and religion:a perspective from a Muslim country. *Iran. J. Psychiatry* 9, 137–141.

Haidula, L., Shino, E., Plattner, I., and Feinstein, A. (2003). A Namibian version of the 28 item General Health Questionnaire. *South Afr. Psychiatry Rev.* 6, 23–25.

Hofstee, W. K. B., Kiers, H. A. L., De Raad, B., Goldberg, L. R., and Ostendorf, F. (1997). A comparison of big-five structures of personality traits in Dutch, English, and German. *Eur. J. Pers.* 11, 15–31.

Hopwood, C. J., and Donnellan, M. B. (2010). How should the internal structure of personality inventories be evaluated? *Pers. Soc. Psychol. Rev.* 14, 332–346. doi: 10.1177/1088868310361240

Hu, L., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equat. Model. Multidiscip. J.* 6, 1–55. doi: 10.1080/10705519909540118

Koenig, H. G., and Büssing, A. (2010). The Duke University Religion Index (DUREL): a five-item measure for use in epidemological studies. *Religions* 1, 78–85. doi: 10.3390/rel1010078

Kööts–Ausmees, L., Schmidt, M., Esko, T., Metspalu, A., Allik, J., and Realo, A. (2016). The role of the five–factor personality traits in general self–rated health. *Eur. J. Pers.* 30, 492–504. doi: 10.1002/per.2058

Kotov, R., Gamez, W., Schmidt, F., and Watson, D. (2010). Linking "Big" personality traits to anxiety, depressive, and substance use disorders: a meta-analysis. *Psychol. Bull.* 136, 768–821. doi: 10.1037/a0020327

Laajaj, R., Macours, K., Hernandez, D. A. P., Arias, O., Gosling, S. D., Potter, J., et al. (2019). Challenges to capture the big five personality traits in non-WEIRD populations. *Sci. Adv.* 5:eaaw5226. doi: 10.1126/sciadv.aaw5226

Lippa, R. A. (2010). Sex differences in personality traits and gender-related occupational preferences across 53 Nations: testing evolutionary and social-environmental theories. *Arch. Sex. Behav.* 39, 619–636. doi: 10.1007/s10508-008-9380-7

Lucchetti, G., Granero Lucchetti, A. L., Peres, M. F., Leão, F. C., Moreira-Almeida, A., and Koenig, H. G. (2012). Validation of the Duke religion index: DUREL (Portuguese Version). *J. Relig. Health* 51, 579–586. doi: 10.1007/s10943-010-9429-5

Ludeke, S. G., and Larsen, E. G. (2017). Problems with the Big Five assessment in the World Values Survey. *Pers. Individ. Dif.* 112, 103–105. doi: 10.1016/j.paid.2017.02.042

Malouff, J. M., Thorsteinsson, E. B., and Schutte, N. S. (2005). The relationship between the five-factor model of personality and symptoms of clinical disorders: a meta-analysis. *J. Psychopathol. Behav. Assess.* 27, 101–114. doi: 10.1007/s10862-005-5384-y

McCrae, R. R., and Costa, P. T. (1997). Personality trait structure as a human universal. *Am. Psychol.* 52, 509–516. doi: 10.1037/0003-066X.52.5.509

Mogilski, J. K., Vrabel, J., Mitchell, V. E., and Welling, L. L. M. (2019). The primacy of trust within romantic relationships: evidence from conjoint analysis of HEXACO-derived personality profiles. *Evol. Hum. Behav.* 40, 365–374. doi: 10.1016/j.evolhumbehav.2019.04.001

Mõttus, R., Kandler, C., Bleidorn, W., Riemann, R., and McCrae, R. R. (2017). Personality traits below facets: the consensual validity, longitudinal stability, heritability, and utility of personality nuances. *J. Pers. Soc. Psychol.* 112:474. doi: 10.1037/pspp0000100

Namibia Statistics Agency (2013). *Namibia* 2011 *Population and Housing Census - Main Report.* 214. Available online at: Available online at: https://www.npc.gov.na/downloads/Policies%20(By%20institutions%20or%20sector)/NPC/Census%20Report%202011%20FINAL.pdf (accessed December, 2020).

Nigg, J. T., Blaskey, L. G., Huang-Pollock, C. L., Hinshaw, S. P., John, O. P., Willcutt, E. G., et al. (2002). Big five dimensions and ADHD symptoms: links between personality traits and clinical symptoms. *J. Pers. Soc. Psychol.* 83, 451–469. doi: 10.1037/0022-3514.83.2.451

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behav. Res. Methods Instruments Comput.* 32, 396–402. doi: 10.3758/BF03200807

Ozer, D. J., and Benet-Martínez, V. (2006). Personality and the prediction of consequential outcomes. *Annu. Rev. Psychol.* 57, 401–421. doi: 10.1146/annurev.psych.57.102904.190127

Pailing, A., Boon, J., and Egan, V. (2014). Personality, the Dark Triad and violence. *Pers. Individ. Dif.* 67, 81–86. doi: 10.1016/j.paid.2013.11.018

Pakendorf, B. (2014). "Molecular anthropological perspectives on the Kalahari Basin area," in *Beyond "Khoisan": Historical Relations in the Kalahari Basin*, eds T. Güldemann and A.-M. Fehn (Amsterdam: John Benjamins Publishing Company), 45–68.

Pickrell, J. K., Patterson, N., Barbieri, C., Berthold, F., Gerlach, L., Güldemann, T., et al. (2012). The genetic prehistory of southern Africa. *Nat. Commun.* 3, 1–6. doi: 10.1038/ncomms2140

Rossier, J., Ouedraogo, A., and Dahourou, D. (2017). "Personality structure and assessment in French-speaking African cultures," in *The Praeger Handbook of Personality Across Cultures,* Vol. 1, eds A. T. Church (Santa Barbara, CA: Praeger), 73–103.

Saroglou, V. (2010). Religiousness as a cultural adaptation of basic traits: a five-factor model perspective. *Pers. Soc. Psychol. Rev.* 14, 108–125. doi: 10.1177/1088868309352322

Saucier, G. (2009). Recurrent personality dimensions in inclusive lexical studies: indications for a Big Six Structure. *J. Pers.* 77, 1577–1614. doi: 10.1111/j.1467-6494.2009.00593.x

Saucier, G., and Iurino, K. (2020). High-dimensionality personality structure in the natural language: further analyses of classic sets of English-language trait-adjectives. *J. Pers. Soc. Psychol.* 119, 1188–1219. doi: 10.1037/pspp0000273

Saucier, G., Iurino, K., and Thalmayer, A. G. (2020). Comparing predictive validity in a community sample: High-dimensionality and traditional domain-and-facet structures of personality variation. *Eur. J. Pers.* 34, 1120–1137. doi: 10.1002/per.2235

Saucier, G., Thalmayer, A. G., Payne, D. L., Carlson, R., Sanogo, L., Ole-Kotikash, L., et al. (2014). A basic bivariate structure of personality attributes evident across nine languages. *J. Pers.* 82, 1–14. doi: 10.1111/jopy.12028

Schimmack, U., Oishi, S., Furr, R. M., and Funder, D. C. (2004). Personality and life satisfaction: a facet-level analysis. *Pers. Soc. Psychol. Bull.* 30, 1062–1075. doi: 10.1177/0146167204264292

Shifiona, N., Poggenpoel, M., and Myburgh, C. (2006). Life stories of depressed adult women in peri-urban Namibia. *Curationis* 29, 5–11. doi: 10.4102/curationis.v29i2.1063

Soto, C. J., John, O. P., Gosling, S. D., and Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *J. Pers. Soc. Psychol.* 100, 330–348. doi: 10.1037/a0021717

Thalmayer, A. G. (2018). Personality and mental health treatment: traits as predictors of presentation, usage, and outcome. *Psychol. Assess.* 30, 967–977. doi: 10.1037/pas0000551

Thalmayer, A. G., Job, S., Shino, E., Robinson, S. L., and Saucier, G. (2020a). ǂŪsigu: a mixed-method lexical study of character description in Khoekhoegowab. *J. Pers. Soc. Psychol.* doi: 10.1037/pspp0000372

Thalmayer, A. G., and Saucier, G. (2014). The Questionnaire Big Six in 26 nations: developing cross-culturally applicable Big Six, Big Five and Big Two inventories. *Eur. J. Pers.* 28, 482–496. doi: 10.1002/per.1969

Thalmayer, A. G., Saucier, G., Ole-Kotikash, L., and Payne, D. (2020b). Personality structure in east and west Africa: lexical studies of personality in Maa and Supyire-Senufo. *J. Pers. Soc. Psychol.* 119, 1132–1152. doi: 10.1037/pspp0000264

Vauclair, C.-M., and Fischer, R. (2011). Do cultural values predict individuals' moral attitudes? A cross-cultural multilevel approach. *Eur. J. Soc. Psychol.* 41, 645–657. doi: 10.1002/ejsp.794

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The Contributions of Indigenous Personality and Parenting Style to Life Satisfaction Development in Chinese Adolescents

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The present three-wave longitudinal study examined the contributions of indigenous personality traits and parenting style to life satisfaction in Chinese adolescents. Seven hundred and ten junior high school students (M_{age} = 11.39, SD_{age} = 0.53; 53.2% girls) were administered self-report measures of personality, parenting styles, and life satisfaction in Grade 6. Data on life satisfaction were collected again in Grades 7 and 8, respectively. Latent growth model analyses indicated that life satisfaction decreased over time. Regression analyses showed that the initial level of global life satisfaction was positively predicted by personality factors of dependability and interpersonal relatedness; the slope of global life satisfaction was positively predicted by personality factors of emotional stability whereas negatively predicted by interpersonal relatedness. The initial levels and slopes of different domains of life satisfaction were predicted by personality factors and parenting styles to different extents. Meanwhile, paternal and maternal parenting styles had different effects on adolescents' life satisfaction. The study provided valuable information about the contributions of indigenous personality and both paternal and maternal parenting styles to psychological adjustment in the Chinese context. The implications of the findings concerning the associations among personality, parenting styles, and life satisfaction were discussed.

Keywords: life satisfaction, indigenous personality, adolescence, parenting styles, longitudinal

INTRODUCTION

Life satisfaction reflects individuals' subjective evaluations about their general satisfaction with the whole life (Diener et al., 1999). It is a crucial life outcome and has attracted many researchers' attention over the past several decades (e.g., Casas and González-Carrasco, 2019). Previous research has shown that life satisfaction is linked to various adaptive and maladaptive functioning among adolescents (e.g., Proctor et al., 2009; Huebner et al., 2012). Given that adolescents are experiencing mental development and enduring heavy studying pressures (Arnett, 1999; Shek and Liang, 2018; Cosma et al., 2020) and that they are vulnerable to problems in affect regulation (Steinberg, 2005), it is important to deepen our knowledge of life satisfaction during the volatile adolescence period.

Studies regarding the predictors of life satisfaction are generally following two approaches: Top-down models, which assume that life satisfaction is influenced mainly by individual characteristics; and bottom-up models, which argue that environmental factors may affect life

satisfaction judgments (Diener, 1984; Fan, 2014). Personality is considered a major personal determinant of individuals' life satisfaction (e.g., Garcia, 2011). The majority of studies that adopted the top-down approach to explore the contributions of personality were based on the Big Five Model (McCrae and Costa, 2008) among adult samples (e.g., Joshanloo and Afshari, 2011). However, less research that derived from adolescents (e.g., Suldo et al., 2015; Kim et al., 2019) is not enough to reveal the relationships between personality and life satisfaction. Meanwhile, most of the previous studies regarding links between personality and life satisfaction are cross-sectional design (e.g., Xie et al., 2016), little is known about how personality could contribute to the developmental trajectories in adolescent life satisfaction.

As for the environmental factors, familial variables such as parenting styles have often been cross-sectionally examined for understanding adolescents' life satisfaction (e.g., Milevsky et al., 2007; Di Maggio and Zappulla, 2014; Gherasim et al., 2017). Particularly, under the framework of parenting style by Baumrind (1971), authoritative parenting was associated with higher levels of life satisfaction in adolescents (e.g., Abubakar et al., 2015; Lavrič and Naterer, 2020), whereas authoritarian and permissive parenting were not reported consistent relationships with life satisfaction (e.g., Milevsky et al., 2007; Raboteg-Saric and Sakic, 2014; Abubakar et al., 2015; Xie et al., 2016; Lavrič and Naterer, 2020). Furthermore, very few studies have differentiated the functions of maternal and paternal parenting styles on life satisfaction (e.g., Milevsky et al., 2007).

In addition, culture is a pivotal factor for understanding life satisfaction in adolescents. Cultural context shapes the development trajectories of life satisfaction (e.g., Cosma et al., 2020), as well as the relationships between life satisfaction and other factors, such as personality (e.g., Kim et al., 2018) and parenting styles (e.g., Lavrič and Naterer, 2020). For example, while adolescents in some cultural settings displayed decreased trends in life satisfaction, stable or increased patterns in life satisfaction were viewed in adolescents in some other cultural settings (e.g., Cosma et al., 2020). Furthermore, the relationships between the Big Five personality and adolescents' life satisfaction were shown to be different across cultures (e.g., Kim et al., 2018), and the relationships of authoritarian and permissive parenting to life satisfaction varied across cultures (e.g., Lavrič and Naterer, 2020). Particularly, despite such cultural variation, the majority of studies investigated the change trend in life satisfaction or examined the predictors of life satisfaction in Western settings (e.g., Martin et al., 2008; Suldo et al., 2015), not in non-western backgrounds such as China.

Some culture-specific contents in personality that are emphasized in the Chinese cultural context are not reflected in the Big Five Model, such as interpersonal relatedness which reflects the Chinese indigenous values of family orientation and harmony (Yang, 2006; Cheung et al., 2008; Fan et al., 2011). Meanwhile, unlike the Western cultures that emphasize independence and autonomy, in China, authoritarian parenting with strictness and authority is considered as a signal of parental involvement and deemed beneficial for children (Chao, 1994). Accordingly, cultural variation in the relationships of personality

and parenting to life satisfaction may exist between Chinese and Western backgrounds. However, the contributions of personality and parenting styles to adolescent life satisfaction development are yet to be understood in Chinese context.

To fill out these research gaps and examine the differential contributions of personal and familial factors to adolescent life satisfaction, the present three-wave longitudinal study investigated the predictors of changes in life satisfaction in Chinese adolescents. In this study, the influences of both maternal and paternal parenting styles and both the universal personality and Chinese indigenous personality on adolescents' life satisfaction developmental trajectories were explored as well. In addition, because global life satisfaction and domain-specific satisfaction are distinguishable from each other (e.g., Weber and Huebner, 2015), the contributions of personality and parenting styles to global and specific domain-specific satisfaction were considered separately in this study.

The Development of Life Satisfaction in Adolescents

Even though there are longitudinal studies examining the change of adolescents' life satisfaction, inconsistent findings have generally been showed in the literature. For example, Shoshani and Slone (2013) found that Israeli adolescents showed lower levels of life satisfaction in their eighth grade than in the seventh grade. A similar decrease pattern in life satisfaction was also reported in Spanish adolescents (Gomez-Baya et al., 2018), Korean adolescents (Jung and Choi, 2017), and American adolescents (Martin et al., 2008). In contrast, Lewis et al. (2011) found that US middle school students' life satisfaction significantly increased over 5 months. In a 2-year longitudinal study, Salmela-Aro and Tuominen-Soini (2010) reported that life satisfaction increased during the transition from Grade 9 to upper secondary or vocational education among Finnish adolescents. In addition, some other studies showed a stable pattern of life satisfaction during adolescence. For example, Marques et al. (2011, 2013) reported non-significant changes in life satisfaction in Portuguese adolescents over 1- and 2-year intervals, respectively. Bratt (2015) found that life satisfaction was stable over 3 years among Norwegian middle school students.

Under cross-cultural backgrounds, the results of change in adolescents' life satisfaction have also been reported (e.g., Cosma et al., 2020; Marquez and Long, 2020). For example, based on the data from the International Health Behavior survey between 2002 and 2018 among adolescents in 36 countries, Cosma et al. (2020) found adolescents from 13 countries had a decreasing trend in life satisfaction (e.g., Greece, Austria, and Canada), and adolescents from the other 13 countries had increases in life satisfaction (e.g., Romania, Croatia, and Lithuania), whereas the adolescents from the rest 10 countries were stable in life satisfaction (e.g., Germany, France, and Italy). Based on the data from the Program for International Student Assessment, Marquez and Long (2020) analyzed the change trends of life satisfaction in 15-year-old adolescents between 2015 and 2018 in 46 countries. In their article, a decline trend of life satisfaction among adolescents in 39 out of 46 countries (e.g., France, Germany, and Russia) was

reported. Adolescents in seven countries (e.g., Thailand, Spain, and Italy) had a stable level of life satisfaction between 2015 and 2018. Only South Korean adolescents showed an increase in life satisfaction during the period.

As for studies in Chinese context, most of them have been conducted among Hong Kong and Taiwanese adolescents. For example, Leung et al. (2004) found that the global life satisfaction of Hong Kong adolescents significantly declined from the beginning to the end of the 7th grade. Also in Hong Kong adolescents, Shek and Liang (2018) reported that life satisfaction showed a declining trend in a 6-year period. Jhang (2018) found that life satisfaction declined across 2 years among Taiwanese junior high school students in poverty. In addition, two inconsistent findings were reported for the adolescents from mainland China. One was conducted by Wang and Zhang (2012), and a decrease pattern in life satisfaction from Grade 7 to Grade 9 was reported. The other was performed by Nie et al. (2019) and they found life satisfaction displayed a stable pattern across 2 years among high school students.

To sum up, all of those above-mentioned inconsistent research findings suggest more longitudinal studies need to be conducted to explore the development trajectories in life satisfaction among adolescents.

Life Satisfaction and Personality

Compared with studies exploring links between personality and life satisfaction in adults, there are fewer studies conducted in adolescent samples (Anglim et al., 2020). Furthermore, the majority of studies that examined the association between personality and life satisfaction in adolescents were in light of the Big Five Model. For instance, neuroticism has consistently been shown to be the strongest predictor of life satisfaction and was negatively related to life satisfaction (e.g., Suldo et al., 2015; Xu et al., 2017). Extraversion and conscientiousness were found to be positively associated with life satisfaction (e.g., Suldo et al., 2015; Weber and Huebner, 2015). As for openness, most empirical studies reported a non-significant relationship between openness and life satisfaction (e.g., Jovanović, 2019; Kim et al., 2019). Only a few found a positive link between openness and life satisfaction (e.g., Suldo et al., 2015). The relationship between agreeableness and life satisfaction was also inconsistent in the literature. Some showed a positive link between agreeableness and life satisfaction (e.g., Jovanović, 2019), whereas others reported non-significant relationships (e.g., Marcionetti and Rossier, 2016).

Despite such research findings about personality and life satisfaction in adolescents, with very few exceptions (e.g., Weber and Huebner, 2015), previous studies have mostly focused on the relationships between personality and global life satisfaction, so that little is known about the relationships between personality and specific domains of life satisfaction. For example, among US adolescents, Weber and Huebner (2015) found that functions of personality were varied in different domains of life satisfaction. Specifically, neuroticism negatively predicted all five domains of satisfaction (i.e., family life, friendships, school experiences, self, and living environment). Extraversion was positively related to satisfaction with friendships, self, and living environment. Openness was positively associated

with satisfaction with family life, school experiences, and self. Agreeableness was only positively linked to satisfaction with family life. Conscientiousness was positively related to all life satisfaction domains except for satisfaction with friendships.

As shown in the above literature review, the relationship between personality (mainly in terms of the Big Five dimensions) and life satisfaction including global and specific domains has been explored mainly in western backgrounds. However, because the Big Five Model is derived from the western contexts, it may not be sufficient to capture some non-western personality features in other cultural contexts (Yang, 2006; Cheung et al., 2008; Fan et al., 2011). Accordingly, the association between personality and life satisfaction in non-western backgrounds may show very distinguished patterns from those in western backgrounds. Furthermore, the levels of global life satisfaction and the levels of satisfaction in various domains are not necessarily consistent (e.g., Jovanović et al., 2017), and the patterns of associations between global or different domain-specific satisfaction and personality are different (e.g., Lent et al., 2005; Weber and Huebner, 2015). Therefore, more empirical studies in non-western settings may further increase our knowledge about the relations of personality to both global and domain-specific life satisfaction across cultures.

For example, in the Chinese context in which Confucian philosophy is highlighted, there are a few culture-specific personality contents that have not been covered in the Big Five Model, such as harmony, face, Renqing, and family orientation (Cheung et al., 2008). Those Chinese indigenous personality attributes in adolescents have been systematically and effectively assessed by the factor of interpersonal relatedness of the Cross-Cultural (Chinese) Personality Assessment Inventory for Adolescents (CPAI-A), which is derived from Chinese settings and has been validated across eastern and western cultural settings (Fan et al., 2011; Cheung et al., 2013). In addition, the CPAI-A also includes universal independent personality factors such as social potency, emotional stability, and dependability that are correspondingly correlated with those factors in the Big Five model (Cheung et al., 2001, 2003; Lin and Church, 2004).

Empirical studies have examined the association between the personality dimensions of CPAI and life satisfaction in the Chinese samples (e.g., Chen et al., 2006; Zhang et al., 2011). For example, in a sample of Hong Kong adolescents, Ho et al. (2008) reported that certain indicators of social potency, emotional stability, and interpersonal relatedness positively predicted life satisfaction. Among junior secondary school students, Xie et al. (2016) reported positive relationships of emotional stability, dependability, and interpersonal relatedness to global life satisfaction. In addition, they also found that different domains of life satisfaction were predicted by different personality dimensions. However, all those aforementioned studies are cross-sectional design and did not provide evidence for the contributing roles of CPAI dimensions on the development trajectories of adolescents' life satisfaction.

Life Satisfaction and Parenting Styles

According to Baumrind (1991), three distinct styles could be identified based on the demandingness (also referred to

as behavioral control) and responsiveness (also referred to as warmth) of parenting: authoritative, authoritarian, and permissive parenting. Authoritative parenting emphasizes clear standards and support and is characterized by being both demanding and responsive based on children's needs and capabilities. Authoritarian parenting emphasizes order and obedience and is characterized by demanding parental behaviors but without responsiveness. Permissive parenting has more responsiveness than demandingness, and parents with this style allow children's self-regulation and do not accentuate authority. This model of parenting styles has been widely examined across cultures in the past 40 years (e.g., Xie et al., 2016).

For many years, studies regarding the relationships of parenting styles to life satisfaction have mostly been conducted in children (Di Maggio and Zappulla, 2014). Recently, researchers have begun to notice the impact of parenting practices on life satisfaction in adolescence (e.g., Coccia et al., 2012). Empirical studies provided evidence on the links between parenting styles and adolescents' life satisfaction across Western (e.g., Milevsky et al., 2007) and non-Western contexts (e.g., Abubakar et al., 2015).

Higher authoritative parenting was often found to contribute to higher levels of life satisfaction in both Western and non-Western cultures (e.g., Milevsky et al., 2007; Xie et al., 2016). However, the influence of authoritarian parenting was shown to be different across cultures. In the United States (e.g., Milevsky et al., 2007), Romanian (e.g., Gherasim et al., 2017), and Russian contexts (e.g., Gherasim et al., 2017), authoritarian parenting was related to lower levels of life satisfaction. However, Xie et al. (2016) reported a positive link between authoritarian parenting style and school satisfaction in a group of Chinese adolescents. In other contexts, such as Indonesian (e.g., Abubakar et al., 2015) and French (e.g., Gherasim et al., 2017) contexts, no significant relationship between authoritarian and life satisfaction was found.

As for permissive parenting style, Xie et al. (2016) and Lavrič and Naterer (2020) reported that permissive parenting was positively associated with life satisfaction in Chinese adolescents and Romanian youths, respectively. Raboteg-Saric and Sakic (2014) found that Croatian adolescents with permissive mothers and fathers are more satisfied with their life than those with authoritarian mothers and fathers. However, negative associations between permissive parenting and life satisfaction among Albanian, Bosnian, Croatian, and Kosovo youths were reported in the literature (Lavrič and Naterer, 2020).

In addition, it has been shown that the functions of maternal parenting style and paternal parenting style on offspring's life satisfaction are different (e.g., Milevsky et al., 2007). For example, Abubakar et al. (2015) reported that Indonesian adolescents' life satisfaction was only positively predicted by paternal authoritativeness, but not by maternal authoritativeness. Milevsky et al. (2007) found that US adolescents with maternal authoritative style had higher life satisfaction than those with maternal permissive styles, whereas no significant difference was found in life satisfaction between adolescents with paternal authoritative style and those with paternal permissive styles.

The influence of parenting styles on Chinese adolescents' life satisfaction was supported in the literature. For example, in addition to the study by Leung et al. (2004) and Xie et al. (2016) reported that maternal restrictiveness (also known as demandingness) was negatively associated with Hong Kong adolescents' family, self, and friend satisfaction 8 months later; and maternal concern (also known as responsiveness) was positively correlated with family, self, and friend satisfaction 8 months later. Xiang et al. (2017) reported that parental autonomy support positively predicted adolescents' life satisfaction, and psychological control negatively predicted adolescents' life satisfaction. In a longitudinal study with 1 year interval, Shek (2007) found that paternal and maternal psychological control negatively predicted Hong Kong adolescents' life satisfaction. Gao et al. (2021) reported that paternal and maternal warmth positively related to adolescents' life satisfaction 8 months later. Zhu and Shek (2021) found that trajectories of paternal and maternal behavioral control positively predicted trajectory of adolescents' life satisfaction, and paternal and maternal psychological control negatively predicted trajectory of adolescents' life satisfaction during the 6-year high school period. However, with the exception of Zhu and Shek's (2021) work, most of these studies are cross-sectional or short-term longitudinal design, and the antecedents to the development trajectories of life satisfaction cannot be well examined in Chinese adolescents up to now. Meanwhile, none of them has explored functions of maternal and paternal parenting styles on different aspects of life satisfaction separately.

The Present Study

In response to the abovementioned research gaps for the contributions of personality and parenting styles in Chinese adolescents, the present three-wave longitudinal study aimed at the following three points. The first was to investigate the stability and change in life satisfaction in adolescents from mainland China. Based on the previous research findings (e.g., Wang and Zhang, 2012; Shek and Liang, 2018), we expected decreasing trends in life satisfaction during the present study period. Second, the influence of both universal and indigenous personalities on adolescents' development trajectories in life satisfaction was explored. Given the findings regarding the significant links between CPAI dimensions and life satisfaction (e.g., Xie et al., 2016), we expected that higher levels of social potency, dependability, emotional stability, and interpersonal relatedness would relate to higher levels of adolescents' life satisfaction.

Third, in terms of Baumrind's (1991) framework of parenting styles, the contributions of parenting styles to the development trajectories of life satisfaction during adolescence were investigated as well. Consistent with previous relevant findings (e.g., Xie et al., 2016; Gherasim et al., 2017), I hypothesized that perceived authoritative and permissive parenting would positively relate to life satisfaction. Due to the inconsistent research findings in the literature (e.g., Abubakar et al., 2015; Xie et al., 2016), no specific hypothesis was made regarding the influence of authoritarian parenting on life satisfaction. In addition, given previous supporting on the different effects of paternal parenting and maternal parenting on adolescents' life

satisfaction, (e.g., Abubakar et al., 2015), I further hypothesized that paternal and maternal parenting styles would have different functions on Chinese adolescents' life satisfaction.

MATERIALS AND METHODS

Participants

Participants in this study were students from four public junior high schools in Shanghai, China. The initial sample consisted of 710 students (M_{age} = 11.39, SD_{age} = 0.53; 53.2% girls) in Grade 6. Six hundred sixty-one students in Grade 7 (93.10%) participated in the second wave of data collection, and 646 (90.10%) students in Grade 8 participated in the third wave of data collection. All participants received their personality profiles at the end of the longitudinal study as reward. Results from attrition analyses indicated non-significant differences among all study variables (i.e., parenting styles, personality, and life satisfaction) at Grade 6 between students who participated in all three waves and those who participated in only one or two waves: Wilks' Λ = 0.97, F (16, 596) = 1.01, p = 0.45. Consent forms were obtained from both participants and their parents. The majority (90.6% fathers and 87.4% mothers) of the participants' parents had a high school or higher degree.

Measurements

Personality

The Cross-Cultural (Chinese) Personality Inventory for Adolescents (CPAI-A; Form B; Cheung et al., 2008) was used to measure both universal and indigenous personality of participants. It is a self-report measure that features a yes-or-no format with a total of 307 items. The CPAI-A (Form B) consists of four factors encompassing 25 personality scales: Social Potency, Dependability, Emotional Stability, and Interpersonal Relatedness. Social Potency is related to Extraversion and Openness in the Big Five model and refers to orientation toward novelty, change, self-development, and sociability (e.g., "I do not like stable jobs; instead, I like challenges."). Dependability is similar to Conscientiousness and comprises responsibility, discipline, and meaning in life (e.g., "I make good use of my time after school to learn different things so as to enrich my life"). Emotional Stability is related to Neuroticism and consists of emotionality, inferiority versus self-acceptance, optimism versus pessimism, and face (e.g., "Sometimes I feel miserable for no reason"). The Interpersonal Relatedness factor consists of the most typical interdependent dispositions in collectivistic cultures such as Renqing (Relationship Orientation), Harmony, and Family Orientation (e.g., "I do not mind suffering a bit of loss as long as it can prevent disputes"). Factor level of personality measured was employed in the current study. Each factor score is the average score of the corresponding subscales. A number of studies have reported good internal consistency reliability, test-retest reliability, and construct validity of the CPAI-A (Form B; Cheung et al., 2008; Li et al., 2019). The structural validity of CPAI-A in the present study was tested by CFA (because Social Potency and Interpersonal Relatedness factors includes more than five subscales, subscales under these two factors

were parceled into three parcels using random assignment) and results indicated adequate model fit indices: χ^2 = 343.80, df = 72, CFI = 0.90, RMSEA = 0.073, SRMR = 0.072.

Parenting Styles

The Parental Authority Questionnaire (Buri, 1991) was used to measure paternal and maternal authoritarian (10 items; e.g., "As I was growing up my father (mother) often told me exactly what he (she) wanted me to do and how he (she) expected me to do it"), authoritative (10 items; e.g., "As I was growing up my father (mother) gave me clear direction for my behaviors and activities but he(she) was also understanding when I disagreed with him (her)"), and permissive (10 items; e.g., "My father (mother) did not view himself (herself) as responsible for directing and guiding my behavior as I was growing up") parenting styles. Adolescents were asked to rate the total 60 items on a 5-point scale, ranging from 1 (not at all true) to 5 (very true) for their mother (30 items) and father (30 items). The PAQ has good psychometric properties in the Chinese context (e.g., Xie et al., 2016). The structural validity of PAQ in the present study was tested by CFA (items under each factor were parceled into three parcels using random assignment) and results indicated adequate model fit indices for maternal styles (χ^2 = 114.87, df = 22, CFI = 0.95, RMSEA = 0.079, SRMR = 0.050) and paternal styles (χ^2 = 105.48, df = 22, CFI = 0.96, RMSEA = 0.075, SRMR = 0.049).

Life Satisfaction

Life satisfaction was measured by the Chinese Adolescents' Life Satisfaction Scale (CALSS; Cheung and Cheung, 2005), which was developed based on the Satisfaction with Life Scale (Diener et al., 1985) and the Multidimensional Students' Life Satisfaction Scale (Gilman et al., 2000). The 30-item CALSS assessed both the global life satisfaction (5 items; e.g., "I am satisfied with my life"), and the satisfaction in five specific domains: family (7 items; e.g., "My parents could understand me very well"), friend (4 items; e.g., "I have a number of good friends"), health (4 items; e.g., "My body is very healthy"), school (9 items; e.g., "Most classmates do not like me"), and self (6 items; e.g., "I am confident very much"). Adolescents were asked to rate each item on a 7-point scale, ranging from 1 (not at all true) to 7 (very true). Previous studies reported good psychometric properties of this inventory in the Chinese context (e.g., Ho et al., 2010).

Data Analysis

A power analysis was conducted to determine whether the sample size of this study is enough to do the following analysis using G*power. According to previous study regarding the influences of personality and parenting styles on life satisfaction (e.g., Xie et al., 2016), the R^2 was set to 0.30, the power was set to 0.80 (Faul et al., 2009), alpha was set to 0.05, the number of predictors was set to 10. Results of the power analysis suggested to collect data on a sample of 389 participants, which is lower than the actual number of participants (N = 710) in this study.

The scalar invariance is a prerequisite for comparing means across different time points (Klimstra et al., 2018). In order to employ latent growth models, the scalar invariance of life satisfaction was examined. Because item parceled solution,

relative to the individual item solution, resulted in less bias in estimates of structural parameters (Bandalos, 2002), items under the dimensions with more than five items (i.e., family satisfaction, school satisfaction, and self-satisfaction) were parceled into three parcels using random assignment (Little et al., 2002). Overall, evidence for scalar invariance in global and four domain-specific life satisfactions (except for self-satisfaction) was found, which implies that valid conclusions from growth curve models based on observed variables could be drawn. Therefore, latent growth models based on observed variables were employed to explore the change trajectories of global, family, friend, health, and school satisfaction.

As for the self-satisfaction, although full scalar invariance was not supported, evidence for the partial scalar invariance (i.e., with at least one of the intercepts constrained to be equal across time) can still support the comparison of latent means across time (Steinmetz, 2013). Therefore, latent growth models based on latent variables with partial scalar invariance constraints that were imposed on the confirmatory factor analysis models for measurement invariance were employed to explore the change trajectories of self-satisfaction.

The skewness (ranged from -1.37 to 0.33) and kurtosis (-0.69 to 1.25) values of the research variables indicated the normal distributions of the data (Kline, 1998). Zero-order correlational analysis was conducted. Repeated measure multivariate analysis of variance (MANOVA) was used to examine the time and gender differences of life satisfaction. Another MANOVA was used to examine the gender difference in personality and parenting styles. Latent growth models were employed to examine the change trajectories of life satisfaction with the maximum likelihood estimator. Missing data were handled in M*plus* using full information maximum likelihood estimation. Because intercept and linear slope were examined with a three-wave data set in the current study, the degree of freedom (df) should be 1. However, as argued by researchers (Kenny et al., 2014; Taasoobshirazi and Wang, 2016), it may be problematic and possibly misleading to use Root Mean Square Error of Approximation (RMSEA) as a fit index when df equals 1. As such, only Comparative Fit Index (CFI) and Standardized Root Mean Square Residual (SRMR) were fit indices referred to the latent growth model analysis. Regression paths were then added into the growth models to examine the influence of personality and parenting styles on the growth patterns of life satisfaction using M*plus*.

In terms of the common method bias (CMB), Harman's single factor was used to test the potential limitation of the self-reported personality, parenting styles, and life satisfaction. The total variance for a single factor is 10.60%, suggesting an acceptable rate that is lower than 50% (Podsakoff et al., 2003).

RESULTS

Preliminary Analysis

Descriptive statistics of the study variables, their correlations, and Cronbach's alphas are presented in **Tables 1** and **2**. The overall effects of time, gender, and their interactions on life satisfaction in three waves were examined through mixed repeated MANOVA.

According to Cohen's (1988) guidelines for interpreting F-test effect size (small = 0.01, medium = 0.059, and large = 0.138), only time difference, Wilks' Λ = 0.85, F (12, 589) = 8.70, p = 0.00, η^2 = 0.15 was further considered. The overall effect of gender on personality and parenting styles was examined through another MANOVA. According to the Cohen's (1988) guidelines, gender difference was not considered in the following analyses. Correlation results showed that, in general, social potency, dependability, emotional stability, interpersonal relatedness, and authoritative parenting style were positively correlated with life satisfaction. Authoritarian parenting style was negatively correlated with life satisfaction. Permissive parenting style was positively correlated with family, self, and global satisfaction.

Growth Model Analyses of Life Satisfaction

Latent growth models were conducted to examine the linear changes in life satisfaction. The model fit indices (i.e., CFI and SRMR) indicated adequate data fit for all linear growth models except for self-satisfaction (**Table 3**). The latent change model for self-satisfaction was not convergent. Therefore, no model fit indices for self-satisfaction were reported. Results revealed that life satisfaction (except for self-satisfaction) had medium-high initial levels that significantly decreased over time. The significant negative intercept-slope correlations in friend, school, and global satisfaction indicated that adolescents who initially scored higher reported a sharper decrease with time in the four aforementioned life satisfactions.

Regression Analyses on Personality and Parenting Styles Predicting Life Satisfaction

Five models were then tested with the growth patterns of life satisfaction regressing on personality and parenting styles to examine the predicting roles of personality and parenting styles in global and four domain-specific life satisfactions except for self-satisfaction (see **Table 4**). All five models indicated good fit index with χ^2/df smaller than 5, CFI larger than 0.90, and RMSEA smaller than 0.08, SRMR smaller than 0.08 (Hu and Bentler, 1999; Kline, 2005).

Results indicated that dependability, interpersonal relatedness, and paternal and maternal authoritative styles positively predicted the initial level of family satisfaction, whereas paternal and maternal authoritarian style negatively predicted the initial level of family satisfaction. As for friend satisfaction, social potency, interpersonal relatedness, and paternal authoritative style positively predicted adolescents' initial level of friend satisfaction, whereas paternal authoritarian style negatively predicted the initial level of friend satisfaction. The slope of friend satisfaction was positively predicted by emotional stability and paternal authoritarian style, whereas negatively predicted by social potency. The initial level of health satisfaction was positively predicted by social potency and emotional stability. The initial level of school satisfaction was positively predicted by dependability, emotional stability, interpersonal relatedness, and paternal authoritative style. The

TABLE 1 | Descriptive statistics and zero-order correlations among personality, parenting styles, and life satisfaction at Time 1.

		M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	CPAI_SP	7.36	1.49	(0.84)															
2	CPAI_DEP	7.51	2.01	0.45**	(0.79)														
3	CPAI_ES	8.40	2.26	0.43**	0.49**	(0.86)													
4	CPAI_IR	8.40	1.78	0.38**	0.40**	0.73**	(0.88)												
5	AN_F	2.80	0.81	−0.15**	−0.14**	−0.21**	−0.23**	(0.82)											
6	AU_F	3.72	0.75	0.27**	0.31**	0.27**	0.28**	−0.24**	(0.83)										
7	Per_F	3.08	0.59	0.09**	0.10*	0.08*	0.02	0.03	0.50**	(0.63)									
8	AN_M	2.85	0.82	−0.11**	−0.11**	−0.23**	−0.25**	0.82**	−0.20**	0.07	(0.83)								
9	AU_M	3.77	0.73	0.23**	0.27**	0.24**	0.29**	−0.22**	0.80**	0.39**	−0.26**	(0.81)							
10	Per_M	3.08	0.60	0.05	0.07	0.05	−0.01	0.07	0.33**	0.81**	0.05	0.43**	(0.63)						
11	Family_T1	5.57	1.07	0.28**	0.36**	0.40**	0.43**	−0.46**	0.53**	0.24**	−0.46**	0.54**	0.22**	(0.78)					
12	Friend_T1	6.04	1.13	0.37**	0.26**	0.30**	0.34**	−0.28**	0.30**	0.04	−0.23**	0.28**	0.01	0.45**	(0.76)				
13	Health_T1	5.19	1.47	0.23**	0.15**	0.22**	0.16**	−0.12**	0.12**	0.07	−0.10**	0.11**	0.03	0.25**	0.21**	(0.75)			
14	School_T1	5.61	1.01	0.33**	0.41**	0.41**	0.41**	−0.26**	0.35**	0.03	−0.26**	0.34**	−0.02	0.49**	0.54**	0.25**	(0.79)		
15	Self_T1	4.95	1.25	0.39**	0.29**	0.29**	0.21**	−0.04	0.34**	0.18**	−0.04	0.32**	0.16**	0.40**	0.48**	0.24**	0.31**	(0.80)	
16	Global_T1	4.81	1.23	0.28**	0.31**	0.31**	0.36**	−0.10**	0.38**	0.24**	−0.09*	0.36**	0.22**	0.50**	0.36**	0.21**	0.35**	0.47**	(0.67)

CPAI_SP, Social Potency; CPAI_DEP, Dependability; CPAI_ES, Emotional Stability; CPAI_IR, Interpersonal Relatedness; An_F, Paternal Authoritarian Style. Au_F, Paternal Authoritative Style; Per_F, Paternal Permissive Style; An_M, Maternal Authoritarian Style; Au_M, Maternal Authoritative Style; Per_M, Maternal Permissive Style. Family, Friend, Health, School, Self, Global means domain-specific life satisfaction and global satisfaction. The Cronbach's alphas are shown on the diagonal line.
*$p < 0.05$; **$p < 0.01$.*

TABLE 2 | Descriptive statistics of life satisfaction at Time 2 and Time 3 and their zero-order correlations with personality and parenting styles.

	M	SD	α	CPAI_SP	CPAI_DEP	CPAI_ES	CPAI_IR	AN_F	AU_F	Per_F	AN_M	AU_M	Per_M
Family_T2	5.26	1.16	0.82	0.21**	0.26**	0.35**	0.36**	−0.28**	0.40**	0.19**	−0.33**	0.43**	0.15**
Friend_T2	5.78	1.26	0.81	0.32**	0.26**	0.32**	0.35**	−0.14**	0.30**	0.08*	−0.17**	0.29**	0.06
Health_T2	5.04	1.43	0.74	0.18**	0.15**	0.21**	0.18**	−0.11**	0.14**	0.02	−0.12**	0.14**	−0.01
School_T2	5.32	1.03	0.79	0.29**	0.40**	0.40**	0.41**	−0.10*	0.31**	0.03	−0.13**	0.29**	−0.01
Self_T2	4.78	1.38	0.86	0.36**	0.27**	0.36**	0.25**	−0.05	0.30**	0.12**	−0.10**	0.29**	0.10**
Global_T2	4.62	1.35	0.75	0.21**	0.27**	0.34**	0.32**	−0.13**	0.29**	0.14**	−0.14**	0.31**	0.15**
Family_T3	5.25	1.13	0.86	0.21**	0.26**	0.33**	0.33**	−0.31**	0.41**	0.15**	−0.32**	0.42**	0.14**
Friend_T3	5.74	1.12	0.80	0.26**	0.25**	0.31**	0.30**	−0.19**	0.31**	0.09*	−0.19**	0.32**	0.07
Health_T3	4.98	1.33	0.76	0.19**	0.14**	0.19**	0.18**	−0.05	0.15**	0.00	−0.08	0.18**	0.01
School _T3	5.29	0.96	0.81	0.23**	0.31**	0.32**	0.33**	−0.15**	0.29**	0.01	−0.16**	0.30**	0.01
Self_T3	4.77	1.34	0.88	0.31**	0.28**	0.32**	0.24**	−0.13**	0.25**	0.04	−0.14**	0.24**	0.03
Global_T3	4.53	1.24	0.77	0.21**	0.33**	0.37**	0.31**	−0.17**	0.24**	0.03	−0.14**	0.25**	0.04

CPAI_SP, Social Potency; CPAI_DEP, Dependability; CPAI_ES, Emotional Stability; CPAI_IR, Interpersonal Relatedness; An_F, Paternal Authoritarian Style; Au_F, Paternal Authoritative Style; Per_F, Paternal Permissive Style; An_M, Maternal Authoritarian Style; Au_M, Maternal Authoritative Style; Per_M, Maternal Permissive Style. Family, Friend, Health, School, Self, Global means domain-specific life satisfaction and global satisfaction.
*$p < 0.05$; **$p < 0.01$.*

TABLE 3 | Latent growth models for life satisfaction.

	Growth factors			Model fit indices			
	Intercept (I)	Slope (S)	r(I, S)	χ^2/df	CFI	RMSEA	SRMR
	M(σ²)	M(σ²)					
Family	5.54**(0.76**)	−0.17**(0.14**)	−0.08	15.368/1	0.975	0.142	0.028
Friend	6.02**(0.80**)	−0.15**(0.19**)	−0.15**	5.557/1	0.988	0.080	0.019
Health	5.17**(1.16**)	−0.10**(0.15*)	−0.14	0.331/1	1.000	0.000	0.005
School	5.58**(0.71**)	−0.16**(0.13**)	−0.12**	15.877/1	0.973	0.145	0.028
Global	4.81**(0.97**)	−0.15**(0.26**)	−0.23**	1.081/1	1.000	0.011	0.009

Family, Friend, Health, School, Global means domain-specific life satisfaction and global satisfaction.
*$p < 0.05$; **$p < 0.01$.*

TABLE 4 | Regression analyses for predicting growth of life satisfaction by personality and parenting style.

	Family satisfaction				Friend satisfaction				Health satisfaction			
	Intercept	sr^2	Slope	sr^2	Intercept	sr^2	Slope	sr^2	Intercept	sr^2	Slope	sr^2
SP	−0.01(0.80) [−0.09,0.07]	0.000	−0.02(0.75) [−0.16,0.12]	0.000	0.30(0.00) [0.19,0.41]	0.038	−0.22(0.00) [−0.36, −0.07]	0.012	0.17(0.00) [0.05,0.30]	0.014	−0.09(0.37) [−0.64,0.47]	0.001
DEP	0.14(0.00) [0.06,0.22]	0.008	−0.12(0.08) [−0.25,0.02]	0.003	0.06(0.23) [−0.04,0.16]	0.002	0.01(0.92) [−0.14,0.15]	0.000	−0.00(0.98) [−0.12,0.12]	0.000	0.01(0.92) [−0.38,0.41]	0.000
ES	0.06(0.21) [−0.04,0.16]	0.003	0.12(0.16) [−0.06,0.29]	0.004	−0.01(0.87) [−0.17,0.14]	0.000	0.20(0.03) [0.003,0.39]	0.008	0.19(0.02) [0.03,0.36]	0.009	−0.12(0.37) [−0.59,0.36]	0.001
IR	0.19(0.00) [0.09,0.29]	0.012	−0.10(0.22) [−0.27,0.07]	0.001	0.20(0.00) [0.07,0.34]	0.011	−0.15(0.09) [−0.31,0.01]	0.003	−0.01(0.88) [−0.17,0.15]	0.000	0.05(0.71) [−0.35,0.44]	0.000
AN_F	−0.21(0.00) [−0.34, −0.07]	0.007	0.19(0.07) [−0.10,0.49]	0.003	−0.19(0.02) [−0.35,−0.03]	0.005	0.23(0.04) [0.005,0.51]	0.004	−0.05(0.63) [−0.25,0.16]	0.000	0.16(0.32) [−0.41,0.73]	0.002
AU_F	0.16(0.02) [0.01,0.32]	0.006	0.08(0.45) [−0.17,0.34]	0.001	0.18(0.04) [0.01,0.43]	0.006	0.00(0.98) [−0.28,0.29]	0.000	−0.01(0.96) [−0.21,0.20]	0.000	0.04(0.82) [−0.56,0.64]	0.000
Per_F	0.01(0.89) [−0.15,0.17]	0.000	−0.05(0.70) [−0.31,0.22]	0.000	−0.09(0.36) [−0.29,0.12]	0.001	0.15(0.22) [−0.19,0.50]	0.001	0.18(0.11) [−0.05,0.40]	0.001	−0.33(0.08) [−1.20,0.54]	0.006
AN_M	−0.17(0.01) [−0.30, −0.03]	0.009	−0.05(0.67) [−0.34,0.25]	0.001	0.03(0.69) [−0.14,0.20]	0.000	−0.15(0.20) [−0.42,0.12]	0.001	−0.04(0.66) [−0.24,0.16]	0.001	−0.06(0.69) [−0.45,0.32]	0.000
AU_M	0.27(0.00) [0.13,0.41]	0.014	−0.14(0.21) [−0.38,0.11]	0.001	0.09(0.31) [−0.09,0.26]	0.002	0.02(0.85) [−0.25,0.30]	0.000	0.05(0.63) [−0.15,0.25]	0.002	0.16(0.34) [−0.72, 1.03]	0.002
Per_M	0.09(0.19) [−0.05,0.23]	0.001	−0.05(0.64) [−0.30,0.19]	0.000	0.01(0.95) [−0.19,0.20]	0.000	−0.13(0.28) [−0.45,0.20]	0.001	−0.16(0.12) [−0.37,0.04]	0.003	0.14(0.41) [−0.45,0.73]	0.001

	School satisfaction				Self-satisfaction						Global satisfaction			
	Intercept	sr^2	Slope	sr^2	Time 1	sr^2	Time 2	sr^2	Time 3	sr^2	Intercept	sr^2	Slope	sr^2
SP	0.08(0.07) [−0.01,0.18]	0.003	−0.10(0.15) [−0.23,0.04]	0.003	0.26(0.00) [0.17,0.34]	0.047	0.25(0.00) [0.17,0.33]	0.043	0.18(0.00) [0.09,0.26]	0.024	0.08(0.10) [−0.02,0.18]	0.002	−0.09(0.16) [−0.23,0.04]	0.003
DEP	0.27(0.00) [0.17,0.37]	0.035	−0.12(0.08) [−0.27,0.02]	0.003	0.08(0.08) [−0.01,0.16]	0.004	0.03(0.51) [−0.06,0.12]	0.001	0.09(0.04) [0.002,0.19]	0.006	0.14(0.01) [0.03,0.24]	0.013	0.06(0.38) [−0.09,0.21]	0.002
ES	0.14(0.02) [0.02,0.27]	0.007	−0.01(0.95) [−0.19,0.18]	0.000	0.15(0.01) [0.04,0.26]	0.009	0.28(0.00) [0.17,0.39]	0.032	0.22(0.00) [0.09,0.35]	0.020	0.01(0.87) [−0.13,0.15]	0.001	0.27(0.00) [0.09,0.45]	0.015
IR	0.16(0.01) [0.04,0.29]	0.009	−0.05(0.54) [−0.24,0.13]	0.000	−0.08(0.12) [−0.20,0.03]	0.003	−0.12(0.02) [−0.25, −0.001]	0.007	−0.10(0.09) [−0.22,0.02]	0.006	0.29(0.00) [0.13,0.44]	0.022	−0.24(0.01) [−0.43,−0.06]	0.011
AN_F	0.02(0.80) [−0.15,0.19]	0.000	0.06(0.58) [−0.17,0.29]	0.000	0.10(0.13) [−0.05,0.24]	0.003	0.16(0.02) [0.04,0.28]	0.008	0.06(0.45) [−0.09,0.21]	0.000	0.01(0.90) [−0.15,0.17]	0.000	−0.14(0.22) [−0.35,0.08]	0.002
AU_F	0.16(0.048) [0.004,0.31]	0.006	0.07(0.57) [−0.15,0.29]	0.001	20(0.01) [0.03,0.37]	0.009	0.12(0.11) [−0.02,0.26]	0.003	0.14(0.08) [−0.02,0.30]	0.004	0.17(0.05) [−0.02,0.36]	0.004	−0.12(0.31) [−0.38,0.14]	0.001
Per_F	−0.01(0.91) [−0.18,0.16]	0.000	−0.11(0.37) [−0.38,0.29]	0.002	0.03(0.71) [−0.14,0.20]	0.000	0.04(0.66) [−0.12,0.19]	0.000	−0.03(0.72) [−0.20,0.14]	0.001	0.05(0.60) [−0.15,0.24]	0.000	−0.16(0.20) [−0.44,0.12]	0.002
AN_M	−0.12(0.09) [−0.29,0.05]	0.004	0.05(0.65) [−0.17,0.28]	0.001	−0.01(0.84) [−0.16,0.13]	0.000	−0.11(0.10) [−0.24,0.02]	0.004	−0.08(0.32) [−0.22,0.07]	0.001	0.04(0.58) [−0.12,0.21]	0.000	0.01(0.90) [−0.20,0.23]	0.000
AU_M	0.14(0.06) [0.00,0.29]	0.004	−0.08(0.48) [−0.28,0.12]	0.001	0.09(0.19) [−0.06,0.25]	0.002	0.11(0.14) [−0.04,0.25]	0.003	0.06(0.41) [−0.08,0.21]	0.001	0.14(0.08) [−0.04,0.32]	0.004	−0.01(0.92) [−0.24,0.22]	0.000
Per_M	−0.14(0.07) [−0.30,0.01]	0.003	0.13(0.29) [−0.12,0.37]	0.002	−0.01(0.89) [−0.18,0.15]	0.000	−0.08(0.30) [−0.23,0.07]	0.002	−0.07(0.42) [−0.23,0.10]	0.001	0.12(0.18) [−0.07,0.30]	0.002	−0.08(0.52) [−0.32,0.17]	0.001

SP, Social Potency; DEP, Dependability; ES, Emotional Stability; IR, Interpersonal Relatedness; An_F, Paternal Authoritarian Style; Au_F, Paternal Authoritative Style; Per_F, Paternal Permissive Style; An_M, Maternal Authoritarian Style; Au_M, Maternal Authoritative Style; Per_M, Maternal Permissive Style; sr², squared semi-partial correlations. p-Values were shown within the parentheses. The bootstrapping 5000 results of 95% confidence intervals were shown within the brackets.

initial level of global satisfaction was positively predicted by dependability and interpersonal relatedness. The slope of global satisfaction was positively predicted by emotional stability, whereas negatively predicted by interpersonal relatedness.

These results indicated that social potency, emotional stability, and paternal authoritarian style moderated the growth of friend satisfaction; emotional stability and interpersonal relatedness moderated the growth of global satisfaction. I then conducted simple slope analyses to examine the moderating effects. As presented in **Figure 1**, students with higher social potency (+ 1 *SD*), lower emotional stability (−1 *SD*), or perceived lower paternal authoritarian style (−1 *SD*) displayed sharper decreasing trends in friend satisfaction than did those with lower social potency (−1 *SD*), higher emotional stability (+ 1 *SD*),
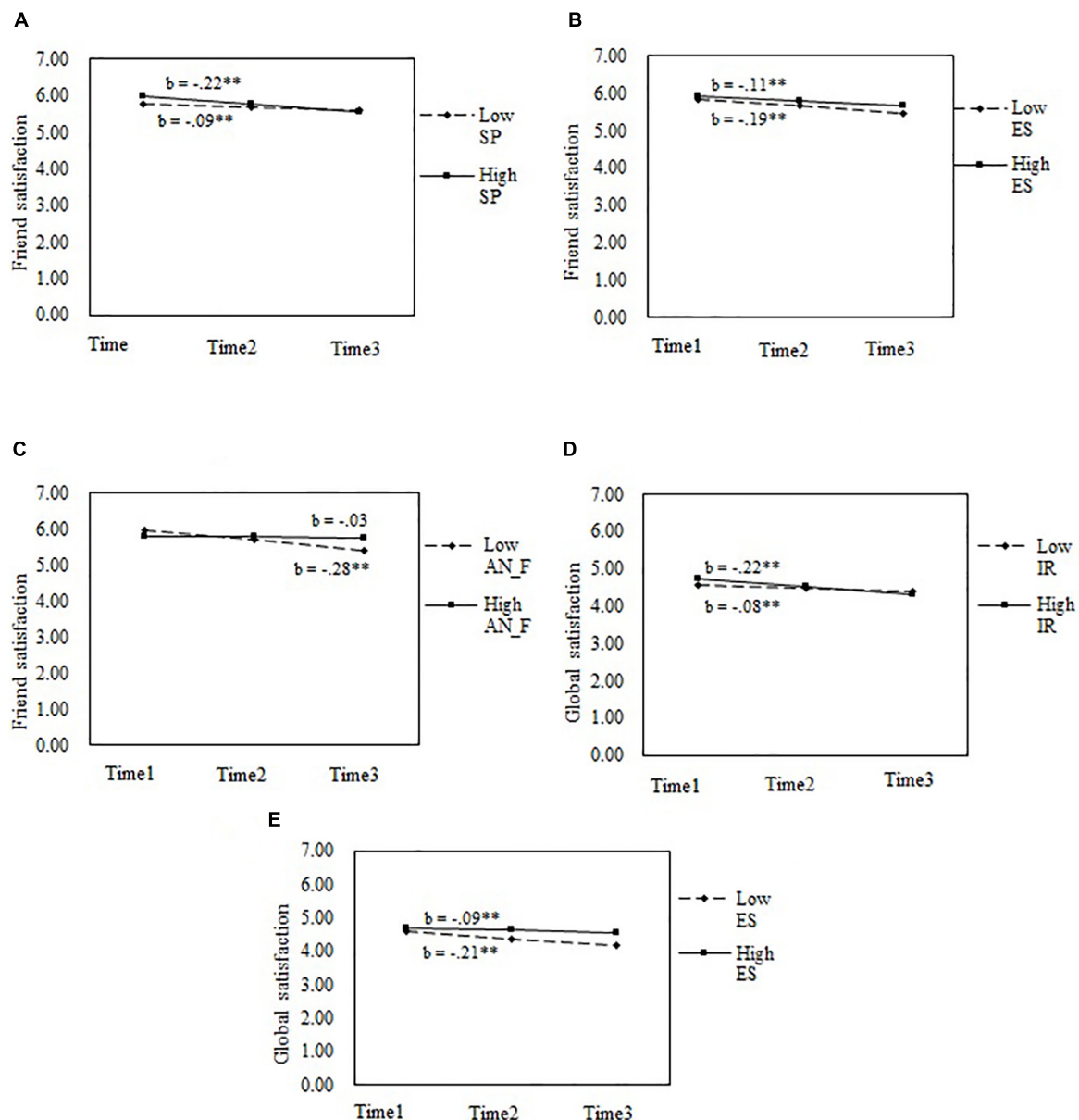
FIGURE 1 | Moderating effects of personality and parenting styles on the growth of life satisfaction from Grade 6 to Grade 8. SP, social potency; ES, emotional stability; IR, interpersonal relatedness; AN_F, paternal authoritarian style. **(A–C)** The moderating effects of social potency, emotional stability, and paternal authoritarian style on growth of friend satisfaction, respectively. **(D,E)** The moderating effects of interpersonal relatedness and emotional stability on growth of global satisfaction, respectively. *$p < 0.05$; **$p < 0.01$.

or perceived higher paternal authoritarian style ($+ 1$ SD) (see **Figures 1A–C**, respectively). Students with higher interpersonal relatedness ($+ 1$ SD) or lower emotional stability (-1 SD) displayed sharper decreasing trends in global satisfaction than did those with lower interpersonal relatedness (-1 SD) or higher emotional stability ($+ 1$ SD) (see **Figures 1D, E**, respectively).

The regression results of self-satisfaction at three time points on parenting styles and personality were reported in **Table 4**. Results showed that social potency, emotional stability and paternal authoritative style positively predicted self-satisfaction at Time 1 and totally complained 25% variance. Self-satisfaction

at Time 2 ($R^2 = 0.24$) was positively predicted by paternal authoritarian style, social potency, and emotional stability, whereas negatively predicted by interpersonal relatedness. Self-satisfaction at Time 3 ($R^2 = 0.19$) was positively predicted by social potency, dependability, and emotional stability.

DISCUSSION

The present longitudinal study explored the developmental trajectories of life satisfaction and investigated the influences of

both maternal and paternal parenting styles and both universal independent personality and Chinese indigenous interdependent personality on life satisfaction in a Chinese adolescent sample.

The Development of Life Satisfaction in Chinese Adolescents

Consistent with our hypothesis, adolescents displayed decreasing trends in both global and domain-specific life satisfactions as the school year progressed. This result reinforced previously reported evidence from Hong Kong (e.g., Shek and Liang, 2018), Taiwan (e.g., Jhang, 2018), mainland China (e.g., Wang and Zhang, 2012), and other countries (e.g., Marquez and Long, 2020). Such decreasing trends may be due to the high expectations (Shoshani and Slone, 2013) and schoolwork pressure (Cosma et al., 2020) during the middle school years in this highly formative era. The inconsistent findings with the stable pattern shown in mainland Chinese high school students (Nie et al., 2019) may indicate that the developmental trajectories in life satisfaction during early adolescence and late adolescence are different (e.g., Chen, 2020).

Life Satisfaction and Personality

The results indicated that four CPAI dimensions significantly predicted both global and domain-specific life satisfaction in Chinese adolescents. The functions of these personality factors varied across different domains of life satisfaction. Such results supported the view that the global and domain-specific life satisfaction are distinguishable and may have different relationships with personality (Weber and Huebner, 2015).

Specifically, consistent with previous studies (e.g., Xie et al., 2016), adolescents who scored higher on social potency reported higher levels of satisfaction in friend and health domains at the initial stage and higher self-satisfaction at all three time points; no significant influence of social potency on the global life satisfaction was viewed (e.g., Chen et al., 2006). Unexpectedly, I found that individuals with higher levels of social potency experienced shaper decrease in friend satisfaction over time. Nevertheless, this result is similar to Li et al.'s (2019) research findings that Chinese adolescents with higher levels of social potency experienced increased loneliness from Grade 6 to Grade 8. It is possible that individuals who are extravertive and like to take the lead in making decisions would maintain larger social networks and thus have higher levels of friend satisfaction at the initial stage (e.g., Moran and Weiss, 2006; Harris and Vazire, 2016). However, as adolescents grow up, "good friends" are not only those who spend time together, but more those who can chat about beliefs, values, and ideologies with each other (Brown, 2004). Thus, it is conceivable that sharper decreasing trends in friend satisfaction for those with higher levels of social potency would be viewed during the research period.

Dependability was found to positively predict the initial levels of family, school, and global life satisfaction, which is in agreement with previous research (e.g., Chen et al., 2006; Xie et al., 2016). For example, Xie et al. (2016) reported positive associations between dependability and the global life satisfaction as well as the satisfaction in family and school domains. Dependable people who are high in responsibility and

have clear life meaning tend to plan ahead and pursue meaningful goals (Cheung et al., 2008), and thus would be more likely to be relied on and have higher life satisfaction (Chen et al., 2006; Ho et al., 2010). Our current finding that dependability only predicted self-satisfaction at Time 3 may indicate that traits like responsibility and meaning in life are more important in determining one's self-satisfaction at higher grades comparing to their contributions at lower grades.

Given the overlapping between dependability and conscientiousness (Cheung et al., 2001), the findings of present study are also, to some extent, consistent with previous studies in which a positive association between conscientiousness and life satisfaction was reported (e.g., Suldo et al., 2015; Weber and Huebner, 2015). For example, Weber and Huebner (2015) found that conscientiousness was positively related to satisfaction in family life and school experiences domains in US adolescents. With a sample of US high school students, Suldo et al. (2015) reported that conscientiousness positively predicted global life satisfaction.

Higher levels of emotional stability were associated with higher initial levels of satisfaction in health and school domains as well as higher self-satisfaction at all three time points, which substantiates previous empirical studies (e.g., Xie et al., 2016; Tian et al., 2017; Cohrdes and Mauz, 2020). For example, Tian et al. (2017) reported a positive association between emotional stability and subjective well-being in school (i.e., school satisfaction and school affect) in Chinese adolescent students. Although adolescents generally displayed a decrease trend in life satisfaction in the current study, it was found that highly emotionally stable individuals declined less from Grade 6 to Grade 8. These results suggested that emotional stability could serve as a protective factor that helps adolescents cope with stressful situations (e.g., Ho et al., 2013).

The positive predictions from interpersonal relatedness on the initial levels of adolescents' family, friend, and school satisfactions are consistent with previous findings in Chinese adolescents. For example, Xie et al. (2016) found significant and positive influence of interpersonal relatedness on family, friend, and school satisfaction in a sample of junior secondary school students. These results provided empirical support for the idea that the interpersonal relationship orientation is associated with the quality of social relationships (Cheung et al., 2001) and leads to the satisfaction in interaction with others (Xie et al., 2016). Higher levels of interpersonal relatedness were also related to higher initial levels in global life satisfaction. This result is in agreement with previous research in which a positive association between interpersonal relatedness and adolescents' global life satisfaction was reported (e.g., Ho et al., 2008; Xie et al., 2016). Such findings supported the idea that the emphasis on relationships with others can help to foster individuals' life satisfaction (Blanca et al., 2018).

However, contrary to our hypothesis, individuals with higher levels of interpersonal relatedness experienced a shaper decrease in global life satisfaction over time and lower levels of self-satisfaction at Time 2. This result suggested that the tendency to maintain useful ties, avoid conflict, and contribute to the collective over the individual goals (features of interpersonal

relatedness) may sometimes have negative consequences because individuals may give up their own interests and maintain even harmful relationships (Kim et al., 2018). The contribution of interpersonal relatedness to Chinese adolescents' life satisfaction highlighted the importance of considering the indigenous personality when exploring factors that influence adolescents' development in the specific cultural context.

Life Satisfaction and Parenting Styles

Regarding the variations in life satisfaction as a function of maternal and paternal parenting styles, the present results overall indicated that parenting styles were related to domain-specific life satisfaction. However, in contrast with literature showing positive link between global life satisfaction and parental authoritative style in Western and non-Western cultures, and negative link between global life satisfaction and parental authoritarian style in Western cultures and positive link between global life satisfaction and parental authoritarian style in Chinese Context (e.g., Milevsky et al., 2007; Xie et al., 2016; Gherasim et al., 2017), parenting styles in the present study did not influence the global life satisfaction when the effect of adolescents' personality is considered. One possible reason is that most previous studies did not consider the influence of individuals' personality when exploring the influence of parenting styles on life satisfaction (e.g., Abubakar et al., 2015). Results in the current study implied that the influence of parenting on student development becomes less important as individuals' demand for independence and autonomy increase during adolescence (Inguglia et al., 2015), and that personality traits were better predictors of life satisfaction than situational factors (Diener et al., 1999).

In the present study, adolescents who perceived their mothers or fathers as more authoritative reported higher family satisfaction at the initial stage, and those who perceived their mothers or fathers as more authoritarian reported lower family satisfaction at the initial stage. These findings are consistent with the previous studies that were conducted in Western contexts, showing that authoritative parenting style is associated with happier family life and authoritarian is related to lower family satisfaction (e.g., Givertz and Segrin, 2014). Such similar results may indicate that whether in Western or in non-Western contexts, authoritative parenting is preferred than authoritarianism in achieving a child perceived happy family life. An alternative explanation is that the present sample was recruited from Shanghai that has a relatively high exposure to the Western cultural context, and thus would display a similar relationship pattern with the findings in Western context. It was also noted that on family satisfaction, paternal and maternal parenting styles have a similar function.

In addition, paternal authoritative style was found to be associated with higher levels of friend, school, and self-satisfaction at the initial stage. These results were in accordance with the findings of previous studies in which authoritative style was shown to play an important role in adolescents' interpersonal management (e.g., Shalini and Acharya, 2013), avoidance of social withdrawal (e.g., Sandhu and Sharma, 2015), school adjustment (e.g., Pinquart and Kauser, 2018), and general self-efficacy (e.g., Tam et al., 2012).

It should be noted that adolescents who perceived lower paternal authoritarian style reported higher levels of friend satisfaction at the initial stage and sharper decrease trends over 2 years. Although this result was unexpected, similar observations were made by Di Maggio and Zappulla (2014). In their study, Italian high school students (with the similar age to the participants in the present study at Time 3) who perceived their fathers as authoritarian reported higher levels of satisfaction with friends than those with authoritative fathers.

It was also found that adolescents who perceived higher paternal authoritarian parenting would be more likely to be satisfied of themselves. These findings hinted that lower authoritarian parenting may not always be a good thing for Chinese adolescents' life satisfaction (Chao, 1994). Specifically, unlike in Western cultures where authoritarianism is construed as rejection, in the Chinese context that Confucian philosophy is highlighted, the authoritarian parenting may be perceived as training and monitoring. Chinese parents who engage the authoritarian parenting would supervise, monitor, and guide their children's behaviors to fit the rules and standards of the society. Such guidance and monitoring are beneficial for the formation of children's adaptive working model of self, such as seeing oneself as lovable, competent and worthy (Li et al., 2016). This result is also consistent with previous research which showing that parental behavioral control associated with higher life satisfaction among Chinese adolescents (e.g., Zhu and Shek, 2021).

THEORETICAL AND PRACTICAL IMPLICATIONS

The current three-wave longitudinal study provided at least three aspects of theoretical contributions. First, the findings provided more empirical evidence of the development trajectories in life satisfaction among early adolescents, which has been rarely examined in the context of mainland China. Second, this study highlighted the impact of culture-specific personality (i.e., interpersonal relatedness) on the development of adolescents' life satisfaction above and beyond the universal independent personality factors (i.e., social potency, emotional stability, and dependability). Such results suggested that including culture-specific personality in research might provide a better prediction of developmental outcomes than only considering universal personality factors. Third, the findings provide further evidence for the long-term influence of parenting styles and add value to the research field by revealing how paternal and maternal styles may affect the trajectories in each specific aspects of life satisfaction among early adolescents, respectively. The differences in functions of paternal and maternal parenting styles highlighted the importance of examining the consequences of parenting practices separately for mothers and fathers.

The current study also has possible implications for potential prevention and intervention programs aiming at promoting early adolescent life satisfaction. First, personality assessment, particularly relevant with indigenous personality attributes, may help with the identification of adolescents who are at

risk of life dissatisfaction. The close relationship between personality and life satisfaction suggests that early intervention efforts are warranted for adolescents at Grade 6 with lower levels of social potency, dependability, emotional stability, and interpersonal relatedness to avoid maladaptive functioning which was progressed from low life satisfaction (e.g., Proctor et al., 2009). Furthermore, given that adolescents with higher levels of social potency and interpersonal relatedness appeared to decline sharper in life satisfaction, although high life satisfaction at Grade 6 were displayed, attention should also be paid to those who seemed untargeted at Grade 6.

Second, interventions are suggested to be designed to help with adolescents' personality development. Although personality is relatively stable throughout the life span, there is evidence that personality is changeable and malleable due to significant life events or changing environments (e.g., Specht et al., 2011). Programs focusing on personality would be helpful to enhance the life satisfaction of adolescents. Because the influence of personality on life satisfaction was different across varied life domains, intervention could be designed according to which specific domain of satisfaction is targeted. For example, in order to promote satisfaction in social life (i.e., family, friend, and school satisfaction) and help those with social adjustment problems, professionals and teachers could encourage and cultivate adolescents to be more interpersonal-relationship orientated.

Third, given that authoritative parenting is linked to higher levels of life satisfaction, family interventions and family education program are suggested to employ to improve the practice of authoritative parenting. Moreover, most work on parenting styles has combined maternal and paternal styles (e.g., Xiang et al., 2017), or only focused on the effects of maternal parenting styles (e.g., Gherasim et al., 2017), whereas the present study showed that, compared with maternal parenting, paternal parenting seemed to play a more important role in Chinese adolescents' lives, especially in the friend, school, and self domains of life satisfaction. Therefore, intervention programs aiming at promoting adolescent life satisfaction should not only incorporate components related to maternal parenting behaviors, but also pay attention to fathers' involvement and encourage and cultivate fathers to adopt the authoritative parenting style.

LIMITATIONS AND FUTURE DIRECTIONS

The present study has several limitations that might suggest directions for future research. First, although the study was a three-wave longitudinal design that lasted 2 years, it only explored the development of life satisfaction in early adolescents.

To capture the characteristics during the whole adolescence stage, future longitudinal studies should continue exploring the change patterns of adolescents' life satisfaction over a longer time frame. Second, only adolescents' self-report measures were employed in the present study. Although I have checked the common method bias, the self-reported data may still have some limitations, such as the social desirability bias. Parent-report, teacher-report, and peer-report measures could be employed to supplement students' reports in future research. Third, the sample in the present study was from one city in mainland China, which may be distinctive to other cities due to different economic and educational backgrounds. Future research could examine more regions with different Chinese local cultures. Finally, the self-satisfaction dimension in this study only achieved the partial scalar invariance, which indicates that mean differences of self-satisfaction did not capture all mean differences in shared variance of the items measuring this dimension. To reduce chances of running into such problems, future studies should revise the self-satisfaction items and improve its psychometric properties.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Shanghai Normal University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

ML substantially contributed to the conception and the design of the work, acquisition of data and analyzed and interpreted the data, and prepared the draft and finalize it. The author approved the final version of the manuscript for submission.

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REFERENCES

Abubakar, A., Van de Vijver, F. J., Suryani, A. O., Handayani, P., and Pandia, W. S. (2015). Perceptions of parenting styles and their associations with mental health and life satisfaction among urban Indonesian adolescents. *J. Child Fam. Stud.* 24, 2680–2692.

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., and Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: a meta-analysis. *Psychol. Bull.* 146:279.

Arnett, J. J. (1999). Adolescent storm and stress, reconsidered. *Am. Psychol.* 54, 317–326.

Bandalos, D. L. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Struct. Equ. Modeling* 9, 78–102.

Baumrind, D. (1971). Current patterns of parental authority. *Dev. Psychol.* 4, 1–103.

Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *J. Early Adolesc.* 11, 56–95.

Blanca, M. J., Ferragut, M., Ortiz-Tallo, M., and Bendayan, R. (2018). Life satisfaction and character strengths in Spanish early adolescents. *J. Happiness Stud.* 19, 1247–1260.

Bratt, C. (2015). One of few or one of many: Social identification and psychological well-being among minority youth. *Br. J. Soc. Psychol.* 54, 671–694.

Brown, B. B. (2004). "Adolescents' relationships with peers," in *Handbook of Adolescent Psychology*, eds R. Lerner and L. Steinberg (Hoboken, NJ: Wiley), 363–394.

Buri, J. R. (1991). Parental authority questionnaire. *J. Pers. Assess.* 57, 110–119.

Casas, F., and González-Carrasco, M. (2019). Subjective well-being decreasing with age: new research on children over 8. *Child Dev.* 90, 375–394.

Chao, R. K. (1994). Beyond parental control and authoritarian parenting style: understanding Chinese parenting through the cultural notion of training. *Child Dev.* 65, 1111–1119.

Chen, K. M. (2020). Subjective poverty, deprivation, and the subjective well-being of children and young people: a multilevel growth curve analysis in Taiwan. *Child. Youth Serv. Rev.* 114:105045. doi: 10.1016/j.childyouth.2020.105045

Chen, S. X., Cheung, F. M., Bond, M. H., and Leung, J. P. (2006). Going beyond self-esteem to predict life satisfaction: the Chinese case. *Asian J. Soc. Psychol.* 9, 24–35.

Cheung, F. M., and Cheung, S. F. (2005). *The Chinese Adolescents' Life Satisfaction Scale (CALSS)*. Hong Kong: The Chinese University of Hong Kong.

Cheung, F. M., Cheung, S. F., Leung, K., Ward, C., and Leong, F. (2003). The English version of the Chinese personality assessment inventory. *J. Cross Cult. Psychol.* 34, 433–452.

Cheung, F. M., Fan, W., Cheung, S. F., and Leung, K. (2008). Standardization of the cross-cultural (Chinese) personality assessment inventory for adolescents in Hong Kong: a combined emic-etic approach to personality assessment. *Acta Psychol. Sin.* 40, 839–852.

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z., et al. (2001). Indigenous Chinese personality constructs: is the five-factor model complete? *J. Cross Cult. Psychol.* 32, 407–433.

Cheung, S. F., Cheung, F. M., and Fan, W. (2013). "From Chinese to cross-cultural personality inventory: a combined emic-etic approach to the study of personality in culture," in *Advances in Culture and Psychology*, Vol. 3, eds M. J. Gelfand, C. Chiu, and Y. Hong (Oxford: Oxford University Press).

Coccia, C., Darling, C. A., Rehm, M., Cui, M., and Sathe, S. K. (2012). Adolescent health, stress and life satisfaction: the paradox of indulgent parenting. *Stress Health* 28, 211–221.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd Edn. Mahwah, NJ: Lawrence Erlbaum.

Cohrdes, C., and Mauz, E. (2020). Self-efficacy and emotional stability buffer negative effects of adverse childhood experiences on young adult health-related quality of life. *J. Adolesc. Health* 67, 93–100. doi: 10.1016/j.jadohealth.2020.01.005

Cosma, A., Stevens, G., Martin, G., Duinhof, E. L., Walsh, S. D., Garcia-Moya, I., et al. (2020). Cross-national time trends in adolescent mental well-being from 2002 to 2018 and the explanatory role of schoolwork pressure. *J. Adolesc. Health* 66, S50–S58.

Di Maggio, R., and Zappulla, C. (2014). Mothering, fathering, and Italian adolescents' problem behaviors and life satisfaction: dimensional and typological approach. *J. Child Fam. Stud.* 23, 567–580.

Diener, E. (1984). Subjective well-being. *Psychol. Bull.* 95, 542–575.

Diener, E., Emmons, R. A., Larsen, R. J., and Griffin, S. (1985). The satisfaction with life scale. *J. Pers. Assess.* 49, 71–75.

Diener, E., Suh, E. M., Lucas, R. E., and Smith, H. L. (1999). Subjective well-being: three decades of progress. *Psychol. Bull.* 125, 276–302. doi: 10.1037/0033-2909.125.2.276

Fan, J. (2014). *Thinking Styles' Socialization and Their Roles in Student Development*. Doctoral dissertation. Hong Kong: The university of Hong Kong.

Fan, W., Cheung, F. M., Zhang, J. X., and Cheung, S. F. (2011). A combined emic-etic approach to personality: CPAI and cross-cultural applications. *Acta Psychol. Sin.* 43, 1418–1429.

Faul, F., Erdfelder, E., Buchner, A., and Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav. Res. Methods* 41, 1149–1160.

Gao, Q., Bian, R., Wan, X., Wei, H., and Qiu, H. (2021). The influence of paternal and maternal parenting styles on adolescents' regulatory focus: a longitudinal study. *Curr. Psychol.* [Advance online publication].

Garcia, D. (2011). Two models of personality and well-being among adolescents. *Pers. Individ. Dif.* 50, 1208–1212.

Gherasim, L. R., Brumariu, L. E., and Alim, C. L. (2017). Parenting style and children's life satisfaction and depressive symptoms: preliminary findings from Romania, France, and Russia. *J. Happiness Stud.* 18, 1013–1028.

Gilman, R., Huebner, E. S., and Laughlin, J. (2000). A first study of the multidimensional students' life scale with adolescents. *Soc. Indic. Res.* 52, 135–160.

Givertz, M., and Segrin, C. (2014). The association between overinvolved parenting and young adults' self-efficacy, psychological entitlement, and family communication. *Commun. Res.* 41, 1111–1136.

Gomez-Baya, D., Mendoza, R., Gaspar, T., and Gomes, P. (2018). Responses to positive affect, life satisfaction and self-esteem: a cross-lagged panel analysis during middle adolescence. *Scand. J. Psychol.* 59, 462–472.

Harris, K., and Vazire, S. (2016). On friendship development and the big five personality traits. *Soc. Pers. Psychol. Compass* 10, 647–667.

Ho, M. Y., Cheung, F. M., and Cheung, S. F. (2008). Personality and life events as predictors of adolescents' life satisfaction: do life events mediate the link between personality and life satisfaction? *Soc. Indic. Res.* 89, 457–471.

Ho, M. Y., Cheung, F. M., and Cheung, S. F. (2010). The role of meaning in life and optimism in promoting well-being. *Pers. Individ. Dif.* 48, 658–663.

Ho, M. Y., Cheung, F. M., You, J., Kam, C., Zhang, X., and Kliewer, W. (2013). The moderating role of emotional stability in the relationship between exposure to violence and anxiety and depression. *Pers. Individ. Dif.* 55, 634–639. doi: 10.1016/j.paid.2013.05.004

Hu, L. T., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equ. Modeling* 6, 1–55.

Huebner, E. S., Gilman, R., and Ma, C. (2012). "Perceived quality of life of children and youth," in *Handbook of Social Indicators and Quality of Life Research*, eds K. Land, A. Michalos, and M. Sirgy (Dordrecht: Springer), 355–372.

Inguglia, C., Ingoglia, S., Liga, F., Coco, A. L., and Cricchio, M. G. L. (2015). Autonomy and relatedness in adolescence and emerging adulthood: relationships with parental support and psychological distress. *J. Adult Dev.* 22, 1–13.

Jhang, F. H. (2018). The five dimensions of money attitudes and their link to changes in life satisfaction among Taiwanese adolescents in poverty. *Appl. Res. Qual. Life* 13, 399–418.

Joshanloo, M., and Afshari, S. (2011). Big Five personality traits and self-esteem as predictors of life satisfaction in Iranian Muslim University students. *J. Happiness Stud.* 12, 105–113. doi: 10.1007/s10902-009-9177-y

Jovanović, V. (2019). Adolescent life satisfaction: the role of negative life events and the big five personality traits. *Pers. Individ. Dif.* 151:109548.

Jovanović, V., Joshanloo, M., Đunda, D., and Bakhshi, A. (2017). Gender differences in the relationship between domain-specific and general life satisfaction: a study in Iran and Serbia. *Appl. Res. Qual. Life* 12, 185–204.

Jung, S., and Choi, E. (2017). Life satisfaction and delinquent behaviors among Korean adolescents. *Pers. Individ. Dif.* 104, 104–110.

Kenny, D. A., Kaniskan, B., and McCoach, D. B. (2014). The performance of RMSEA in models with small degrees of freedom. *Sociol. Methods Res.* 44, 486–507. doi: 10.1177/0049124114543236

Kim, E. K., Furlong, M. J., and Dowdy, E. (2019). Adolescents' personality traits and positive psychological orientations: relations with emotional distress and life satisfaction mediated by school connectedness. *Child Indic. Res.* 12, 1951–1969.

Kim, H., Schimmack, U., Oishi, S., and Tsutsui, Y. (2018). Extraversion and life satisfaction: a cross-cultural examination of student and nationally representative samples. *J. Pers.* 86, 604–618.

Klimstra, T. A., Noftle, E. E., Luyckx, K., Goossens, L., and Robins, R. W. (2018). Personality development and adjustment in college: a multifaceted, cross-national view. *J. Pers. Soc. Psychol.* 115:338.

Kline, R. (1998). *Principles and Practice of Structural Equation Modeling*. New York, NY: The Guilford Press.

Kline, R. (2005). *Principles and Practices of Structural Equation Modeling*, 2nd Edn. New York, NY: The Guilford Press.

Lavrič, M., and Naterer, A. (2020). The power of authoritative parenting: a cross-national study of effects of exposure to different parenting styles on life satisfaction. *Child. Youth Serv. Rev.* 116:105274.

Lent, R. W., Singley, D., Sheu, H., Gainor, K. A., Brenner, B. R., Treistman, D., et al. (2005). Social cognitive predictors of domain and life satisfaction: exploring the theoretical precursors of subjective well-being. *J. Couns. Psychol.* 52, 429–442. doi: 10.1037/0022-0167.52.3.429

Leung, C. Y. W., McBride-Chang, C., and Lai, B. P. Y. (2004). Relations among maternal parenting style, academic competence, and life satisfaction in Chinese early adolescents. *J. Early Adolesc.* 24, 113–143.

Lewis, A. D., Huebner, E. S., Malone, P. S., and Valois, R. F. (2011). Life satisfaction and student engagement in adolescents. *J. Youth Adolesc.* 40, 249–262.

Li, D., Li, X., Wang, Y., and Bao, Z. (2016). Parenting and Chinese adolescent suicidal ideation and suicide attempts: the mediating role of hopelessness. *J. Child Fam. Stud.* 25, 1397–1407.

Li, M., Fan, W., Chen, X., and Cheung, F. M. (2019). Independent and interdependent personalities at individual and group levels: predicting loneliness in Chinese adolescents. *Pers. Individ. Dif.* 147, 85–90.

Lin, E. J., and Church, A. T. (2004). Are indigenous Chinese personality dimensions culture-specific? An investigation of the Chinese personality assessment inventory in Chinese American and European American samples. *J. Cross Cult. Psychol.* 35, 586–605.

Little, T. D., Cunningham, W. A., Shahar, G., and Widaman, K. F. (2002). To parcel or not to parcel: exploring the question, weighing the merits. *Struct. Equ. Modeling* 9, 151–173.

Marcionetti, J., and Rossier, J. (2016). Global life satisfaction in adolescence: the role of personality traits, self-esteem, and self-efficacy. *J. Individ. Dif.* 37:135.

Marques, S. C., Lopez, S. J., and Mitchell, J. (2013). The role of hope, spirituality and religious practice in adolescents' life satisfaction: longitudinal findings. *J. Happiness Stud.* 14, 251–261.

Marques, S. C., Pais-Ribeiro, J. L., and Lopez, S. J. (2011). The role of positive psychology constructs in predicting mental health and academic achievement in children and adolescents: a two-year longitudinal study. *J. Happiness Stud.* 12, 1049–1062.

Marquez, J., and Long, E. (2020). A global decline in adolescents' subjective well-being: a comparative study exploring patterns of change in the life satisfaction of 15-year-old students in 46 countries. *Child Indic. Res.* 14, 1251–1292.

Martin, K., Huebner, E. S., and Valois, R. F. (2008). Does life satisfaction predict victimization experiences in adolescence? *Psychol. Schools* 45, 705–714.

McCrae, R. R., and Costa, P. T. Jr. (2008). "The five-factor theory of personality," in *Handbook of Personality: Theory and Research*, eds O. P. John, R. W. Robins, and L. A. Pervin (New York, NY: Guilford Press).

Milevsky, A., Schlechter, M., Netter, S., and Keehn, D. (2007). Maternal and paternal parenting styles in adolescents: associations with self-esteem, depression and life-satisfaction. *J. Child Fam. Stud.* 16, 39–47.

Moran, M. M., and Weiss, M. R. (2006). Peer leadership in sport: links with friendship, peer acceptance, psychological characteristics, and athletic ability. *J. Appl. Sport Psychol.* 18, 97–113.

Negru-Subtirica, O., Pop, E. I., and Crocetti, E. (2015). Developmental trajectories and reciprocal associations between career adaptability and vocational identity: a three-wave longitudinal study with adolescents. *J. Vocat. Behav.* 88, 131–142. doi: 10.1016/j.jvb.2015.03.004

Nie, Q., Teng, Z., Bear, G. G., Guo, C., Liu, Y., and Zhang, D. (2019). Hope as mediator between teacher–student relationships and life satisfaction among Chinese adolescents: a between-and within-person effects analysis. *J. Happiness Stud.* 20, 2367–2383.

Pinquart, M., and Kauser, R. (2018). Do the associations of parenting styles with behavior problems and academic achievement vary by culture? Results from a meta-analysis. *Cultur. Divers. Ethnic Minor. Psychol.* 24, 75–100. doi: 10.1037/cdp0000149

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88:879.

Proctor, C. L., Linley, P., and Maltby, J. (2009). Youth life satisfaction: a review of the literature. *J. Happiness Stud.* 10, 583–630. doi: 10.1007/s10902-008-9110-9

Raboteg-Saric, Z., and Sakic, M. (2014). Relations of parenting styles and friendship quality to self-esteem, life satisfaction and happiness in adolescents. *Appl. Res. Qual. Life* 9, 749–765.

Salmela-Aro, K., and Tuominen-Soini, H. (2010). Adolescents' life satisfaction during the transition to post-comprehensive education: antecedents and consequences. *J. Happiness Stud.* 11, 683–701.

Sandhu, G. K., and Sharma, V. (2015). Social withdrawal and social anxiety in relation to stylistic parenting dimensions in the Indian cultural context. *Res. Psychol. Behav. Sci.* 3, 51–59.

Shalini, A., and Acharya, Y. (2013). Perceived paternal parenting style on emotional intelligence of adolescents. *Guru J. Behav. Soc. Sci.* 1, 194–202.

Shek, D. T. (2007). A longitudinal study of perceived parental psychological control and psychological well-being in Chinese adolescents in Hong Kong. *J. Clin. Psychol.* 63, 1–22.

Shek, D. T., and Liang, L. Y. (2018). Psychosocial factors influencing individual well-being in Chinese adolescents in Hong Kong: a six-year longitudinal study. *Appl. Res. Qual. Life* 13, 561–584.

Shoshani, A., and Slone, M. (2013). Middle school transition from the strengths perspective: young adolescents' character strengths, subjective well-being, and school adjustment. *J. Happiness Stud.* 14, 1163–1181.

Specht, J., Elgoff, B., and Schmukle, S. C. (2011). Stability and change of personality across the life course: the impact of age and major life events on mean-level and rank-order stability of the Big Five. *J. Pers. Soc. Psychol.* 101, 862–882.

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends Cognit. Sci.* 9, 69–74.

Steinmetz, H. (2013). Analyzing observed composite differences across groups. Is partial measurement invariance enough? *Methodology* 9, 1–12. doi: 10.1027/1614-2241/a000049

Suldo, S. M., Minch, D. R., and Hearon, B. V. (2015). Adolescent life satisfaction and personality characteristics: investigating relationships using a five factor model. *J. Happiness Stud.* 16, 965–983. doi: 10.1007/s10902-014-9544-1

Taasoobshirazi, G., and Wang, S. (2016). The performance of the SRMR, RMSEA, CFI, and TLI: an examination of sample size, path size, and degrees of freedom. *J. Appl. Quant. Methods* 11, 31–39.

Tam, C. L., Chong, A., Kadirvelu, A., and Khoo, Y. T. (2012). Parenting styles and self-efficacy of adolescents: Malaysian scenario. *Glob. J. Hum. Soc. Sci.* 12, 19–25.

Tian, L., Yu, T., and Huebner, E. S. (2017). Achievement goal orientations and adolescents' subjective well-being in school: the mediating roles of academic social comparison directions. *Front. Psychol.* 8:37. doi: 10.3389/fpsyg.2017.00037

Wang, X. Q., and Zhang, D. J. (2012). The change of junior middle school students' life satisfaction and the prospective effect of resilience: a two-year longitudinal study. *Psychol. Dev. Educ.* 1, 91–98.

Weber, M., and Huebner, E. S. (2015). Early adolescents' personality and life satisfaction: a closer look at global vs. domain-specific satisfaction. *Pers. Individ. Dif.* 83, 31–36.

Xiang, S., Liu, Y., and Bai, L. (2017). Parenting styles and adolescents' school adjustment: investigating the mediating role of achievement goals within the 2× 2 Framework. *Front. Psychol.* 8:1809. doi: 10.3389/fpsyg.2017.01809

Xie, Q., Fan, W., Wong, P., and Cheung, F. M. (2016). Personality and parenting style as predictors of life satisfaction among Chinese secondary students. *Asia Pac. Educ. Res.* 25, 423–432.

Xu, L., Liu, R. D., Ding, Y., Mou, X., Wang, J., and Liu, Y. (2017). The mediation effect of coping style on the relations between personality and life satisfaction in Chinese adolescents. *Front. Psychol.* 8:1076. doi: 10.3389/fpsyg.2017.01076

Yang, K. S. (2006). "Indigenous personality research: the Chinese case," in *Indigenous and Cultural Psychology: Understanding People in Context*, eds U. Kim, K.-S. Yang, and K.-K. Hwang (Boston, MA: Springer), 285–314. doi: 10.1007/0-387-28662-4_13

Zhang, X. A., Tian, P., and Grigoriou, N. (2011). Gain face, but lose happiness? It depends on how much money you have. *Asian J. Soc. Psychol.* 14, 112–125.

Zhu, X., and Shek, D. T. (2021). Parental factors and adolescent well-being: associations between developmental trajectories. *Child. Youth Serv. Rev.* 127:106071.

APPENDIX

APPENDIX 1 | Measurement Invariance Tests of Life Satisfaction Scale.

	Model	χ^2	df	RMSEA	SRMR	CFI	$\Delta\chi^2(\Delta df)$	ΔRMSEA	ΔCFI
Family satisfaction	configural invariance	17.32	18	0.000	0.022	1.000			
	metric invariance	18.35	22	0.000	0.024	1.000	1.03(4)	0.000	0.000
	scalar invariance	21.63	26	0.000	0.027	1.000	4.31(8)	0.000	0.000
Friend satisfaction	configural invariance	131.61	51	0.047	0.028	0.970			
	metric invariance	132.48	57	0.043	0.030	0.972	0.87(6)	−0.004	0.002
	scalar invariance	136.20	63	0.040	0.031	0.973	4.59(12)	−0.007	0.003
Health satisfaction	configural invariance	270.61	51	0.078	0.044	0.913			
	metric invariance	277.82	57	0.074	0.048	0.913	7.21(6)	−0.004	0.000
	scalar invariance	282.17	63	0.070	0.048	0.914	11.56(12)	−0.008	0.001
School satisfaction	configural invariance	95.83	23	0.067	0.029	0.971			
	metric invariance	106.39	27	0.064	0.047	0.968	1.59*(4)	−0.003	−0.003
	scalar invariance	108.47	31	0.059	0.048	0.969	12.64(8)	−0.008	−0.002
Self-satisfaction	configural invariance	20.41	15	0.023	0.024	0.998			
	metric invariance	27.84	19	0.026	0.033	0.997	7.43(4)	0.003	−0.001
	scalar invariance	92.08	23	0.065	0.053	0.978	71.67**(8)	0.042[b]	−0.020[b]
	partial scalar invariance[a]	33.47	21	0.029	0.034	0.996	13.06*(6)	0.003	−0.001
Global satisfaction	configural invariance	371.61	72	0.077	0.054	0.907			
	metric invariance	381.53	80	0.073	0.058	0.907	9.92(8)	−0.004	0.000
	scalar invariance	404.09	88	0.071	0.060	0.902	32.48**(16)	−0.006	−0.005

CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual. To determine significant differences between these two models at least two of the following three criteria had to be matched: $\Delta\chi^2$ significant at $p < 0.05$, $\Delta CFI \geq 0.01$, and $\Delta RMSEA \geq 0.015$ (Negru-Subtirica et al., 2015).

*p < 0.05; **p < 0.01.
[a] partial scalar invariance with two intercepts freed.
[b] ΔCFI or $\Delta RMSEA$ higher than cutoffs.

The Influence of Actual Appraisals of Peers on the Self-Appraisals of Personality Traits for Chinese Late Adolescents: The Mediating Effect of Reflected Appraisals

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Reflected appraisals refer to the perceptions of individuals of how they are perceived by others. Numerous studies in cultural psychology have revealed that individuals in the Eastern collectivist culture show an interdependent self-construal, which depends much on the social culture. Hence, the research on reflected appraisals in the Eastern culture can improve the understanding of how the social environment shapes the self-perception of an individual. In this study, we aimed to explore the relationships among self-appraisals, reflected appraisals, and actual appraisals of peers of the Big Five personality for Chinese late adolescents. Participants were divided into 16 groups, with two to four people of each group who were familiar with each other. Each participant was told to fill out the questionnaires of reflected appraisals, actual appraisals of peers, and self-appraisals. Through analyzing 164 sets of data, the results showed the following: (a) The scores of reflected appraisals are significantly lower than that of the actual appraisals of peers. (b) The relationships among the reflected appraisals, actual appraisals of peers, and self-appraisals are distinct on different personalities. For extroversion, there are significant medium- to high-degree relationships among the three types of appraisals; while for the agreeableness, conscientiousness, emotional stability, and openness, self-appraisals are highly correlated with reflected appraisals, and reflected appraisals show a low-degree correlation with the actual appraisals of peers. (c) Reflected appraisals play a mediating role between actual appraisals of peers and self-appraisals. Our study suggests that individuals in Chinese culture generally underestimate how their peers perceive them. Furthermore, actual appraisals of peers affect the self-concepts of individuals through reflected appraisals. This study revealed the unique personality feature of self-modesty under the background of Chinese culture and the importance of peers on the development of self-concepts for Chinese late adolescents. This study can shed new light on the understanding of the development of self-concepts for late adolescents under different cultural backgrounds.

Keywords: reflected appraisals, self-appraisals, others' actual appraisals, Big Five personality, mediating effect

"The one who knows others is wise, and the one who knows oneself is really intelligent"—Lao-Tzu

INTRODUCTION

To pursue proper self-knowledge is one of the most important tasks for an individual in his or her lifetime, especially at the stage of adolescence. Adolescence is regarded as a period that is rapid and greatly shifty, involving biological growth, changes in major social roles, and other factors (Sawyer et al., 2018). Despite the historical and cultural differences in the definition of adolescence, modern scholars generally define it as the period between the ages of 10 and 24 years (Sawyer et al., 2018; Crone and Fuligni, 2020). With the enhancement of individual autonomous awareness during adolescence (Steinberg and Silverberg, 1986) and the assumption of new social roles and changes in the living environment (Brown, 2004; Harter, 2015), self-exploration and identity development become the most important developmental tasks at this stage (Erikson, 1963). Therefore, scholars generally think that adolescence is a stage of lifetime during which self-knowledge changes significantly (Harter, 2015; Romund et al., 2016; Cruijsen et al., 2018).

Self-knowledge is considered to be a collection of self-representations that can be truly and accurately described (Bukowski, 2019), which not only involves how an individual usually thinks and feels, as well as the self-perception of behavior, but also refers to how an individual interprets the awareness of these patterns to others (Vazire, 2010; Xua et al., 2015). On the one hand, self-knowledge of people needs to depend on individual introspection, that is, to survey our inner world (such as feelings, goals, and memories) (Bukowski, 2019). On the other hand, self-knowledge also roots in the social interaction (Hinde et al., 2001; Bollich et al., 2011; Harter, 2015). The classical theory of symbolic interaction (Cooley, 1902; Mead, 1934) emphasizes the social construction of the self which believes that the social interaction plays an important role in the construction, maintenance, and change of the self (Kaufman and Johnson, 2004). Without the interaction with others, people would certainly not have a self-view (Swann and Bosson, 2010).

Reflected appraisals, which are the perception of an individual of how others view them, are the core of studying how the social interaction affects the self in the theory of symbolic interaction (Gecas and Burke, 1995; Srivastava, 2012). The reflected appraisals model holds that when others make judgments about us (i.e., actual appraisals of others), we will perceive appraisals of others on us (i.e., reflected appraisals), and then, we will internalize the perceived appraisals into our own view on ourselves (i.e., self-appraisals; Kinch, 1963; Stets et al., 2020). Some studies have proved the mediating role of reflected appraisals in different fields, such as the influence of parents, teachers, and classmates on the academic ability of middle-school students (Bouchey and Harter, 2005; Nurra and Pansu, 2009; Tomasetto et al., 2015); the influence of classmates on the teaching ability of normal University students (Hu et al., 2014); and the influence of parents, coaches, and teammates on the sports ability of teenagers (Amorose, 2002, 2003; Bois et al., 2005); the influence of parents or peers on criminal

behavior (Brownfield and Thompson, 2005; Walters, 2016); the influence of social environment on racial identity (Khanna, 2010; Sims, 2016); and the influence of parents on the self-concept of adolescents (Silva et al., 2020). However, some studies did not underpin the mediation hypothesis of reflected appraisals (Felson, 1993; Hergovich et al., 2002).

People interact socially with many different others, but different others are of different importance to an individual. If the other is regarded as the relevant, important, valuable, expected, and a member of the group by the individual, the perception of appraisals of another person is more likely to be internalized into the self-concept (Cast et al., 1999; Sinclair et al., 2005; Srivastava, 2012; Wallace and Tice, 2012). On the one hand, at the stage of adolescence, individuals are strongly influenced by peers (Borghuis et al., 2017; Luan and Bleidorn, 2019; Crone and Fuligni, 2020); they spend significantly less time on their parents, but significantly more time on their peers (Jankowski et al., 2014); they are more sensitive to the acceptance or rejection of information by peers (Pfeifer and Peake, 2012), especially of their friends or lovers (Yue et al., 2012, 2020). On the other hand, adolescents have not yet fully formed a stable self-view (Erikson, 1963), and even in the late adolescence (i.e., 18–24 years old), their main feature is also to explore their identity (Veroude et al., 2014). Moreover, with the development of cognitive ability of an individual, the change of living environment, and other aspects during adolescence, adolescents form more and more abstract self-descriptions, and more different self-concepts (Brown, 2004; Harter, 2015); and self-representation increasingly focuses on interpersonal or social characteristics (Lu, 1990).

Under different cultural backgrounds, self-concept of people may not be affected by social others to the same degree. Individualist culture attaches more importance to the independence and uniqueness of individuals, while collectivist culture attaches more importance to interpersonal relations and interdependence (Triandis, 1995), thus forming independent self-construct and interdependent self-construct, respectively (Markus and Kitayama, 1991). Some studies have found that, compared with Americans, Chinese are better at perspective taking (Wu and Keysar, 2007). In particular, when appraising oneself in a field highly related to the evaluation of others, individuals with interdependent self-construct have more perspective taking (Li, 2006; Pfeifer et al., 2017). For people with individualistic tendency, their self-representation is more likely to be constructed in a general way, while for people with collectivist tendencies, their self-representation is more likely to be constructed in a context mode (Zhou and Cacioppo, 2010). Some scholars believe that, compared with Americans, the self-concepts of Japanese college students are more affected by the presence of others (Kanagawa et al., 2001). Some studies have also found that the perspective of others very often becomes the default position of the East Asian self (Suh, 2007). These studies meant that the appraisals of others have a greater influence on individual self-concept in the collectivist culture. Therefore, the first issue to be explored in this study is whether peers influence the self-perception of Chinese adolescents, and if so, what role does reflected appraisals play in this?

Cultural factors are not only reflected in the self-concept of people but also in the process of reflected appraisals. Researchers believe that reflected appraisals are interlocking series of processes (Wallace and Tice, 2012), which involve both how others express their appraisals on an individual and how an individual receives such feedback information, even how an individual accurately perceives views of others on himself or herself. In general, people do not express negative information directly (DePaulo and Bell, 1996). Since Chinese culture focuses more on interpersonal harmony (Ho et al., 1991; Yang, 1995; Kim et al., 2006), others will be more indirect and implicit when expressing appraisals information (Gao, 1998; Wen et al., 2009; Hu et al., 2014), which may mean that others usually express more positive views toward individuals. Given the characteristics of Chinese culture, the second issue discussed in this study is whether individuals in the context of Chinese culture can accurately perceive the views of others of them. If not, what are the characteristics of their self-concepts?

One of the salient features of Chinese culture is the worship of modesty (Cai et al., 2011); its main manifestation is "humble oneself and respect others" (Hu and Huang, 2006). That is to say, in order to maintain interpersonal harmony in interpersonal interaction, modesty requires individuals to put themselves in a relatively low position and others in a higher position and use some low-key, implicit way to show themselves (Hu and Huang, 2009), and even to some extent self-deprecating (Shi and Zhang, 2018). This means that modesty requires individuals to keep a low profile, both in self-evaluation and in inferring what others think of them, which in turn showed lower self-appraisals and reflected appraisals. Therefore, we proposed Hypothesis 1: Chinese late adolescents may underestimate the views of others on themselves.

Besides, according to the self-other knowledge asymmetry (SOKA) model (Vazire, 2010), the self and the others have similar information about individuals in some fields of high observations and low evaluativeness (such as extraversion). In the fields of low observations and evaluativeness (such as emotional stability), the self has more information. In the fields of low observations and high evaluativeness (such as openness), others have more information. Therefore, we proposed Hypothesis 2: The relationship among the actual appraisals, reflected appraisals, and self-appraisals of others varies with different traits.

Scholars generally believe that Chinese people have interdependent self-construct (Zhu et al., 2007; Pfeifer and Peake, 2012; Ma et al., 2014), while some studies point out that the degree of interdependent self-construct of Chinese people depends on different fields, with more interdependence in the social self-field and more independence in the academic field (Zhang et al., 2006; Pfeifer et al., 2017). Therefore, this study mainly focuses on the social field of Chinese self. Vazire (2010) believed that most of the personality is an interpersonal relationship in essence. This study took the Big Five personality as the content of appraisals, to explore the influence of peers on the self-concept of Chinese late adolescents. Due to the relative instability of the self in adolescence, peers become more and more important. On this basis, we proposed Hypothesis 3: Actual appraisals of others indirectly affect the self-appraisals of individuals through reflected appraisals.

METHODS

Participants

According to the definition of adolescence (Sawyer et al., 2018; Crone and Fuligni, 2020), the ages of adolescence range from 10 to 24 years. Therefore, we recruited Chinese late adolescents aged from 18 to 24 years. In this study, 59 undergraduate students were recruited *via* the internet through convenient sampling [32 women, 19–23 years old, $M = 21.06$, standard deviation (SD) $= 1.06$]. They were given a detailed introduction and received a written consent prior to the study. They received course credits for their participation. Then, each participant was told to complete three types of questionnaires, namely, self-appraisal questionnaire, reflected appraisal questionnaire, and actual appraisals of peers questionnaire. A total of 387 questionnaires were distributed, and all of them were completed and qualified. This study was approved by the Ethics Committee of the Chongqing University of Arts and Sciences.

Procedure

According to previous research procedures (Levesque, 1997; Hu et al., 2014), 59 participants were divided into 16 groups, each group consisting two to four members who were familiar with each other. Members in each group came to the lab together and completed the study at the same time. In the lab, everyone sat at a desk with a partition, which is to prevent each other from communicating when filling in the questionnaires. The participants were asked to perceive their personality traits based on the Big Five Inventory. They completed three types of questionnaires in order, namely, (a) self-appraisal questionnaire (i.e., how they perceived of themselves), (b) reflected appraisal questionnaire (i.e., how they perceived his or her peers in the group evaluating their own personality traits), and (c) actual appraisals of others questionnaires (i.e., evaluating personality traits of his or her peers in the group). The number of questionnaires completed by each person is ([2 × the number of people in the group] −1).

Measures

We adopted the 44-item version of Big Five Inventory (John and Srivastava, 1999), which has been proved to be suitable for personality measurement in the context of Chinese culture (Li et al., 2015; Carciofo et al., 2016). It consists of five factors, namely, openness, conscientiousness, extroversion, agreeableness, and emotional stability. The 44 items were assessed on a 7-point Likert scale ranging from 1 (i.e., does not apply at all) to 7 (i.e., applies fully). The Cronbach's alpha coefficients for the subscales of the Big Five Inventory ranged from 0.75 to 0.82. The classical paradigm from previous studies (Nurra and Pansu, 2009; Silva et al., 2020) was adopted to measure self-appraisals, reflected appraisals, and actual appraisals of others. Example items included "Am I talkative?" (i.e., self-appraisals), "Does my peer think I'm talkative?" (i.e., reflected appraisals), and "Is my peer talkative?" (i.e., actual appraisals of peers and the names of peers of each participant were written here).

Statistical Analysis

First, the self-appraisals, reflected appraisals, and actual appraisals of peers of each participant were matched one by one. A total of 164 groups of data were processed and analyzed by using the SPSS version 18.0 software. The descriptive statistics (i.e., mean and SD), Pearson correlations, and repeated-measures analysis of variance (ANOVA) were computed. Subsequently, the SPSS macro PROCESS Model 4 (Hayes and Preacher, 2013) was adopted for the mediation analysis, with self-appraisals as the independent variable, reflected appraisals as the mediator, and the actual appraisals of peers as the outcome variable; 5,000 bias-corrected bootstrapped resamplings were used to estimate the 95% confidence interval (CI). Mediation was deemed to be statistically significant if the CIs did not include zero.

RESULTS

The Test of Common Method Variance

Identifying common methods variance with the data collected from a single source was considered as a sticky issue (Avolio et al., 1991). In the present study, we used the Harman's one-factor test (Podsakoff and Organ, 1986) to analyze the common methods variance (Livingstone et al., 1997). The basic assumption of this technique was that if a large number of method variations are present, then a single factor would be isolated during the factor analysis or a common factor explained most of the variation (Fuller et al., 2016). In this study, unrotated factor analysis was carried out to analyze 13 factors of characteristic roots above 1, and the first principal factor explained 17.49% of the variation, which was <40%. The result suggested that there was not any obvious common method bias.

The Differences and Correlations Between the Three Types of Appraisals of Big Five Personality

Descriptive statistics (i.e., mean and SD) and correlations between all variables are summarized in **Table 1**. In order to compare the differences between his/her self-appraisals, reflected appraisals, and actual appraisals of peers of Big Five personality traits, we conducted a repeated measure ANOVA. In the ANOVA analysis, the appraisal condition (i.e., self-appraisals, reflected appraisals, and actual appraisals of peers) was considered as a within-subject factor. The results yielded significant main

effects of appraisal condition on openness [$F_{(2, 326)} = 5.41$, $p < 0.01$, $\eta^2 = 0.032$], conscientiousness [$F_{(2, 326)} = 20.50$, $p < 0.001$, $\eta^2 = 0.112$], extroversion [$F_{(2, 326)} = 31.62$, $p < 0.001$, $\eta^2 = 0.162$], and emotional stability [$F_{(2, 326)} = 39.74$, $p < 0.001$, $\eta^2 = 0.196$] but not on agreeableness [$F_{(2, 326)} = 1.99$, $p > 0.05$]. Further, the one-way ANOVA and *post-hoc* test were conducted, and the results showed the general trend on extroversion, conscientiousness, and emotional stability that the scores of actual appraisals of peers were significantly higher than that of reflected appraisals and self-appraisals, and the scores of reflected appraisals were significantly higher than that of self-appraisals. For openness, the scores of actual appraisals of peers were significantly higher than that of reflected appraisals and self-appraisals, but there was no significant difference between reflected appraisals and self-appraisals.

As indicated in **Table 1**, the Pearson correlation analysis showed there were significant high correlations between self-appraisals and reflected appraisals on five factors ($r = 0.68–0.77$). Furthermore, for extroversion, there was a significant medium correlation between reflected appraisals and actual appraisals of peers ($r = 0.56$), whereas reflected appraisals and actual appraisals of peers showed significantly low relationships on the other four factors ($r = 0.20–0.25$). There was a significant medium correlation between self-appraisals and actual appraisals of peers ($r = 0.48$) on extroversion and a low correlation on openness ($r = 0.19$), but no significant correlation on the other three factors.

The Mediation Analyses

We adopted the model 4 in the SPSS macro PROCESS (Hayes and Preacher, 2013) to test the mediating effect of reflected appraisals on the influence of actual appraisals of peers on self-appraisals. The results showed that reflected appraisals were significantly related to self-appraisals (extroversion, $\beta = 0.73$, $p < 0.001$; agreeableness, $\beta = 0.74$, $p < 0.001$; conscientiousness, $\beta = 0.69$, $p < 0.001$; emotional stability, $\beta = 0.71$, $p < 0.001$; openness, $\beta = 0.72$, $p < 0.001$). The bias-corrected percentile bootstrap analysis further revealed that the mediation effects of reflected appraisals on the relationship between actual appraisals of peers and self-appraisals on the Five Personality traits were all significant (see **Table 2** and **Figure 1**). The indirect effects of the mediating variable were as follows: extroversion [ab (means indirect effect

TABLE 1 | The descriptive statistics and correlations between three types of appraisals.

Factors	SA M (SD)	RA M (SD)	AA M (SD)	SA-RA	RA-AA	SA-AA
Extroversion	4.03 (0.93)	4.31 (0.99)	4.55 (0.91)	0.77**	0.56**	0.48**
Agreeableness	4.82 (0.64)	4.75 (0.58)	4.87 (0.69)	0.72**	0.25**	0.10
Conscientiousness	4.13 (0.78)	4.28 (0.76)	4.55 (0.68)	0.68**	0.21**	0.10
Emotional stability	3.84 (0.81)	4.13 (0.75)	4.43 (0.67)	0.69**	0.23**	0.08
Openness	4.35 (0.65)	4.25 (0.64)	4.45 (0.75)	0.73**	0.20*	0.19**

SA, self-appraisals; RA, reflected appraisals; AA, actual appraisals of peers; M, mean; SD, standard deviation; SA–RA means the relationship between SA and RA; *p < 0.05 and **p < 0.01.

TABLE 2 | Direct effect, indirect effect, and total effect among the variables.

		Effect	Boot SE	Boot LL CI	Boot UL CI
Extroversion	Indirect effect	0.42	0.06	0.31	0.54
	Direct effect	0.07	0.06	−0.05	0.20
	Total effect	0.49	0.07	0.35	0.64
Agreeableness	Indirect effect	0.17	0.05	0.07	0.29
	Direct effect	−0.08	0.05	−0.19	0.02
	Total effect	0.09	0.07	−0.05	0.23
Conscientiousness	Indirect effect	0.15	0.06	0.05	0.26
	Direct effect	−0.05	0.07	−0.18	0.08
	Total effect	0.10	0.09	−0.07	0.27
Emotional stability	Indirect effect	0.20	0.07	0.06	0.34
	Direct effect	−0.11	0.07	−0.24	0.03
	Total effect	0.09	0.09	−0.10	0.27
Openness	Indirect effect	0.12	0.05	0.04	0.23
	Direct effect	0.04	0.04	−0.04	0.13
	Total effect	0.17	0.07	0.04	0.29

Bootstrap sample size = 5,000; SE, standard error; LL, low limit; UL, upper limit; CI, confidence interval.

value) = 0.42, standard error (SE) = 0.06, 95% CI = 0.31–0.54], agreeableness (ab = 0.17, SE = 0.05, 95% CI = 0.07–0.29), conscientiousness (ab = 0.15, SE = 0.06, 95% CI = 0.05–0.26), emotional stability (ab = 0.20, SE = 0.07, 95% CI = 0.06–0.34), and openness (ab = 0.12, SE = 0.05, 95% CI = 0.04–0.23).

DISCUSSION

This study mainly discussed the influence of peers on self-perception during late adolescence under the background of collectivistic culture, and the results showed that reflected appraisals played a mediating role between actual appraisals of peers and self-perception, that is, actual appraisals of peers indirectly influences self-perception of adolescents through reflected appraisals. This study also found that there was a certain degree of correlation between reflected appraisals of an individual and actual appraisals of peers under the background of collectivistic culture, but the score of reflected appraisals was lower than actual appraisals of peers, which indicated that Chinese people had a certain degree of accuracy of views of others on themselves that was usually underestimated by themselves.

The study has found that, on the dimensions of extroversion, conscientiousness, and emotional stability, self-appraisals were lower than reflected appraisals and actual appraisals of peers; meanwhile, reflected appraisals were lower than actual appraisals of peers. Furthermore, Chinese people had the least positive views on themselves and views of others on themselves, which were different from the research on Western individuals. Research on the accuracy of reflected appraisals in Western culture finds that in terms of personality traits, scores of reflected appraisals are higher than actual evaluation of others, indicating that Westerners overestimate the views of others on themselves (Carlson and Kenny, 2012). We speculated that this result

reflects cultural characteristics of self. From the perspective of social interaction, Chinese culture emphasized on interpersonal harmony and coexistence (Ho et al., 1991; Yang, 1995; Kim et al., 2006), and Chinese people paid attention to "face" in the process of social interaction (Wen et al., 2009), which determined the implicit and indirect of expression in the process of interpersonal communication (Gao, 1998; Hu et al., 2014). Therefore, in the process of interpersonal interaction, in order to maintain the "face" of each other (Wen et al., 2009), Chinese people usually do not directly express the feedback about the actual situation of others but give more positive appraisals feedback on them. In contrast, since Chinese culture advocates modesty, which requires showing "humble oneself and respect others" in interpersonal interaction, Chinese people do not show their uniqueness too much in interpersonal interaction but degrade themselves to a certain extent (Shi and Zhang, 2018), showing low self-appraisals. Given the rules that preserve the "face" of others in interpersonal interactions and the cultural norms that require modesty about oneself, reflected appraisals of Chinese people are inaccurate and may underestimate perceptions of others of themselves. However, this study found that on the agreeableness dimension, there was no significant difference in the three kinds of appraisals scores. This result could suggest the self-enhancement motivation (not a self-modest way) of Chinese people on the agreeableness dimension. Some scholars pointed out that when it came to the most meaningful and important part of the self, East Asians would show self-enhancement motivation (Wang, 2005). As Chinese culture focused on interpersonal relationships, Chinese regarded the self as social roles and relationships of a person (Zhu et al., 2007), suggesting that interpersonal relationship for Chinese self was one of the most important and meaningful contents. Therefore, they showed higher scores of self-appraisals on the agreeableness dimension, and there was no significant difference between three types of appraisals.

This study also found that there was a high correlation between Chinese self-appraisals and reflected appraisals and a significant low correlation between reflected appraisals and actual appraisals of peers, which was in accord with the existing results (Silva et al., 2020), indicating that Chinese are able to know their views of peers on them to a certain extent. This study also discovered that the relationships between the three types of appraisals varied with the different traits. Specifically, the relationships between the three types of appraisals were related to trait characteristics. On the dimension of extraversion, actual appraisals of peers had medium to high correlations with reflected appraisals and self-appraisals, whereas, actual appraisals of peers had a significant low correlation with self-appraisals and reflected appraisals on openness. For agreeableness, conscientiousness, and emotional stability, there was a significant low correlation between reflected appraisals and actual appraisals of peers and no significant correlation between self-appraisals and actual appraisals of peers. These results could be related to the self–other knowledge asymmetry model (Vazire, 2010). According to the SOKA model, personality traits involved both observability and evaluativeness. Extraversion was a field with a high observability but low evaluativeness; the judgments of self

FIGURE 1 | Mediation models of the effect of actual appraisals of peers and self-appraisals via reflected appraisals. SA, self-appraisals; RA, reflected appraisals; AA, actual appraisals of peers; M, mean; **$p < 0.01$ and ***$p < 0.001$.
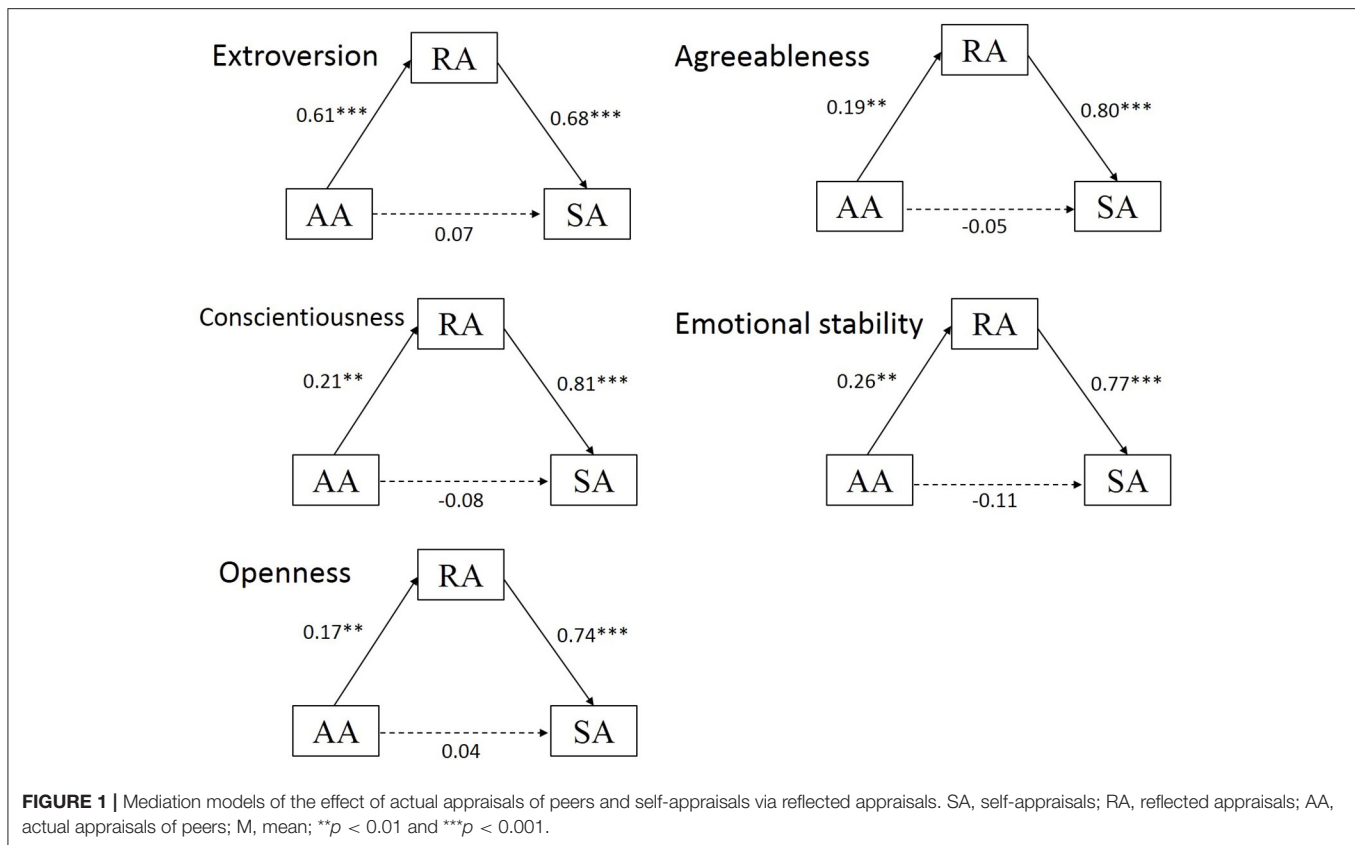
and others were based on similar information (i.e., observation of external behaviors of an individual); therefore, there are high correlations between the three types of appraisals. Openness is a field with a high evaluativeness but low observability, which indicates that others have more information, and self-information of openness is more from outside others, so the self could partially detect actual appraisals of peers. Accordingly, there were significant correlations between self-appraisals, actual appraisals of peers, and reflected appraisals. In the SOKA model, emotional stability is a field with a low observability and evaluativeness, which indicates that individuals have more information about themselves on this dimension, while others have less relevant information, thus, self-appraisals do not show a significant correlation with actual appraisals of peers. However, under the background of collectivistic culture, agreeableness and conscientiousness have a high social desirability (Schlicht et al., 2009). We tended to show bias when evaluating personality traits with a high social desirability (Chen et al., 2013), which may lead to the non-significant correlation between self-appraisals and appraisals of others.

In this study, it was found that actual appraisals of peers had an impact on the self-perception of Chinese in late adolescence, but this impact was indirectly influenced by reflected appraisals, which verified the effectiveness of reflected appraisals model under collectivist culture. On the one hand, Chinese culture attached great importance to interpersonal relationship (Zhu and Han, 2008), and Chinese people had interdependent selves. On the other hand, with the growth of the individuals, peers

have become increasingly important (Borghuis et al., 2017; Luan and Bleidorn, 2019), so individuals are sensitive to the feedback of peers (Pfeifer and Peake, 2012). Moreover, the participants in this study are in late adolescence, and their self-concepts are not stable (Veroude et al., 2014). Taken together, these factors accorded for the impact of actual appraisals of peers on his/her self-perception. It is worth noting that actual appraisals of peers did not directly affect self-appraisals under the background of Chinese culture but indirectly affected self-appraisals through reflected appraisals. Previous studies have found that Chinese were better at perspective-taking (Wu and Keysar, 2007), especially when it came to the relative fields of evaluations of others (Pfeifer et al., 2017). The appraisals content of this study was the Big Five personality traits, and Vazire and Carlson (2010) believed that most of the personality was an interpersonal relationship in essence, which meant that Chinese had stronger perspective taking in the judgment of the Big Five personalities. Generally, perspective taking was the basis of reflected appraisals. Previous studies found that adolescents usually pay more attention to the views of others (Pfeifer et al., 2009; Harter, 2015); especially in East Asia, views of others were the default position of the self (Suh, 2007). Therefore, regardless of the accuracy of reflected appraisals of individuals, the self-knowledge of Chinese was based more on reflected appraisals in the process of interpersonal interaction. Accordingly, reflected appraisals played an intermediary role between actual appraisals of peers and self-appraisals.

This study explores the relationship between self-appraisals, reflected appraisals, and actual appraisals of others on the Big Five personality traits of Chinese people, extending this research field to collectivist culture, and finds the cultural characteristics of reflected appraisals. On the one hand, this study further verifies the rationality of the reflected appraisals model under the collectivism culture. Specifically, actual appraisals of peers indirectly affect the self-appraisals of Chinese teenagers through reflected appraisals. On the other hand, the study also found the uniqueness of reflected appraisals in the context of Chinese culture. Due to the cultural requirements of "face" and "modesty" in interpersonal interaction, Chinese people are more low-key in reflected appraisals compared with Westerners and tend to underestimate the opinions of their peers of them. This study is helpful to understand the formation process of personality of people under collectivism culture. However, this study also has some limitations. First, in terms of the appraisals content, this study only involved the Big Five personality traits. Some studies believed that the self-construct of Chinese subjects is related to specific fields, and there was an independent self-construct in the academic field (Pfeifer et al., 2017). Therefore, whether the results of this study are applicable to the academic field still needs to be further discussed. Second, the participants in the present study were in late adolescence, and developmental psychologists generally believed that peers had a greater influence on the self-concept of individuals in early adolescence (Jankowski et al., 2014). So, further research is needed to determine whether the results can be inferred to other groups of subjects. Third, this study only selected peers groups and neglected other important people. Research on the cognitive structure of the self-found that the self of Chinese included mother (Zhang et al., 2006). Therefore, parents were also important others for Chinese. Then, under the collectivistic culture, how do reflected appraisals from parents affect the self-concept of individuals? More research is needed in the future.

In conclusion, although this study has some limitations, there are still some significant results. We found that, unlike Westerners overestimate the views of others on themselves, Chinese people often underestimate the views of others on themselves. The relationship between self-appraisals, reflected appraisals, and actual appraisals of others varies with different traits. Actual appraisals of others indirectly affect the self-appraisals of Chinese late adolescents through reflected appraisals. This study has been helpful for us to understand the characteristics and functions of reflected appraisals from a cultural perspective.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee of the Chongqing University of Arts and Sciences. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CY and ZY designed the experiments. ZY and YL carried out the survey. CY, QX, and WP analyzed the data. CY, YL, and WP drafted the initial manuscript and revised the manuscript. All authors approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

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REFERENCES

Amorose, A. J. (2002).The influence of reflected appraisals on middle school and high school athletes' self-perceptions of sport competence. *Pediatr. Exerc. Sci.* 14, 377–390. doi: 10.1123/pes.14.4.377

Amorose, A. J. (2003). Reflected appraisals and perceived importance of significant others' appraisals as predictors of college athletes' self-perceptions of competence. *Res. Q. Exerc. Sport* 74, 60–70. doi: 10.1080/02701367.2003.10609065

Avolio, B. J., Yammarino, F. J., and Bass, B. M. (1991). Identifying common methods variance with data collected from a single source: an unresolved sticky issue. *J. Manage.* 17, 571–587. doi: 10.1177/014920639101700303

Bois, J. E., Sarrazin, P. G., Brustad, R. J., Chanal, J. P., and Trouilloud, D. O. (2005). Parents' appraisals, reflected appraisals, and children's self-appraisals of sport competence: a yearlong study. *J. Appl. Sport Psychol.* 17, 273–289. doi: 10.1080/10413200500313552

Bollich, K. L., Johannet, P. M., and Vazire, S. (2011). In search of our true selves: feedback as a path to self-knowledge. *Front. Psychol.* 2:312. doi: 10.3389/fpsyg.2011.00312

Borghuis, J., Denissen, J. J. A., Oberski, D., Sijtsma, K., Meeus, W. H. J., Branje, S., et al. (2017). Big Five personality stability, change, and codevelopment across adolescence and early adulthood. *J. Pers. Soc. Psychol.* 113, 641–657. doi: 10.1037/pspp0 000138

Bouchey, H. A., and Harter, S. (2005). Reflected appraisals, academic self-perceptions, and math science achievement during early adolescence. *Educ. Psychol.* 97, 673–686. doi: 10.1037/0022-0663.97.4.673

Brown, B. (2004). "Adolescents' relationships with peers," in *Handbook of Adolescent Psychology,* eds R. Lerner and L. Steinberg (New York, NY: Wiley), pp. 363–394.

Brownfield, D., and Thompson, K. (2005). Self-concept and delinquency the effects of reflected appraisals by parent and peers. *Western Criminol. Rev.* 6, 22–29.

Bukowski, H. (2019). "Self-knowledge," in *Encyclopedia of Personality and Individual Differences,* eds V. Zeigler-Hill and T. K. Shackelford (Cham: Springer International Publishing), 1–5. doi: 10.1007/978-3-319-28099-8_2004-1

Cai, H., Feng,Y.,and Yue, X. (2011). Pan-cultural need for self-esteem: evidence from China. *Adv. Psychol. Sci.* 19, 1–8. Available online at: http://journal.psych.ac.cn/xlkxjz/EN/abstract/abstract967.shtml

Carciofo, R., Yang, J., Song, N., Du, F., and Zhang, K. (2016). Psychometric evaluation of Chinese-language 44-item and 10-item big five personality inventories, including correlations with chronotype, mindfulness and mind wandering. *PLoS ONE* 11:e0149963. doi: 10.1371/journal.pone.0149963

Carlson, E. N., and Kenny, D. A. (2012). "Meta-accuracy: do we know how others see us?," in *Handbook of Self-Knowledge*, (New York, NY: The Guilford Press), 242-257.

Cast, A. D., Stets, J. E., and Burke, P. J. (1999). Does the self conform to the views of others. *Soc. Psychol. Q.* 62, 68–82. doi: 10.2307/2695826

Chen, S., Wu, H., and Lai, T. (2013). The accuracy of personality judgment: the effects of trait properties. *Adv. Psychol. Sci.* 21, 1441–1449. doi: 10.3724/sp.J.1042.2013.01441

Cooley, C. H. (1902). *Human Nature and the Social Order*. New York, NY: Charles Scribner's Sons.

Crone, E. A., and Fuligni, A. J. (2020). Self and others in adolescence. *Ann. Rev. Psychol.* 71, 447–469. doi: 10.1146/annurev-psych-010419-050937

Cruijsen, R. V. D., Peters, S., Aar, L. P. E. V. D., and Crone, E. A. (2018). The neural signature of self-concept development in adolescence: the role of domain and valence distinctions. *Dev. Cogn. Neurosci.* 30, 1–12. doi: 10.1016/j.dcn.2017.11.005

DePaulo, B. M., and Bell, K. L. (1996).Truth and investment: lies are told to those who care. *J. Pers. Soc. Psychol.* 71, 703–716. doi: 10.1037//0022-3514.71.4.703

Erikson, E. H. (1963). *Childhood and Society, 2nd Edn*. New York, NY: Norton.

Felson, R. (1993). "The (somewhat) social self: how others affect self-appraisals," in *The Self in Social Perspective, Vol. 4,* ed J. Suls (Hillsdale, NJ: Erlbaum), 1–26.

Fuller, C., Simmering, M., Atinc, G., Atinc, Y., and Babin, B. (2016). Common methods variance detection in business research. *Bus. Res.* 69, 3192–3198. doi: 10.1016/j.jbusres.2015.12.008

Gao, G. (1998). Don't take my word for it understanding Chinese speaking practices. *Int. J.* 22, 163–186. doi: 10.1016/S0147-1767(98)00003-0

Gecas, V., and Burke, P. J. (1995). "Self and identity," in *Sociological Perspectives on Social Psychology*, eds K. Cook, G. A. Fine, and J. House (Boston, MA: Allyn and Bacon), 41–67.

Harter, S. (2015). *The Construction of the Self: Developmental and Sociocultural Foundations, 2nd Edn*. New York, NY: The Guilford Press.

Hayes, A. F., and Preacher, K. J. (2013). *Conditional Process Modeling: Using Structural Equation Modeling to Examine Contingent Causal Processes*. Charlotte, NC: Information Age Publishing.

Hergovich, A., Sirsch, U., and Felinger, M. (2002). Self-appraisals, actual appraisals and reflected appraisals of preadolescent children. *Soc. Behav. Pers. Int. J.* 30, 603–611. doi: 10.2224/sbp.2002.30.6.603

Hinde, R. A., Finkenauer, C., and Auhagen, A. E. (2001). Relationships and the self-concept. *Pers. Relations.* 8, 187–204. doi: 10.1111/j.1475-6811.2001.tb00035.x

Ho, D. Y. F., Chan, S. J., and Chiu, C. (1991). "Relational orientation: an inquiry on the methodology of Chinese social psychology," in *Chinese Psychology and Behavior,* eds K. S. Yang and K. K. Hwang (Taipei: Kuei-Kuan Publishing Co.), 49–66 (in Chinese).

Hu, C. M.,Yue, C. Z., He, H. M., and Yang, D. D. (2014). Relationship among self-appraisals, others' actual appraisals and reflected appraisals on the teachers' teaching ability of normal college students. *Psychol. Dev. Educ.* 30, 520–526. doi: 10.19044/esj.2016.v12n7p181

Hu, J., and Huang, X. (2006). A research on self-modesty in Chinese society. *J. Psychol. Sci.* 29, 1392–1395. doi: 10.16719/j.cnki.1671-6981.2006.06.024

Hu, J., and Huang,. X. (2009). Preliminary study on self-modesty: one significant behavioral style of Chinese. *Acta Psychol. Sin.* 41, 842–852. doi: 10.3724/sp.J.1041.2009.00842

Jankowski, K. F., Moore, W. E., Merchant, J. S., Kahn, L. E., and Pfeifer, J. H. (2014). But do you think I'm cool? Developmental differences in striatal recruitment during direct and reflected social self-evaluations. *Dev. Cogn. Neurosci.* 8, 40–54. doi: 10.1016/j.dcn.2014.01.003

John, O. P., and Srivastava, S. (1999). "The Big Five trait taxonomy: History, measurement, and theoretical perspectives," in *Handbook of Personality: Theory and Research*, eds L. A. Perfin and O. P. John (New York, NY: Guilford Press), 102–138.

Kanagawa, C., Cross, S., and Markus, H. (2001). Who am I? The cultural psychology of the conceptual self. *Pers. Soc. Psychol. Bull.* 27, 90–103. doi: 10.1177/0146167201271008

Kaufman, J. M., and Johnson, K. (2004). Stigmatized individuals and the process of identity. *Sociol. Q.* 45, 807–833. doi: 10.1111/j.1533-8525.2004.tb02315.x

Khanna, N. (2010). If you re half black, you are just black: reflected appraisals and the persistence of the one-drop rule. *Sociol. Q.* 51, 96–121. doi: 10.1111/j.1533- 8525.2009.01162.x

Kim, U., Yang, K.-S., and Hwang, K.-K. (2006). *Indigenous and Cultural Psychology: Understanding People in Context*. New York, NY: Springer, 403–420.

Kinch, J. W. (1963). A formalized theory of the self-concept. *Am. J. Sociol.* 68, 481–486. doi: 10.1086/223404

Levesque, M. J. (1997). Meta-accuracy among acquainted individuals a social relations. *Pers. Soc. Psychol.* 72, 66–74. doi: 10.1037//0022-3514.72.1.66

Li, H. Y., Xu, J. P., Chen, J.Y., and Fan, Y. X. (2015). A reliability meta-analysis for 44 items Big Five inventory: based on the reliability generalization methodology. *Adv. Psychol. Sci.* 23, 755–765. doi: 10.3724/sp.J.1042.2015.00755

Li, J. (2006). Self in learning Chinese adolescents goals and sense of agency. *Child Dev.* 77, 482–501. doi: 10.1111/j.1467-8624.2006.00883.x

Livingstone, L. P., Nelson, D. L., and Barr, S. H. (1997). Person–environment fit and creativity: an examination of supply–value and demand–ability versions of fit. *J. Manag.* 23, 119–146. doi: 10.1016/S0149-2063(97)90040-4

Lu, S. (1990). The development of self-conceptions from childhood to adolescence in China. *Child Study J.* 20, 129–137. doi: 10.1207/s15328023top1701_16

Luan, Z., and Bleidorn, W. (2019). Self-other personality agreement and internalizing problems in adolescence. *Personality* 88, 568–583. doi: 10.1111/jopy.12511

Ma, Y., Bang, D., Wang, C., Allen, M., Frith, C., Roepstorff, A., et al. (2014). Sociocultural patterning of neural activity during self-reflection. *Soc. Cogn. Affect. Neurosci.* 9, 73–80. doi: 10.1093/scan/nss103

Markus, H. R., and Kitayama, S. (1991). Culture and the self: implications for cognition, emotion, and motivation. *Psychol. Rev.* 98, 224–253. doi: 10.1037/0033-295X.98.2.224

Mead, G. H. (1934). *Mind, Self and Society from the Stand- Point of a Social Behaviorist*. Chicago, IL: University of Chicago Press.

Nurra, C., and Pansu, P. (2009). The impact of significant others' actual appraisals. *Eur. J. Psychol. Educ.* 24, 247–262. doi: 10.1007/BF03173015

Pfeifer, J. H., Mahy, C., Merchant, J., and Fuligni, A. (2017). Neural systems for reflected and direct self-appraisals in Chinese young adults: exploring the role of the temporal-parietal junction. *Cult. Divers. Ethnic Minor. Psychol.* 23, 45–58. doi: 10.1037/cdp0000122

Pfeifer, J. H., Masten, C. L., Borofsky, L. A., Dapretto, M., Fuligni, A. J., and Lieberman, M. D. (2009). Neural correlates of direct and reflected self-appraisals in adolescents and adults: when social perspective-taking informs self-perception. *Child Dev.* 80, 1016–1038. doi: 10.1111/j.1467-8624.2009.01314.x

Pfeifer, J. H., and Peake, S. J. (2012). Self-development: integrating cognitive, socioemotional, and neuroimaging perspectives. *Dev. Cogn. Neurosci.* 2, 55–69. doi: 10.1016/j.dcn.2011.07.012

Podsakoff, P. M., and Organ, D. W. (1986). Self-reports in organizational research: problems and prospects. *J. Manag.* 12, 531–544. doi: 10.1177/014920638601200408

Romund, L., Golde, S., Lorenz, R. C., Raufelder, D., Pelz, P., Gleich, T., et al. (2016). Neural correlates of the self-concept in adolescence-A focus on the significance of friends. *Hum. Brain Mapp.* 38, 987–996. doi: 10.1002/hbm.23433

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., and Patton, G. C. (2018). The age of adolescence. *Lancet Child Adolesc. Health* 2, 223–228. doi: 10.1016/s2352-4642(18)30022-1

Schlicht, T., Springer, A., Volz, K. G., Vosgerau, G., Schmidt-Daffy, M., Simon, D., et al. (2009). Self as cultural construct? An argument for levels of self-representations. *Philosoph. Psychol.* 22, 687–709. doi: 10.1080/09515080903409929

Shi, Y., and Zhang, H. (2018). Revisiting the value of modesty: from the perspective of well-being. *Chin. Soc. Psychol. Rev.* 15, 215–232.

Silva, C. S., Martins, A. C., and Calheiros, M. M. (2020). 'Why do I think what I think I am?': mothers' and fathers' contributions to adolescents' self-representations. *Self Ident.* 19, 1–21. doi: 10.1080/15298868.2020.1792338

Sims, J. P. (2016). Reevaluation of the influence of appearance and reflected appraisals for mixed-race identity. *Sociol. Race Ethnic.* 2, 569–583. doi: 10.1177/2332649216634740

Sinclair, S., Huntsinger, J., Skorinko, J., and Hardin, C. D. (2005). Social tuning of the self-consequences for the self-evaluations of stereotype targets. *Pers. Soc. Psychol.* 89, 160–175. doi: 10.1037/0022-3514.89.2.160

Srivastava, S. (2012). Others as a Source of Self-Knowledge," in *Handbook of Self-Knowledge*. New York, NY: The Guilford Press.

Steinberg, L., and Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Dev.* 57, 841–851. doi: 10.2307/1130361

Stets, J. E., Savage, S. V., Burke, P. J., and Fares, P. (2020). "Cognitive and behavioral responses to the identity verification process," in *Identity and Symbolic Interaction*, eds R. Serpe, R. Stryker, and B. Powell (Cham: Springer International Publishing), 65–88.

Suh, E. M. (2007). Downsides of an overly context sensitive self:implications from the culture and subjective well-being research. *Personality* 75, 1321–1343. doi: 10.1111/j.1467-6494.2007.00477.x

Swann, W. B., and Bosson, J. (2010). "Self and identity," in *Handbook of Social Psychology*, eds S. T. Fiske, D. T. Gilbert, and G. Lindzey (New York, NY: McGraw-Hill) 589–628.

Tomasetto, C., Mirisola, A., Galdi, S., and Cadinu, M. (2015). Parents' math–gender stereotypes, children's self-perception of ability, and children's appraisal of parents' evaluations in 6-year-olds. *Contemp. Educ. Psychol.* 42, 186–198. doi: 10.1016/j.cedpsych.2015.06.007

Triandis, H. C. (1995). *Individualism and Collectivism*. Boulder CO: Westview Press.

Vazire, S. (2010). Who knows what about a person? The self-other knowledge asymmetry (SOKA) model. *Pers. Proc. Individ. Differ.* 98, 281–300. doi: 10.1037/a0017908

Vazire, S., and Carlson, E. N. (2010). Self-knowledge of personality: do people know themselves? *Soc. Pers. Psychol. Compass* 4, 605–620. doi: 10.1111/j.1751-9004.2010.00280.x

Veroude, K., Jolles, J., Croiset, G., and Krabbendam, L. (2014). Sex differences in the neural bases of social appraisals. *Soc. Cogn. Affect. Neurosci.* 9, 513–519. doi: 10.1093/scan/nst015

Wallace, H. M., and Tice, D. M. (2012). *Reflected Appraisal Through a 21st-Century Looking Glass Handbook of Self and Identity, 2nd Edn*. New York, NY: TheGuilford Press, 124–140.

Walters, G. D. (2016). Reflected appraisals and self-view in delinquency development: an analysis of retrospective accounts from members of the Racine birth cohorts. *J. Crim. Just.* 47, 100–107. doi: 10.1016/j.jcrimjus.2016.07.004

Wang, Y. (2005). About the controversy on the universality of self-enhancement bias. *Adv. Psychol. Sci.* 13, 822–827. doi: 10.1007/s11769-005-0033-7

Wen, C., Hong, C., Xiao, G., and Jackson, T. (2009). Choice, self-expression and the spreading alternatives effect. *Acta Psychol. Sin.* 41, 753–762. doi: 10.3724/sp.J.1041.2009.00753

Wu, S., and Keysar, B. (2007). The effect of culture on perspective taking. *Psychol. Sci.* 18, 600–606. doi: 10.1111/j.1467-9280.2007.01946.x

Xua, X., Chena, Y., Zhao, Y., and Yang, J. (2015). The neural evidence of the reflected appraisal process as a main path for learning about one's self-knowledge of personality. *Biol. Psychol.* 110, 85–90. doi: 10.1016/j.biopsycho.2015.06.017

Yang, K. S. (1995). "Chinese social orientation: an integrative analysis," in *Chinese Societies and Mental Health,* eds T. Y. Lin, W. S.Tseng, and E. K. Yeh (Hong Kong: Oxford University Press), 19–39.

Yue, C., Huang, X., and Yue, T. (2012). The memory effect of adolescents reflected self-appraisals. *Psychol. Dev. Educ.* 3, 225–230. doi: 10.16187/j

Yue, C., Yang, Y., He, W., Yue, T., and Pan, W. (2020). The memory effect of reflected self-appraisals on different types of others. *Front. Psychol.* 11:553585. doi: 10.3389/fpsyg.2020.553585

Zhang, L., Zhou, T., Zhang, J., Liu, Z., Fan, J., and Zhu, Y. (2006). In search of the Chinese self: an fMRI study. *Sci. China Ser. C Life Sci.* 49, 89–96. doi: 10.1007/s11427-004-5105-x

Zhou, H., and Cacioppo, J. (2010). Culture and the brain: opportunities and obstacles. *Asian J. Soc. Psychol.* 13, 59–71. doi: 10.1111/j.1467-839X.2010.01302.x

Zhu, Y., and Han, S. (2008). Cultural differences in the self from philosophy to psychology and neuroscience. *Soc. Pers. Psychol. Comp.* 2, 1799–1811. doi: 10.1111/j.1751-9004.2008.00133.x

Zhu, Y., Zhang, L., Fan, J., and Han, S. (2007). Neural basis of cultural influence on self-representation. *Neuroimage* 34, 1310–1316. doi: 10.1016/j.neuroimage.2006.08.047

Entrepreneur-Region Fit and Entrepreneurial Success in China: The Effect of "Confucian" Personality

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The personality of entrepreneurs is associated with their entrepreneurial success, and the regional personality plays a crucial role in the entrepreneurial ecosystem. Recently, scholars have called for an indigenous personality perspective and combining the personality of entrepreneurs with the regional personality. The current study aimed to investigate the indigenous Confucian personality (e.g., interpersonal relatedness [IR]) and taking an entrepreneur-regional personality fit perspective, allowing testing how entrepreneurs interact with the local ecosystem. Using the personality data of entrepreneurs ($N = 1,386$) from a representative sample across 42 major cities in China, we found that (1) city-level IR is curvilinearly correlated with the annual income of entrepreneurs, with moderate IR associates with the highest income; and (2) the entrepreneur-regional fit analysis further revealed substantial interplay between an entrepreneur and the city. Specifically, entrepreneurs who have moderate IR and run their business in the city also with moderate IR are most likely to have the highest income. This study highlights the usefulness of investigating indigenous personality and the fit perspective in entrepreneurship research.

Keywords: entrepreneurship, personality, China, confucianism, interpersonal relatedness, entrepreneur-regional fit

INTRODUCTION

The Chinese government has encouraged mass entrepreneurship and innovation since 2015. According to the recent government report, there are more than 20,000 newly registered companies every day in 2019 (National Development Reform Commission, 2020), bringing enormous change to the national economy and life of the people. Among those enterprises, only part of them can survive (MyCOS Institute, 2018). Here an important question arises that why do some entrepreneurs succeed while others fail. Personality is found to account for such variation (Zhao et al., 2010). A substantial amount of research, mostly based on the Western countries, has documented the role of personality of entrepreneurs, mostly on Big-Five personality traits, in the entrepreneurial activities and performance (Zhao and Seibert, 2006; Zhao et al., 2010). Despite that, the generalization of the findings on Big-Five to Chinese people is questionable, as the Big-Five construct does not adequately reflect the personality structure of the Chinese people (Cheung et al., 2001).

Indigenous personality research, using an emic method, has identified a unique Chinese personality factor that parallels with the universal Big-Five structure using joint factor analysis (Cheung et al., 2013). Specifically, interpersonal relatedness (IR), also known as the "Confucian" personality, has been found as the core personality of the Chinese people that could distinguish them from the non-Chinese people. Meanwhile, IR is highly relevant in entrepreneurship, as business activities in China are profoundly influenced by the values and norms of Confucianism (Ip, 2009; Chen et al., 2019). Doing business in Confucianism cultures requires well-adaptions to the social mechanism that values "renqing" (reciprocity and relationship orientation), "guanxi" (personalized social network of influence), and "face" (social reputation) (Nolan and Rowley, 2020; Luechapattanaporn and Wongsurawat, 2021). IR, the so-called Confucian personality, taps exactly into these social values and has been found to be a predictive factor to various entrepreneurial activities. For instance, a recent study indicated that Confucian personality is associated with the entrepreneurial vitality in China, whereas the universal Big-Five construct was found to be rather irrelevant (Obschonka et al., 2019). Therefore, Confucian personality is regarded as the leading construct in the current entrepreneurship research due to (1) its centrality in the personality of the Chinese people; and (2) the previously found predictive power of IR in entrepreneurship. However, the research on the association between such indigenous personality and its association with the success of entrepreneurs is scarce.

Entrepreneurs start their business in specific regions. Regional personality, such as the personality of the city (e.g., the population-specific average value on the Big-Five), has been theorized as a regional cultural difference that may allow or restrict entrepreneurship (Obschonka et al., 2013b, 2015). China is an interesting context to investigate entrepreneurship because of its culture-specific social mechanism in doing business (Opper et al., 2017; Liu et al., 2019). Given that IR reflects such indigenous culture, researchers have empirically examined the link between the regional IR (city-level) and the regional entrepreneurial vitality (Obschonka et al., 2019).

Aside from investigating regional characteristics, a new generation of research started to focus on the person-environment fit analysis (i.e., P-E fit). That is, how the characteristic of an individual works together with a region-level characteristic. For instance, Bleidorn et al. (2016) found that people tend to have better self-evaluation if they lived in a city with people who have a similar mind. Regarding entrepreneurship study, one exploratory research recently investigated the link between entrepreneur-city personality fit (e.g., Big-Five) and entrepreneurial success, indicating that the fit research line is insightful and needs to be followed (Zhou et al., 2019).

Given the centrality of IR in Chinese personality and its particular relevance in entrepreneurship, the present study aimed to investigate (1) how IR of entrepreneurs is associated with their entrepreneurial success; (2) how IR of the city is associated with the entrepreneurial success. Moreover, as a response to the burgeoning call for the fit analysis, we further examine how entrepreneur-city IR fit is associated with the entrepreneurial success?

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Interpersonal Relatedness as the Confucian Personality

Being identified as the sixth personality factor of Chinese personality (aside from the Big-Five), IR was theorized in the Chinese Personality Assessment Inventory (CPAI), reflecting how Chinese people "construct themselves" (Cheung et al., 1996). IR refers to "a strong orientation toward instrumental relationships, emphasis on occupying one's proper place and engaging in appropriate actions; avoidance of internal, external, and interpersonal conflict; and adherence to norms and traditions" (Cheung et al., 2001, p. 425). Particularly, IR reflects the Confucian ideal of realizing humanity in oneself and extending this humanity to others (Cheung et al., 2008). People high in IR tends to value Chinese traditions, care about the interpersonal relationship, avoid face to face conflicts, and give or earn "face" for everyone in the relationship.

Interpersonal Relatedness and Entrepreneurial Success: From the Entrepreneur Perspective

So far, how IR of entrepreneurs is associated with their entrepreneurial success has barely been empirically investigated. Given that running their own business requires some common qualities with being a hired manager, we may expect a positive link as empirical evidence indicated IR was positively associated with the job performance of a manager. For instance, research using an enterprise manager sample from Hong Kong indicated that IR could positively predict the performance, especially in contexts that require proficiency in dealing with the interpersonal situations, such as working smoothly with people from diverse backgrounds (Kwong and Cheung, 2003). Also, research using manager samples from mainland China also found a positive link between IR and job performance (Gan et al., 2002; Zhang et al., 2012).

As to entrepreneurship, based on the indigenous origin of IR from Confucian philosophy, we can also expect a negative association between IR of entrepreneurs and their entrepreneurial success. As IR reflects the core value of the Confucian philosophy, people high in IR indicated that they are more likely to endorse the Confucian ideology. Confucian philosophy advocates agriculture but restrains commerce. That is, it emphasizes agricultural production and ignores the development of industry and commerce (Hou and Hou, 2002; Herrmann-Pillath, 2015). It is conceivable that if an individual highly endorses Confucian ideology, this person will score high in IR and holds a negative attitude toward the developing commerce and business. Therefore, on the one hand, entrepreneurs with low IR may give prior to business interests (e.g., taking innovation) than to the interpersonal interests, which may increase the chances of success under some circumstances. For instance, IR

is found to be negatively associated with innovative behavior, as people high in IR are more sensitive to the risk of losing face or receiving fewer favors from others if they might fail when being innovated (Leung et al., 2014). As innovation is an important quality for entrepreneurial success (Chang et al., 2010), the reduced innovative behaviors due to high IR are likely to impede the entrepreneurial success.

On the other hand, the previous research has reported the positive link between IR and social-related work performance (Kwong and Cheung, 2003). A recent study may also support this rationale that entrepreneurs with higher social-related ability are found to have higher revenue growth due to large social networks, and this effect is especially more prominent in the high relational cultures than in low relational cultures (Batjargal et al., 2019). Given that the Chinese culture is highly relational orientated, we expect the positive association between IR and entrepreneurial success is likely to occur in the sample used in this study.

Therefore, IR might benefit and impede entrepreneurial performance at the same time. A recent study on the Chinese family firms may support both the positive and negative impact of Confucian values in doing business (Luechapattanaporn and Wongsurawat, 2021). On the one hand, the values can cultivate long-term relationships; however, on the other hand, these values may also contribute to the poor management, which would impede the business performance (Luechapattanaporn and Wongsurawat, 2021). Furthermore, Mu et al. (2020) provide more direct evidence on both the negative and positive relationship between IR and the subjective entrepreneurial performance among the young Chinese entrepreneurs. Taken together, we assume that the association between the IR of entrepreneurs and entrepreneurial success would be a non-linear relationship that contains both a positive link and a negative link. We assume that:

H1: The association between IR of entrepreneurs and their entrepreneurial success might be non-linear.

Interpersonal Relatedness and Entrepreneurial Success: From the Regional Perspective

The behavior and success of entrepreneurs are also influenced by the region where they start and run their business. Based on Lewin's field theory (Lewin, 1939), the behavior of people is affected by the life space. Specifically, research taking *a sociological psychology perspective* focuses on the *regional personality differences*, arguing geographic regions have their own personality (Oishi and Graham, 2010; Rentfrow, 2010). For instance, Rentfrow et al. (2008), Rentfrow (2010) found systematic regional variations (state-level) in the Big-Five personality across the United States. The regional level Big-Five personality is found to influence entrepreneurship in the region (Obschonka et al., 2013b, 2015).

As a response to the call for taking an indigenous personality perspective, researchers investigated the correlates of regional IR and entrepreneurship in China (Obschonka et al., 2019). Specifically, IR was found to be negatively associated with both

the manifest entrepreneurship (e.g., rate of newly registered individually owned business) and latent entrepreneurship (e.g., number of entrepreneurship-related search queries in the internet search engine). Although this research focuses on the *regional-level* entrepreneurship vitality, we can also expect a similar negative link between the regional IR and the success of an *individual-level* entrepreneur. According to Rentfrow et al. (2008), people respond, adapt to, or get socialized in line with the regional norms and attitudes. In this sense, an individual entrepreneur will perceive the personality climate in this region and adjust to their behaviors. If the region is high in IR, it means a large proportion of people in this city tend to score high in IR and advocate the traditional Confucian value, thus stressing agriculture while limiting the development of commerce, industry, and business. The high regional IR also reflects the macro culture that emphasis on the social harmony and conformism instead of encouraging the prototypical qualities of entrepreneurs, such as rule-breaking or risk-taking (Zhang and Arvey, 2009; Obschonka et al., 2013a). The high regional IR may discourage entrepreneurs from breaking the rules or taking innovative behaviors because entrepreneurs can sense what is favored and what is not. When perceiving something is not encouraged in the environment, people tend to suppress themselves from doing such things (Matthes et al., 2018). Given innovation is an essential factor for the entrepreneurial success, we believe that compared to a region with extremely high IR, a relatively low IR region will develop a more favorable entrepreneurial culture that could nurture entrepreneurship and facilitate success.

On the other hand, we may also expect a positive link between the regional IR and the success of entrepreneurs because how regional IR associates with the entrepreneurial vitality might be different from how regional IR associates with entrepreneurial success. In particular, the regional IR may negatively correlate with the enthusiasm of starting up a business in this region because Confucianism does not value business and looks down on merchants (Herrmann-Pillath, 2015). However, the regional IR may positively correlate with the entrepreneurial performance because Confucianism values the establishment and maintenance of the instrumental relationship (e.g., with strangers aim at obtaining specific resources), thus creating a friendly social climate for entrepreneurs to run business (Hwang, 2010), which in turn, may promote success.

Taken together, it could be that from extremely low to moderate regional IR, the regional IR is positively associated with the entrepreneurial success because the regional climate might be more agreeable for entrepreneurs to navigate business with interpersonal resources. However, from moderate to extremely high regional IR, the regional IR is negatively associated with the entrepreneurial success because the regional climate might become discouraging for taking innovation. Therefore, we assume that:

H2: The association between regional IR and entrepreneurial success assembles as an inverted U-curve.

Interpersonal Relatedness and Entrepreneurial Success: From an Entrepreneur-Region Fit Perspective

We have discussed how IR of entrepreneurs and regional IR may respectively associate with the entrepreneurial success. The question remains how IR of entrepreneurs and regional IR jointly affect the entrepreneurial success. The P-E fit perspective may help to probe this question. The P-E fit (similarity, match, or congruence) perspective indicates that if the characteristics of a person go well with the environmental characteristics, this person will be more likely to achieve success (Zhou et al., 2019).

What is an ideal entrepreneur-region IR fit for promoting success? Evidence showed that positive self-evaluation predicts the performance (Judge and Bono, 2001) and being with like-minded others facilitates the positive self-evaluation. As mentioned earlier, Bleidorn et al. (2016) found that people had positive evaluations about themselves if they lived in a city with a similar personality. Therefore, we may expect that if entrepreneurs with the certain IR level runs the business in a city with similar IR levels, an entrepreneur will be more likely to succeed due to the enhancing effect of positive self-evaluation. However, an entrepreneur-region IR fit can be complex and lacks adequate research to formulate the hypotheses; we now ask an open question,

Q1: What IR fit is beneficial for entrepreneurial success?

METHOD

Participants

In this study, a representative Chinese urban resident sample was used from the Project of Factors on Mental Health Survey conducted by the Institute of Psychology, Chinese Academy of Sciences (H20020). This sample was collected from 42 major cities of China across six different regions with a quota sampling method. People reported their personality and demographic information on a paper-pencil questionnaire. Before administrating the survey, researchers orally informed all the participants of the purpose, benefits, and confidential policy of the study. All the participants were informed that they could withdraw from the study at any time. The total sample included 26,405 urban residents of China, ranging from 104 to 2,862 respondents from each city ($M = 548 \pm 683$ per city). The participants aged from 18 to 65 years ($M = 33.65 \pm 9.75$), with 56.3% were female.

Among all the participants, 1,386 were entrepreneurs. It has to be noted that the definition of an entrepreneur is different from that of in the Western culture. Based on the prior Chinese research and the Chinese national occupational category (Zhou et al., 2019), we defined an entrepreneur as (1) the private business owners and (2) self-employed entrepreneurs. Specially, this study focused on an individual small business which belongs to a natural person or household. We have 548 private business owners and 838 self-employed entrepreneurs.

Measures

Interpersonal Relatedness of Entrepreneurs

Interpersonal relatedness was measured with the subscale from the Cross-cultural Personality Assessment Inventory (CPAI-2) used in the study by Obschonka et al. (2019) (as shown in the **Appendix** for the scale). Entrepreneurs rated their agreements on each item (1 = strongly disagree to 5 = strongly agree). A mean score was created as the indicator for IR. The Cronbach's α is 0.84.

Regional IR

All the urban residents ($n = 26,405$) indicated their agreement on the IR items. An average score was created for each city according to the IR scores of residents. The regional IR was thus achieved on a city level.

Entrepreneurial Success

Financial indicators are typical measurements for the entrepreneurial success. In this study, the entrepreneur participants are small business owners. Small business entities are characterized as the primary source of income, which bounds closely with the family needs (Carland et al., 1984). Besides, following previous entrepreneurial research in China, financial indicators of small business owners usually reflect how much they can provide for their families (Zhou et al., 2019). Therefore, we used the annual family income of the owners as the indicator of entrepreneurial success by asking "What is the total annual income of your family at present?"

Control Variables

In the study, both the entrepreneurs-related and regional-related control variables were included. The entrepreneurs-related variables are gender, age, and education year as the prior research found these variables relevant for the entrepreneurial success (Zhou et al., 2019). The regional control variable is the city-level gross domestic product (GDP) per capita, as regional economic competitiveness is a predictive factor for the entrepreneurial activities (Audretsch et al., 2012). In addition, we controlled for the sample size of cities to make it comparable among the cities with substantial sample differences (Chen et al., 2007).

Statistical Analysis

Although simple difference scores were frequently used to assess fit (e.g., absolute difference score), which was identified with major methodological problems, such as oversimplifying different fit situations or covering up the independent effect of each specific predictor (Edwards, 1993). Researchers recommended polynomial regression because it can overcome these major problems (Edwards, 2002). Specifically, it included the examination of two independent predictors (i.e., IR of entrepreneurs and regional IR), the combination of these two predictors (i.e., the product of IR of entrepreneurs and regional IR), and higher-order terms (i.e., squares of IR of entrepreneurs and regional IR) in the fit analysis. The five terms allowed fine-grained interpretations for the joint effects of two predictors.

The analyzing steps were as followed. First, we made some transformations to the original values of the independent variable (IV) and dependent variable (DV). About the IV, we centralized both the IR of entrepreneurs and regional IR to avoid multicollinearity before creating higher-order terms. About the DV, we followed prior research by using the logged value of annual family income, as this transformation normalizes the original values, which allows for polynomial regression (Zhou et al., 2019).

Second, we conducted a multilevel hierarchical regression. In the first block, the age, gender, education year, city-level GDP per capita, and city sample size were included as controlled variables. In the second block, the IR of entrepreneurs and regional IR were included to examine their independent linear effects on entrepreneurial success. In the third block, the three higher-order terms (product of IR of entrepreneurs and regional IR, square of IR of entrepreneurs, and square of regional IR) were included to examine the curvilinear effect, as well as the entrepreneur-region joint effect. The equation for polynomial regression is as follows.

$$
\begin{aligned}
Enterpreneurial\ success\ =\ &b_0 \\
+\ &b_1 \times enterpreneur's\ IR + b_2 \times regional\ IR \\
+\ &b_3 \times enterpreneur's\ IR\ squred + b_4 \times enterpreneur's\ IR \\
&\times regional\ IR + b_5 \times regional\ IR\ squred\ +\ e.
\end{aligned}
$$

Third, additional tests were conducted to examine the different situations of entrepreneur-region fit (congruence/incongruence). Recently, researchers provided an R package with instructions to inspect the fit effect (as shown in details in Humberg et al., 2019). Then a 3D response surface was plotted to facilitate the interpretation of the results. For clarity, the testing steps and interpretations are demonstrated in the results section.

RESULTS AND DISCUSSION

The descriptive statistics and correlation analysis results are shown in **Table 1**.

Interpersonal Relatedness of Entrepreneurs and the Entrepreneurial Success (H1)

Our first hypothesis proposed a non-linear association between IR of entrepreneurs and the entrepreneurial success. As shown in **Table 2**, this hypothesis was supported among private entrepreneurs ($b_{3\text{private entrepreneurs}} = -0.02$, $SE = 0.01$, $p < 0.05$), but not among the self-employed entrepreneurs ($b_{3\text{self-employed entrepreneurs}} = -0.01$, $SE = 0.01$, $p > 0.05$). The coefficients of quadratic terms (IR of entrepreneurs) only reached a significant value in one sample. Thus, H1 is partially supported. The inverted U-curve meant that, from the extremely low to medium levels of IR of entrepreneurs, annual income of the private entrepreneurs increased with their levels of IR; however, from the medium to high levels of IR of entrepreneurs, the annual income of the private entrepreneurs decreased with their levels of IR.

Regional IR and Entrepreneurial Success (H2)

Our second hypothesis proposed an inverted U-shaped association between regional IR and entrepreneurial success. As shown in **Table 2**, this hypothesis was fully supported among both the private entrepreneurs ($b_{5\text{private entrepreneurs}} = -0.04$, $SE = 0.02$, $p < 0.01$) and self-employed entrepreneurs ($b_{5\text{self-employed entrepreneurs}} = -0.04$, $SE = 0.01$, $p < 0.001$). The inverted U-curve meant that, from the extremely low to medium regional IR, annual income of entrepreneurs increased with regional IR levels; however, from medium to high regional IR, the annual income of entrepreneurs decreased with regional IR levels. Thus, H2 was fully supported.

Entrepreneur-Regional IR Fit and Entrepreneurial Success

To answer the third question about the fit effect of IR of entrepreneurs and regional IR, we calculated the slopes and curvatures along the (in)congruence lines. As shown at the bottom of **Table 2**, the response surface analyses revealed two identical arched surfaces for both the samples, indicating consistent fit effects among both the private entrepreneurs and self-employed entrepreneurs. Overall, the fit effect suggested that if entrepreneurs with moderate IR ran their business in a city where people were alike with moderate IR, they would be the most likely to have the highest annual income. Specifically, the fit analyses yielded two meaningful results supporting this overall claim.

First, if the entrepreneur and city were alike in IR at low-levels or high-levels, the annual income would be lower than that in the moderate levels. This was because the curvature along the congruence line reached significance in both the samples ($a_{2\text{private entrepreneurs}} = -0.06$, $SE = 0.02$, $p < 0.01$, $a_{2\text{self-employed entrepreneurs}} = -0.04$, $SE = 0.02$, $p < 0.05$) and the negative coefficients indicated inverted U-curves. As noted above, approximately, the moderate fit was associated with the highest annual income along the inverted U-curve. Second, if entrepreneurs ran their business in a city where people were alike in IR, they would earn more money when IR was low compared with when IR was high. This was because the slopes along the congruence line reached significance with negative coefficients in both the samples ($a_{1\text{ private entrepreneurs}} = -0.06$, $SE = 0.03$, $p < 0.05$, $a_{1\text{self-employed entrepreneurs}} = -0.06$, $SE = 0.02$, $p < 0.01$), suggesting that higher fits were associated with the lower annual income. Besides, if the entrepreneurs and the city were different in IR, then the larger the difference, the lower was the annual income. This was because the curvature along the incongruence line reached significance in both the samples ($a_{4\text{ private entrepreneurs}} = -0.07$, $SE = 0.03$, $p < 0.05$, $a_{4\text{self-employed entrepreneurs}} = -0.05$, $SE = 0.02$, $p < 0.01$) and the negative coefficients indicated inverted U-curves.

As depicted in the 3D surface in **Figure 1**, the vertical axis shows the amount of annual income, with different colors representing different income levels. The right corner of

TABLE 1 | The descriptive statistics and correlations for the two samples.

Research Variables	M (SD)		1	2	3	4	5	6	7	8
	self-employed entrepreneurs	Private business owners								
1. Age	33.50 (11.95)	33.21 (11.15)	–	−0.06	−0.00	0.08*	−0.01	0.01	0.03	−0.06
2. Gender	1.48 (0.50)	1.36 (0.48)	−0.04	–	−0.02	−0.11**	−0.05	0.04	0.11**	−0.09*
3. Education	3.39 (1.11)	4.13 (1.14)	−0.03	−0.06	–	−0.16**	−0.01	−0.08*	0.09*	0.33***
4. City Sample Size	1096.27 (1052.73)	1054.90 (1028.25)	0.07	−0.00	−0.04	–	0.29***	−0.07*	−0.05	−0.10**
5. GDP per Capita	53324.39 (20070.80)	56825.66 (19579.19)	−0.05	−0.01	0.10*	0.22***	–	0.03	0.07*	0.15***
6. E-IR	3.27 (0.47)	3.19 (0.50)	0.03	0.08	0.00	−0.07	0.03	–	0.16***	−0.06
7. R-IR	3.24 (0.08)	3.24 (0.07)	−0.07	−0.01	0.22***	0.03	−0.00	0.16***	–	−0.07
8.Entrepreneurial success	4.67 (0.42)	4.95 (0.48)	−0.10*	−0.08	0.23***	−0.05	0.16***	−0.01	−0.03	–

E-IR, entrepreneur's IR; R-IR, regional IR. Correlations for self-employed entrepreneurs (n = 838) are presented above the diagonal, and correlations for private business owners (n = 548) are presented below the diagonal. *p < 0.05; **p < 0.01; ***p < 0.001.

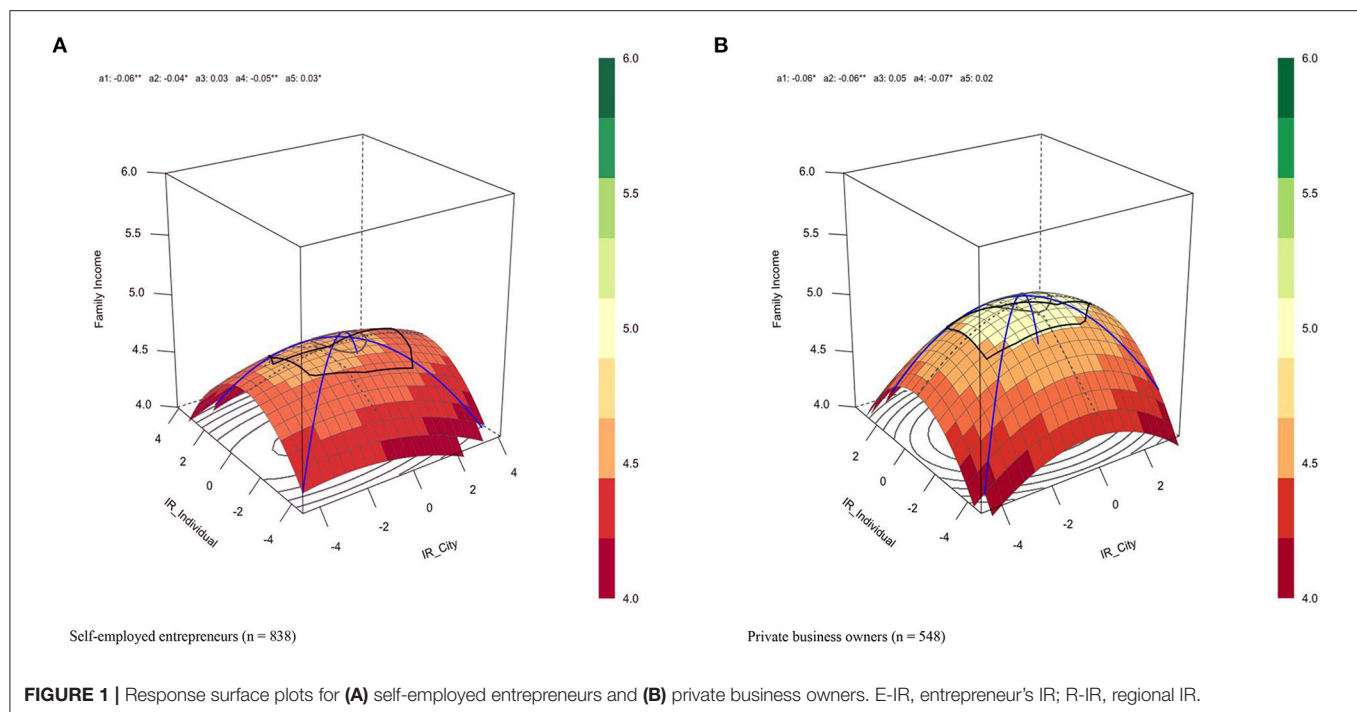TABLE 2 | Results of the polynomial regressions of entrepreneurial success on the IR of entrepreneurs and regional IR.

	Self-employed entrepreneurs (n = 838)			Private business owners (n=548)		
	B	se	95% CI	B	se	95% CI
Constant (b_0)	4.48***	0.07	4.335, 4.626	4.87***	0.12	4.624, 5.109
E-IR (b_1)	−0.02	0.01	−0.043, 0.011	−0.01	0.02	−0.044, 0.034
R-IR (b_2)	−0.04**	0.01	−0.069, −0.017	−0.05*	0.02	−0.098, −0.011
E-IR ^{2} (b_3)	−0.01	0.01	−0.024, 0.006	−0.02*	0.01	−0.039, 0.005
E-IR × R-IR (b_4)	0.01	0.01	−0.016,0.031	0.00	0.02	−0.038,0.045
R-IR ^{2} (b_5)	−0.04***	0.01	−0.052,−0.020	−0.04**	0.02	−0.075, −0.012
Age	0.00	0.00	−0.004, 0.001	−0.00**	0.00	−0.008, −0.001
Gender	−0.06*	0.03	−0.112, −0.007	−0.06	0.04	−0.137, 0.023
Education	0.11***	0.01	0.085, 0.132	0.09***	0.02	0.052, 0.127
City Sample Size	−0.06***	0.01	−0.090, −0.035	−0.03	0.02	−0.071, 0.007
GDP per Capita	0.09***	0.01	0.059,0.114	0.07***	0.02	0.029, 0.100
R^2 for overall model		0.18			0.11	
ΔR^2 above baseline model with control variable		0.03			0.03	
Congruence (x = y) line						
Slope (a_1)	−0.06**	0.02	−0.094, −0.024	−0.06*	0.03	−0.113, −0.006
Curvature (a_2)	−0.04*	0.02	−0.066, −0.009	−0.06**	0.02	−0.108, −0.017
Incongruence (x = -y) line						
Slope (a_3)	0.03	0.02	−0.013, 0.067	0.05	0.03	−0.014, 0.113
Curvature (a_4)	−0.05**	0.02	−0.088, −0.017	−0.07*	0.03	−0.131, −0.006

E-IR, entrepreneur's IR; R-IR, regional IR. *p < 0.05; **p < 0.01; ***p < 0.001.

the surface represented the fit that the entrepreneurs scored extremely low in IR, whereas the city scored extremely high in IR. By contrast, the left corner of the surface represented the fit that the entrepreneurs scored extremely high in IR, whereas the city scored extremely low in IR. From these two corners to the middle part of the surface, the differences between the IR of the entrepreneurs and regional IR became smaller because both values were approaching the moderate levels, along with this, the annual income was higher. Thus, we concluded that the larger the difference in IR, the lower the likelihood to succeed.

Discussion

Using a representative Chinese small business entrepreneur sample, we investigated how the IR of entrepreneurs, the city-level regional IR, and the joint effect of IR of the entrepreneurs and regional IR on entrepreneurial success. We found that the IR of the entrepreneurs was curvilinearly associated with their annual income among the private entrepreneurs but not among the self-employed entrepreneurs, which partially supported our hypothesis (H1). Besides, the city-level regional IR was curvilinearly associated with the annual income of the entrepreneurs in both samples, with moderate IR associated with

FIGURE 1 | Response surface plots for **(A)** self-employed entrepreneurs and **(B)** private business owners. E-IR, entrepreneur's IR; R-IR, regional IR.

the highest annual income, which fully supported hypothesis (H2) of this study. The fit analyses revealed that entrepreneurs with moderate IR run their business in a city also with moderated IR were most likely to have the highest annual income.

This study research is the first empirical research that explicitly investigated the association between IR of the entrepreneurs and their entrepreneurial success from the entrepreneur-region fit perspective. Given its explanatory role in the behavior of the Chinese people and the particular relevance regarding doing business, we provide empirical evidence about the relationship of Confucian trait with their personal success. That is, being moderate in IR seems a favorable personal characteristic for a successful business among the private entrepreneurs in China, while not self-employed entrepreneurs. The different results in the two samples may be due to the differences regarding *scale* and *operation mode* between the self-employed enterprises and the private enterprises. The self-employed enterprises are mostly run within family numbers and have a relatively smaller scale, whereas private enterprises were run with employees and have a relatively larger scale. Therefore, the lower IR in the self-employed enterprises can reduce the harm of cronyism to the performance of the enterprise. While for the private enterprise owners, extremely low IR might bring the employees a harsh and inhospitable feeling. The future research may consider the composed structure of employees as a covariate when investing IR of the entrepreneurs and their success. In addition, this finding should be interpreted with a recent finding which reported that, compared with moderate IR, lower IR and higher IR are associated with the higher levels of perceived entrepreneurial performance (Mu et al., 2020). The inconsistent findings on the link between IR and the entrepreneurial performance might be

because of the association between IR and subjective evaluation of entrepreneurial success is different from that of objective indicators of the entrepreneurial success. Future research is called for to validate both the findings and examine the potential difference.

The city-level regional IR was curvilinearly associated with the annual income of the entrepreneurs as expected, suggesting that a city with moderate IR may provide the most fertile environment for profitable small business enterprises. This finding speaks to previous research, which points out that the perceptions, attitudes, and behaviors of a certain population together constitute a latent "entrepreneurial spirit" in the region, which may translate into the regional entrepreneurial activities (Audretsch and Fritsch, 1994; Sternberg, 2009). By examining the city-level IR, we specify such "entrepreneurial spirit" in China as moderate IR, which can create a favorable atmosphere for promoting the success of the small businesses. Specifically, the region with moderate IR tends to facilitate the successful business because people in this region basically merit in maintaining harmonious reciprocal relations. In such a relational culture, entrepreneurs are more likely to forge satisfactory social networks and smooth communication. Nevertheless, the promoting effect of moderate regional IR on entrepreneurial success seemed different for entrepreneurs with different IR levels.

The fit analyses revealed that this promoting effect was most prominent for the entrepreneurs who also have moderate IR. This finding reflected a *similarity attraction* effect, suggesting shared tendency in IR between the entrepreneurs and the population of their city paves ways for a successful business. By contrast, if the entrepreneurs with moderate IR run a business in a city with either extremely low IR or extremely high IR, their income will

be remarkably lower than those with moderate IR. Therefore, we believe that the potential of entrepreneurs with moderate IR in running a successful enterprise, such as socially adequate and intellectually innovative, can get fully exerted when the population in the same city is also like-minded.

IMPLICATION, LIMITATION, AND FUTURE DIRECTION

Theoretical Implications

This research contributes to the literature in four aspects. First, we enrich the personality entrepreneurship research by introducing the Confucian trait and provide robust empirical evidence for its usefulness by using a representative Chinese sample. Second, entrepreneurship is regarded as "regional events" (Feldman, 2001) and regional personality is a crucial ingredient in such events (Obschonka et al., 2015), which points to the necessity of investigating (regional) personality. To the best of our knowledge, only one research has explicitly examined IR and entrepreneurship from a macro perspective by focusing on the regional entrepreneurial vitality (Obschonka et al., 2019). Therefore, investigating IR across the major cities increases the knowledge of how IR shapes entrepreneurship in China. Third, researchers regard entrepreneurship as interactions, meaning that the entrepreneurs interact with society economically and culturally (Hisrich et al., 2007). The fit analysis prevails in the entrepreneurship research because it centralizes the interactions and puts a dual emphasis on the people and the environment (Edwards et al., 1998). Therefore, our research contributes by taking the *fit* perspective, providing a fine-grained picture of how the indigenous personality of the entrepreneurs and the city as macro-level culture jointly determined the success of the entrepreneurs. Last but most important, this research points out an ideal matching on Confucian personality between entrepreneur and the city, speaking to the seemingly "*paradox of personal gains and social lost*" found in the previous studies on IR and entrepreneurship. Specially, Mu et al. (2020) argue that IR of entrepreneurs, on the individual level, is positively related to entrepreneurial performance, suggesting *a person gain effect* on IR. However, Obschonka et al. (2019) indicate that the IR of the city, on a regional level, is negatively related to the regional entrepreneurial vitality, suggesting *a social lost effect* in IR. This research, taking an integrated fit perspective, articulates that a person-city balance should be kept at a moderate IR level to achieve the entrepreneurial success.

Practical Implications

This research has the following practical implications. First, entrepreneurs should increase their knowledge about the social mechanism of doing business in China and the adaptivity of indigenous personality in such mechanism. Particularly, moderate IR may enable private entrepreneurs to expand the instrumental relationship, nurture the long-term relationship, and keep motivated to innovate. The private entrepreneurs may mindfully cultivate and conduct themselves accordingly. Second, when considering where to start their business, entrepreneurs

may take into account whether the IR of the city agrees with their own IR. Selecting the city based on IR fitness, entrepreneurs may be more likely to succeed because they tend to feel well-adapted or enabled in the city. In contrast, mismatching in IR may lead to the inadaptation for the entrepreneurs. For instance, if entrepreneurs with high IR run their business in a city with low IR, they might feel a sense of "fish in the shark pond" that they highly value interpersonal harmony and cooperation, whereas the city ecosystems are highly competitive (Obschonka et al., 2019). Third, policymakers may consider cultivating a moderate IR culture, which does not excessively encourage rule-breaking or self-reliance that Western culture may value for the entrepreneurship (Zhang and Arvey, 2009). In Chinese society, IR-related values, such as interpersonal harmony and reciprocal dependence, are also essential for running a successful business. One recent research may also support this claim that IR was found to have two folds, with one stressing *relationship orientation* values, for instance, appreciating harmony, the other focusing on *conduct oneself* values, for instance, abiding by discipline (Zhou et al., 2021). Low regional IR, in this sense, may not only exert a negative influence on the relational atmosphere but also undermine the rule consciousness, which is the cornerstone of the modern market economy. Policymakers thus need to advocate cooperation and seeking mutual benefits for the entrepreneurship from a regional macro-level.

Limitation and Future Direction

The findings of this research have to be interpreted with the following limitations. First, as an exploratory study, we found a *fit effect* between city-level IR and the family income of entrepreneurs. Future research may consider using more precise and objective regional economic indicators, such as the city-level tax revenue contributed by these enterprises. Also, entrepreneurial success should not be evaluated only by financial indicators. Future research may include multiple indicators, such as satisfaction of the entrepreneurs (Dej, 2010), to quantify entrepreneurial success. Second, we have included the self-employed and private-owned enterprises for sample diversity. However, those enterprises may belong to various economic sectors. The previous research has underscored the heterogeneity of enterprises that should be considered when investigating entrepreneurship (Davidsson, 2016). Future research may need to control for such heterogeneity or compare among enterprises based on their attributions. Third, despite that IR fitness finding is insightful, we still do not know how different fits translate into the success of the entrepreneurs. A promising next step might be investigating the self-efficacy of entrepreneurs, as previous research has hinted at its crucial role in predicting performance (Newman et al., 2019).

CONCLUSION

The present research found that cities with moderate IR may provide the "entrepreneurship-friendly" context for entrepreneurs to yield successful business and that the

entrepreneurs who have moderate IR are most likely to succeed. These findings contribute by stressing the importance of investigating indigenous "Confucian" personality in the entrepreneurship research from an entrepreneur-region fit perspective, and explicitly pointing out that an ideal fit for IR is remaining moderate on both parts. Therefore, entrepreneurs should practice accordingly by balancing the interpersonal harmony with the willingness to take potential personal risks for the innovation instead of emphasizing one side at the expense of another. In addition, they may need to consider the fitness of IR between themselves and the city when starting their business. Regional policymakers should acknowledge the traditions of values and norms that date back to Confucianism and uphold the motivation and agency of the local population to promote entrepreneurship at the same time.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethical Review Board of the Institute of Psychology, Chinese Academy of Sciences. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

JZ and MZ developed the research project. DH and MZ carried out the data collection. YZ and WM carried out the data analysis. KW wrote the first draft. WM, FL and MZ revised the manuscript. All authors contributed to the article and approved the submitted version.

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REFERENCES

Audretsch, D. B., and Fritsch, M. (1994). The geography of firm births in Germany. *Reg. Stud.* 28, 359–365. doi: 10.1080/00343409412331348326

Audretsch, D. B., Huelsbeck, M., and Lehmann, E. E. (2012). Regional competitiveness, university spillovers, and entrepreneurial activity. *Small Bus. Econ.* 39, 587–601. doi: 10.1007/s11187-011-9332-9

Batjargal, B., Webb, J. W., Tsui, A., Arregle, J.-L., Hitt, M. A., and Miller, T. (2019). The moderating influence of national culture on female and male entrepreneurs' social network size and new venture growth. *Cross Cult. Strat. Manage.* 26, 490–521. doi: 10.1108/CCSM-04-2018-0057

Bleidorn, W., Schonbrodt, F., Gebauer, J. E., Rentfrow, P. J., Potter, J., and Gosling, S. D. (2016). To live among like-minded others: exploring the links between person-city personality fit and self-esteem. *Psychol. Sci.* 27, 419–427. doi: 10.1177/0956797615627133

Carland, J. W., Hoy, F., Boulton, W. R., and Carland, J. A. C. (1984). Differentiating entrepreneurs from small business owners: a conceptualization. *Social Sci. Electron. Publ.* 9, 354–359. doi: 10.5465/amr.1984.4277721

Chang, E. P., Memili, E., and Chrisman, J. J. (2010). "Does innovation matter to achieve entrepreneurial success? An exploratory study of the Inc. 500 companies," in *Conference Proceedings: United States Association for Small Business and Entrepreneurship* (Decatur, IL: United States Association for Small Business and Entrepreneurship), 105.

Chen, G., Kirkman, B. L., Kanfer, R., Allen, D., and Rosen, B. (2007). A multilevel study of leadership, empowerment, and performance in teams. *J. Appl. Psychol.* 92, 331–346. doi: 10.1037/0021-9010.92.2.331

Chen, L., Jin, Z., Ma, Y., and Xu, H. (2019). Confucianism, openness to the West, and corporate investment efficiency. *Eur. Financ. Manage.* 25, 554–590. doi: 10.1111/eufm.12173

Cheung, F. M., Cheung, S. F., and Fan, W. (2013). "From Chinese to cross-cultural personality assessment Inventory: a combined emic-etic approach to study of personality in culture," in *Advances in Culture and Psychology: Volume 3*, eds M. J. Gelfand, Y. -y. Hong, and C. -y. Chiu. (Oxford, UK: Oxford University Press), 117–178. doi: 10.1093/acprof:oso/9780199930449.003.0003

Cheung, F. M., Cheung, S. F., Zhang, J., Leung, K., Leong, F., and Huiyeh, K. (2008). Relevance of openness as a personality dimension in Chinese culture: aspects of its cultural relevance. *J. Cross-Cult. Psychol.* 39, 81–108. doi: 10.1177/0022022107311968

Cheung, F. M., Leung, K., Fan, R. M., Song, W.-Z., Zhang, J.-X., and Zhang, J.-P. (1996). Development of the Chinese personality assessment inventory. *J. Cross-Cult. Psychol.* 27, 181–199. doi: 10.1177/0022022196272003

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z., et al. (2001). Indigenous Chinese personality constructs - Is the five-factor model complete? *J. Cross-Cult. Psychol.* 32, 407–433. doi: 10.1177/0022022101032004003

Davidsson, P. (2016). A "business researcher" view on opportunities for psychology in entrepreneurship research. *Appl. Psychol.* 65, 628–636. doi: 10.1111/apps.12071

Dej, D. (2010). "Defining and measuring entrepreneurial success," in *Entrepreneurship: A Psychological Approach,* eds M. Lukes, and M. Laguna (Prague: Oeconomica), 89–102.

Edwards, J. R. (1993). Problems with the use of profile similarity indices in the study of congruence in organizational research. *Pers. Psychology* 46, 641–665. doi: 10.1111/j.1744-6570.1993.tb00889.x

Edwards, J. R. (2002). "Alternatives to difference scores: polynomial regression and response surface methodology," in *Advances in Measurement and Data Analysis,* eds F. Drasgow, and N.W. Schmitt (San Francisco: Jossey-Bass), 350–400. doi: 10.1037/e576892011-020

Edwards, J. R., Caplan, R. D., and Van Harrison, R. (1998). "Person-environment fit theory: conceptual foundations, empirical evidence, and directions for future research," in *Theories of Organizational Stress*, ed C. L. Cooper (Oxford: Oxford University Press Oxford), 28–67.

Feldman, M. P. (2001). The entrepreneurial event revisited: firm formation in a regional context. *Ind. Corp. Change* 10, 861–891. doi: 10.1093/icc/10.4.861

Gan, Y. Q., Cheung, F. M., Wan, X. A., and Sun, Z. X. (2002). Predicting work performance of middle and top managers of state-owned enterprise using the Chinese Personality Assessment Inventory (CPAI). *Chin. J. Appl. Psychol.* 8, 35–39. (in Chinese)

Herrmann-Pillath, C. (2015). "A 'third culture' in economics? An essay on Smith, Confucius and the rise of China," in *The Adam Smith Review Volume 8,* ed F. Forman (London: Routledge).

Hisrich, R., Langan-Fox, J., and Grant, S. (2007). Entrepreneurship research and practice: a call to action for psychology. *Am. Psychol.* 62, 575–589. doi: 10.1037/0003-066X.62.6.575

Hou, C. C., and Hou, J. W. (2002). Evolution of economic institutions and China's economic reform. *Social Sci. J.* 39, 363–379. doi: 10.1016/S0362-3319(02)00206-9

Humberg, S., Nestler, S., and Back, M. D. (2019). Response surface analysis in personality and social psychology: checklist and clarifications for the case of congruence hypotheses. *Social Psychol. Pers. Sci.* 10, 409–419. doi: 10.1177/1948550618757600

Hwang, K. (2010). Chinese relationalism: theoretical construction and methodological considerations. *J. Theor. Social Behav.* 30, 155–178. doi: 10.1111/1468-5914.00124

Ip, P. K. (2009). Is confucianism good for business ethics in China? *J. Bus. Ethics* 88, 463–476. doi: 10.1007/s10551-009-0120-2

Judge, T. A., and Bono, J. E. (2001). Relationship of core self-evaluations traits-self-esteem, generalized self-efficacy, locus of control, and emotional stability-with job satisfaction and job performance: a meta-analysis. *J. Appl. Psychol.* 86, 80–92. doi: 10.1037/0021-9010.86.1.80

Kwong, J. Y. Y., and Cheung, F. M. (2003). Prediction of performance facets using specific personality traits in the Chinese context. *J. Vocat. Behav.* 63, 99–110. doi: 10.1016/S0001-8791(02)00021-0

Leung, K., Chen, Z. J., Zhou, F., and Lim, K. (2014). The role of relational orientation as measured by face and renqing in innovative behavior in China: an indigenous analysis. *Asia Pac. J. Manage.* 31, 105–126. doi: 10.1007/s10490-011-9277-1

Lewin, K. (1939). Field theory and experiment in social psychology: concepts and methods. *Am. J. Sociol.* 44, 868–896. doi: 10.1086/218177

Liu, C. Y., Ye, L., and Feng, B. (2019). Migrant entrepreneurship in China: entrepreneurial transition and firm performance. *Small Bus. Econ.* 52, 681–696. doi: 10.1007/s11187-017-9979-y

Luechapattanaporn, T., and Wongsurawat, W. (2021). Cultural factors in Chinese family business performance in Thailand. *Int. J. Entrepreneurship* 25, 1–15.

Matthes, J., Knoll, J., and von Sikorski, C. (2018). The "spiral of silence" revisited: a meta-analysis on the relationship between perceptions of opinion support and political opinion expression. *Commun. Res.* 45, 3–33. doi: 10.1177/0093650217745429

Mu, W. Q., Li, F. G., Ye, L. Y., Wang, B., Xu, J., and Zhou, M. J. (2020). The linear and nonlinear effect of Big-Six personality traits of college entrepreneurs on entrepreneurial performance: the mediating effect of entrepreneurial self-efficacy. *Chin. Soc. Psychol. Rev.* 19, 93–112. (in Chinese)

MyCOS Institute (2018). *Chinese 4-year College Graduates' Employment Annual Report (2018)*. Beijing: Social Sciences Academic Press (CHINA).

National Development and Reform Commission (2020). *Report on the Development of China's Mass Entrepreneurship and Innovation in 2019*. Beijing: People's Publishing House.

Newman, A., Obschonka, M., Schwarz, S., Cohen, M., and Nielsen, I. (2019). Entrepreneurial self-efficacy: a systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research. *J. Vocat. Behav.* 110, 403–419. doi: 10.1016/j.jvb.2018.05.012

Nolan, J., and Rowley, C. (2020). Whither guanxi and social networks in China? A review of theory and practice. *Asia Pac. Bus. Rev.* 26, 113–123. doi: 10.1080/13602381.2020.1737391

Obschonka, M., Andersson, H., Silbereisen, R. K., and Sverke, M. (2013a). Rule-breaking, crime, and entrepreneurship: a replication and extension study with 37-year longitudinal data. *J. Vocat. Behav.* 83, 386–396. doi: 10.1016/j.jvb.2013.06.007

Obschonka, M., Schmitt-Rodermund, E., Silbereisen, R. K., Gosling, S. D., and Potter, J. (2013b). The regional distribution and correlates of an entrepreneurship-prone personality profile in the United States, Germany, and the United Kingdom: a socioecological perspective. *J. Pers. Social Psychol.* 105, 104–122. doi: 10.1037/a0032275

Obschonka, M., Stuetzer, M., Gosling, S. D., Rentfrow, P. J., Lamb, M. E., Potter, J., et al. (2015). Entrepreneurial regions: do macro-psychological cultural characteristics of regions help solve the "knowledge paradox" of economics? *PLoS ONE* 10:e0129332. doi: 10.1371/journal.pone.0129332

Obschonka, M., Zhou, M., Zhou, Y., Zhang, J., and Silbereisen, R. K. (2019). "Confucian" traits, entrepreneurial personality, and entrepreneurship in China: a regional analysis. *Small Bus. Econ.* 53, 961–979. doi: 10.1007/s11187-018-0103-8

Oishi, S., and Graham, J. (2010). Social ecology: lost and found in psychological science. *Perspect. Psychol.l Sci.* 5, 356–377. doi: 10.1177/1745691610374588

Opper, S., Nee, V., and Holm, H. J. (2017). Risk aversion and guanxi activities: a behavioral analysis of CEOs in China. *Acad. Manage. J.* 60, 1504–1530. doi: 10.5465/amj.2015.0355

Rentfrow, P. J. (2010). Statewide differences in personality toward a psychological geography of the United States. *Am. Psychol.* 65, 548–558. doi: 10.1037/a0018194

Rentfrow, P. J., Gosling, S. D., and Potter, J. (2008). A theory of the emergence, persistence, and expression of geographic variation in psychological characteristics. *Perspect. Psychol. Sci.* 3, 339–369. doi: 10.1111/j.1745-6924.2008.00084.x

Sternberg, R. (2009). "Regional dimensions of entrepreneurship," in *Foundations and Trends® in Entrepreneurship, Vol. 5*, 211–340. doi: 10.1561/0300000024

Zhang, S. S., Zhou, M. J., Chen, S., and Zhang, J. X. (2012). The relationships between indigenous personality traits and job performance: linear and nonlinear. *J. Psychol. Sci.* 35, 1440–1444. doi: 10.16719/j.cnki.1671-6981.2012.06.034

Zhang, Z., and Arvey, R. D. (2009). Rule breaking in adolescence and entrepreneurial status: an empirical investigation. *J. Bus. Ventur.* 24, 436–447. doi: 10.1016/j.jbusvent.2008.04.009

Zhao, H., and Seibert, S. E. (2006). The big five personality dimensions and entrepreneurial status: a meta-analytical review. *J. Appl. Psychol.* 91, 259–271. doi: 10.1037/0021-9010.91.2.259

Zhao, H., Seibert, S. E., and Lumpkin, G. T. (2010). The relationship of personality to entrepreneurial intentions and performance: a meta-analytic review. *J. Manage.* 36, 381–404. doi: 10.1177/0149206309335187

Zhou, M. J., Li, F. G., Mu, W. Q., Fan, W. Q., Zhang, J. X., and Cheung, F. M. (2021). Round outside and square inside: the latent profile structure and adaptability of Chinese interpersonal relatedness. *Acta psychologica Sinica* 53, 1–16. (in Chinese)

Zhou, M. J., Zhou, Y. X., Zhang, J. X., Obschonka, M., and Silbereisen, R. K. (2019). Person-city personality fit and entrepreneurial success: an explorative study in China. *Int. J. Psychol.* 54, 155–163. doi: 10.1002/ijop.12451

APPENDIX

Following are items measuring the interpersonal relatedness (IR) of entrepreneurs which was used in the study by Obschonka et al. (2019).

1. Inviting someone out to dinner has to be done in style in order to keep up appearances.
2. I am usually very particular about the way I dress because I do not want others to look down on me.
3. I would rather cut down on my regular expenses, but when it comes to inviting people out or giving presents, I must be generous.
4. Even if I do not have much money, I would still try to buy a presentable coat.
5. To avoid mistakes in life, the best thing to do is to listen to the elders' suggestions.
6. Students should concentrate on their studies and not get distracted by what is happening in the society.
7. A woman's chastity is more important than her life.
8. I try my best to listen to my parents out of filial piety.
9. In order to avoid offending others, it is best not to show off too much.
10. When dealing with organizations, things can work out more smoothly through the connections of friends working inside.
11. When a friend borrows something from me and does not return it, I often feel uneasy about asking him/her to give it back.
12. Blood is thicker than water, and no matter what, one's feelings for one's family are always stronger than for outsiders.
13. One can avoid making serious mistakes by always following tradition.
14. Rules and laws should be strictly enforced and should be without exception.
15. I believe traditional ideas or concepts should not be torn down.
16. It would be great if everyone had a similar way of thinking or a similar value system.
17. I try my best to maintain harmony in my family because I believe that if a family lives in harmony, all things will prosper.
18. When facing a dilemma, I can always arrive at a compromise.
19. It is a virtue to tolerate everything.
20. I follow the saying that "Those who are contented are always happy" as a principle in life.

Entrepreneurial success: "What is the total annual income of your family at present?"

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Reciprocal Relationship Between Parenting Styles and Interpersonal Personality in Chinese Adolescents

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This study examined the reciprocal relations between the parenting styles and adolescents' interpersonal personality in China. A total of 722 sixth-grade Chinese junior high school students reported their interpersonal relatedness (IR) personality trait and perceived parenting styles of their parents. Of these students, 411 completed the survey again in eighth grade. One parent of each student rated their parenting styles. The results indicated that perceived paternal rejection negatively predicted adolescents' IR 2 years later, whereas perceived paternal behavioral controlling positively predicted adolescents' IR 2 years later. IR also positively predicted perceived paternal warmth 2 years later. Significant reciprocal association between adolescents' IR and perceived maternal rejection was found. Parent-rated behavioral control negatively predicted adolescents' IR, whereas Parent-rated filial piety positively predicted adolescents' IR. The results were discussed in the Chinese context.

Keywords: interpersonal personality, parenting styles, filial piety, reciprocal relationship, Chinese adolescents

INTRODUCTION

Personality is one of the most important individual dispositions. Numerous theories have been conducted to examine how personality develops and what influences it (Caspi et al., 2005; Specht, 2017). There is a growing interest in adolescent personality development (e.g., Schofield et al., 2012) due to the findings about its links with subjective well-being, school performance, and career development (e.g., Rogers et al., 2008; Poropat, 2009; Cheung et al., 2012; Li, 2021). Parent is one of the most important socializing agents interacting with child (Damon et al., 2006). Parenting style, which is defined as a climate in which the family functions and child-rearing or socialization occurs (Darling and Steinberg, 1993), is an important factor that may be associated with children's personality development (Shiner and Caspi, 2003).

The mechanisms for the relations between personality and parenting are often discussed from two major perspectives. First, according to the internal working model (Bowlby, 1980; Bretherton, 1990), children internalize the experience from the interaction with their parents and develop the "self" and carry it to other contexts, which eventually leads to a relatively stable personality. Consistent with this perspective, studies have indicated that parenting styles play a significant role in the development of individual personality (Coplan et al., 2009; Kitamura et al., 2009). Second, according to the environmental elicitation model (Belsky, 1984; Shiner and Caspi, 2003), children's characteristics may elicit specific parenting behaviors and shape parenting styles. There is emerging evidence indicating children's personalities may predict parenting styles

(Prinzie et al., 2012; Hong et al., 2015; Skinner et al., 2019). In fact, a bi-directional relation between parenting and child characteristics has been highlighted in socialization literature as well (e.g., Bell, 1968; Dodge, 1990).

Theoretically, the internal working model of behavior and the environmental elicitation model are not mutually exclusive (Anaya and Pérez-Edgar, 2019). For example, the transactional model of development emphasizes the bidirectional unfolding of parents' and children's behavior and posits that children's development occurs through the continuous dynamic interplay between child's characteristics and parent's response (Sameroff, 1987; Sanson et al., 2018). This theory has been supported by some results concerning the relations between parenting and child functioning (e.g., personality development) (Van den Akker et al., 2014; Van Heel et al., 2019). For example, Van den Akker et al. (2014) showed that maternal warmth and children's benevolent and openness traits contributed to each other in a bi-directional manner. Nevertheless, further research is needed to explore reciprocal associations between different parenting styles and children's personality in order to better understand the mechanisms of socialization and human development as suggested by the internal working model and the environmental elicitation model (Anaya and Pérez-Edgar, 2019).

However, the existing studies of relations between parenting styles and personality have been conducted mainly in Western societies based on the Western models of intrapersonal personality (e.g., the five factor model, McCrae and Costa, 2008) and parenting styles (e.g., the three-dimensional framework of responsiveness, demandingness, and autonomy support; Baumrind, 1971; Prinzie et al., 2009; Huver et al., 2010; Kim et al., 2013; Fu and Markus, 2014; Zhong et al., 2020). As a result, little is known about the relations in non-Western societies. Developmental theorists (e.g., LeVine, 1974; Chao, 1994; Chen, 2000) have long argued that social and cultural contexts are likely to affect parenting, individual characteristics, and their relations. Therefore, it is necessary to examine the links between parenting styles and personality in different societies, which may provide valuable information about the socialization processes beyond the Western frameworks.

For example, an important indigenous notion in socialization in the Confucian doctrine, which is the primary ideological system in Chinese and some other East Asian societies, is filial piety (Chan et al., 2009). The principle of filial piety stipulates that child should fulfill parents' expectations, maintain absolute obedience to parents, and care for elders in the family whereas parents are responsible for teaching and disciplining their children (Hsu, 1981; Chen, 2014; Jorgensen et al., 2017). A major socialization task for parents is to encourage and help children to learn and display filial piety from childhood (Ho, 1996). Relatedly, interpersonal relatedness is highly valued in group-oriented Chinese and Asian societies (Chen, 2000). Accordingly, researchers have identified Interpersonal Relatedness (IR) as a typical personality factor that describes the orientation toward harmonious social interactions and avoidance of conflict (Cheung et al., 2001; Fan et al., 2011). Empirical studies have supported the validity of IR in explaining and predicting adolescents' developmental outcomes, such as loneliness, life

satisfaction, and career development (e.g., Cheung et al., 2012; Wan and Cheung, 2016; Xie et al., 2016; Li et al., 2019; Li, 2021). In this 2-year longitudinal study, we attempted to investigate reciprocal associations between parenting styles, as rated by parents and adolescents, and adolescents' interpersonal personality in China.

Parenting Styles and Adolescents' Personality

The contributions of parenting styles to the development of adolescents' personalities have been well-documented in the literature (e.g., Kitamura et al., 2009; Schofield et al., 2012). For example, in an American adolescent sample, Schofield et al. (2012) found that maternal and paternal warmth significantly predicted adolescent alpha personality traits (including high agreeableness and consciousness and low neuroticism) 2 years later. Researchers also found that parental acceptance was a significant predictor of self-rated openness in Chinese adolescents (Fan and Wu, 2009) and teacher-rated creative personality in South Korean children (Lim and Smith, 2008). Similarly, Kitamura et al. (2009) found that parental caring styles predicted children's novelty-seeking trait. Weiss and Schwarz (1996) found significant links between parenting styles and the Big Five traits: unengaged and authoritarian parenting styles predicted low scores on agreeableness and openness to experience or high scores on neuroticism in the US.

Regarding the effects of adolescents' personality on their parent's parenting styles, de Haan et al. (2012) and Egberts et al. (2015) found longitudinal evidence with Belgian adolescents that extraverted, benevolent (agreeable), and imaginative (open to experience) traits evoked high parental warmth but low parental overreactivity/psychological control 2 years later. In an African American sample, Skinner et al. (2019) found in a 3-year longitudinal study that the self-rated expressivity of youths positively predicted maternal and paternal warmth and conflict.

In addition, it has been argued that parenting styles of mothers and fathers may be associated with children's behaviors and characteristics in different manners (Chen et al., 2000; Winsler et al., 2005; Latzman et al., 2009). Milevsky et al. (2007) found that authoritative mothering was positively associated with self-esteem and life satisfaction and negatively associated with depression; however, authoritative fathering was only negatively associated with depression. In a meta-analytic review that based on 48 studies, Kawabata et al. (2011) reported that uninvolved parenting of mothers, but not fathers, was positively associated with relational aggression, whereas psychologically controlling parenting of fathers, but not mothers, was positively related to relational aggression.

Parenting Style and Personality in Chinese Adolescents: The Present Study

Social context is believed to play an important role in shaping parenting and child-rearing practices (Chen-Bouck et al., 2019), which serve to transmit the values and ideals of a culture to the next generation (Super and Harkness, 1997). Thus, the relations between parenting styles and personality of adolescents can be

fully understood only in the context of the society in which they are embedded (Szapocznik and Kurtines, 1993).

Researchers have found that the Western framework may not be sufficient in capturing Chinese parenting styles (Chao, 1994; Chen et al., 2000). For example, although Chinese parents tend to be more power-assertive and controlling than Western parents, parental power assertion and control are often associated with care, concern, and involvement in Chinese culture, which may be reflected in the notion of *Guan* (strict control based on care and concern) (Chao, 1994; Chen et al., 2000). In addition, as mentioned earlier, filial piety parenting represents an indigenous parenting style in Chinese families, which is different from overprotection in the Western literature (Szapocznik and Kurtines, 1993; Young et al., 2003).

With regard to personality, it has been argued that the Western models, such as the Big Five (McCrae and Costa, 2008), may not provide an adequate and relevant understanding of personality in other contexts (Kim et al., 2006). Cheung et al. (2011) recommended a combined emic-etic approach to "bridge the divide between mainstream and indigenous psychology and provide a comprehensive framework to understand universal and culturally variable personality dimensions" (p. 5). The Cross-Cultural (Chinese) Personality Assessment Inventory (CPAI; Cheung et al., 2001; Fan et al., 2011) has been used to assess the personalities of adult and adolescent populations with a combined emic-etic approach. In addition to the Western-derived Big Five factors, a personality trait known as IR was validated in a series of studies in Chinese samples. For example, it was found that IR significantly predicted life satisfaction among Chinese adolescents (Xie et al., 2016). IR and independent personality related to the Big Five model also significantly predicted Chinese adolescents' loneliness at the individual and group levels (Li et al., 2019).

Therefore, we attempted in this study to expand the research on the relations between parenting and personality in Chinese adolescents by including some culturally relevant aspects such as parental encouragement of filial piety and adolescents' IR. We posited that adolescents' IR is reciprocally associated with Western-based parenting styles (e.g., warmth and rejection as the types of responsiveness, control as the type of demandingness, and encouragement of independence as the type of autonomy support) and the indigenous Chinese parenting style of encouragement of filial piety. Adolescence is a critical period for personality development. Adolescents during this period actively engage in dynamic social processes in constructing their self-identity and understanding their relationships with others (Caspi et al., 2005). As important socialization agents, parents may exert significant influence on adolescents' personality and, at the same time, adolescents' characteristics and experiences may shape parenting styles (Belsky, 1984; Huver et al., 2010).

Many of the studies of parenting and personality have used one informant (child reports or parental reports) in assessments. Children's and parents' perceptions of parenting may reflect different perspectives (Hou et al., 2020). For example, Yan et al. (2021) found that parents reported higher levels of warmth and monitoring than the adolescents did. Therefore, we collected data on parenting from both parents and adolescents in the present study.

METHOD

Participants

A total of 722 sixth-grade students were recruited from four regular public junior high schools (40.8% female; $M_{age} = 11.49$, $SD_{age} = 0.61$) in Shanghai, China. The schools were comparable in their structure, curriculum, and conditions. At the first wave of data collection, 499 (43.69% mothers) parents also participated. From the original sample, 411 eighth-grade students (56.93% of the students from the first wave of data collection) and 276 parents (60.51% mothers) participated in the second wave of data collection 2 years later. Because the parenting measure was completed by different parents at different times (e.g., the mother in Grade 6 and the father in Grade 8) for 85 students, data on parent-rated styles for these adolescents were not included in the data analysis.

Forty-two students did not report paternal educational level and forty-four students did not report maternal educational level. Of the fathers, 48.8% had an education of middle school or lower, 30.6% had an education of high school or technical training school, and 20.6% had a college/university education or higher. Of the mothers, 56.6% had an education of middle school or lower, 27.6% had an education of high school or technical training school, and 15.8% had a college/university education or higher. Fifty-seven students did not provide information about fathers' income and eighty-four students did not report mother's income. The available data indicated that for fathers' income (per month), 15.9% had 3000 RMB or less, 36.5% had 3,000–5,000 RMB, 28.0% had 5,000–10,000 RMB, and 19.6% had over 10,000 RMB. For mothers' income (per month), 37.9% had 3,000 RMB or less, 38.4% had 3,000–5,000 RMB, 16.5% had 5,000–10,000 RMB and 7.2% had over 10,000 RMB.

Measures
IR

Adolescents reported on their IR by filling out the CPAI for Adolescents (CPAI-A, Form B) (Cheung et al., 2008), which was developed for assessing adolescent personality in Chinese populations. The CPAI-A (Form B) is composed of 25 general personality scales. In the present study, only the eight personality scales (i.e., harmony, family orientation, relationship orientation, graciousness vs. meanness, interpersonal tolerance, self vs. social orientation, veraciousness vs. slickness, and social sensitivity) of the IR factor were used. These scales were assessed using 90 items that were answered in a yes-or-no format. The average score for the eight scales was calculated for IR. The items for IR reflected the relevance of interpersonal dimensions [e.g., "It is hard for me to get along with others" (harmony; reversely scored), "I find it hard to sense other people's true reactions" (social sensitivity; reversely scored)] in the conceptualization of personality across Western and Eastern societies (Lin and Church, 2004; Fan et al., 2011). Previous studies have reported good internal consistency reliability, test-retest reliability, and construct validity for the CPAI-A (Cheung et al., 2008; Li et al., 2019). In this study, the

Cronbach's alpha of the IR factor was 0.86 in Grade 6 and 0.83 in Grade 8.

Parenting Styles

Adolescents reported their perceptions of paternal and maternal parenting styles separately by using a measure that Chen et al. (1998) adapted from the Children's Report of Parent Behavior Inventory (CRPR; Schaefer, 1965). The Chinese version of the CRPR has been used in research on parenting in China (e.g., Xu et al., 2005). The revised measure includes parenting dimensions of (1) warmth (five items; e.g., "speak to me in a gentle and kind manner"), which refers to displaying positive emotions, acceptance, and support in parent-child interactions; (2) independence (six items; e.g., "encourage me to be independent and not to rely on her"), which refers to providing support for children to be autonomous and independent in attitudes and behaviors; (3) rejection (one item; i.e., "when my mother/father is angry, she/he scolds me"), which refers to parental indifferent and rejecting attitudes toward children; (4) behavioral control (five items; e.g., "believes in having a lot of rules and sticking with them"), refers to parental regulation of children's behaviors through monitoring, supervision, and emphasis on child obedience, and (5) filial piety (six items; e.g., "told me to be filial to my parents and elders"), refers to cultivating children to fulfill parents' expectations, obey their wishes, care for parents and elders in the family, and maintain interpersonal harmony in the family. The subscale of filial piety was added in this study. Adolescents were asked to rate each items on a 5-point scale, ranging from 1 (*not at all true*) to 5 (*very true*) for their mother and father.

One parent of each student reported on parenting styles using a measure adapted by Chen et al. (1998) from the Block Child-Rearing Practices Report (Block, 1965), with a filial piety subscale added in this study. The revised measure assessed the parenting styles corresponding to those in the adolescent measure, including parental warmth (four items; e.g., "I speak to my children in a gentle and kind manner"), independence (six items; e.g., "In many things, I let my children make their own decisions"), rejection (four items; e.g., "When I was angry, I scolded my children"), behavioral control (four items; e.g., "I always ask about my children's activities outside of school"), and filial piety (eight items; e.g., "I told my children to be filial to parents and elders"). The 5-point Likert scale was used for reporting (1 = *not at all true*, 5 = *very true*). The reliabilities of the subscales are presented in **Table 1**, ranging from 0.60 to 0.83 at Grade 6, and from 0.70 to 0.89 at Grade 8.

Procedure

The same procedure was used in both waves of data collection. The students were administered self-report measures of IR and parenting style. The students completed the questionnaires in their classrooms in ~30 min. Each participant received a small gift worth ~20 RMB for their participation. The students were told that the data are collected for scientific research and will be kept confidential and that data analysis will be performed at the group level.

TABLE 1 | Descriptive statistics and reliabilities (Cronbach's α).

	Grade 6			Grade 8		
	M	*SD*	α	*M*	*SD*	α
IR	8.10	1.73	0.86	8.23	1.65	0.83
Warmth_M	3.77	.98	0.83	3.59	0.94	0.89
Independence_M	3.81	0.85	0.76	3.67	0.85	0.86
Rejection_M#	2.83	1.47	–	2.78	1.18	–
Control_M	2.99	0.88	0.61	2.83	0.84	0.73
Filial piety_M	4.16	0.72	0.72	3.93	0.77	0.83
Warmth_F	3.67	1.05	0.84	3.47	0.93	0.86
Independence_F	3.87	0.92	0.80	3.78	0.84	0.86
Rejection_F#	2.60	1.53	–	2.67	1.30	–
Control_F	2.80	1.00	0.72	2.69	0.97	0.80
Filial piety_F	4.07	0.80	0.77	3.85	0.77	0.81
Warmth_P	3.91	0.72	0.70	3.85	0.67	0.72
Independence_P	4.09	0.62	0.73	4.06	0.61	0.82
Rejection_P	2.01	0.77	0.60	1.89	0.66	0.70
Control_P	3.30	0.83	0.70	3.23	0.73	0.73
Filial piety_P	4.20	0.55	0.71	4.17	0.57	0.81

IR, Interpersonal Relatedness. The letter following the variable name refers to the resource of the corresponding data: M, self-reported data for maternal parenting style; F, self-reported data for paternal parenting style; P, parent-reported; #, the subscale is composed of one item and the alpha value is not computed.

As for the parental data collection, students took the corresponding parental questionnaires to their parents, and then one parent of each student completed the questionnaires at home, which were brought back to school in a sealed envelope and given to the research assistant. Written consent was obtained from the participants and their parents through the school. This study was approved by the ethics panel of the university.

Data Analysis

The metric invariance is a prerequisite for comparing associations across time (Klimstra et al., 2018). In order to conduct cross-lagged analyses, a metric invariance of the measures of parenting styles (except for adolescent-reported rejection which included one item) and personality was examined. Items for the dimensions with eight items (i.e., parent-reported filial piety and IR) were parceled into three parcels using random assignment (Little et al., 2002). In general, the results indicated metric invariance in the measures of parenting styles and personality, which allowed us to conduct further cross-lagged analyses.

A repeated measures MANOVA was conducted to examine the effects of time, parental gender, and adolescent gender on the research variables. Cross-lagged analyses were conducted to examine reciprocal longitudinal associations between parenting styles and personality variables using Mplus (Version 7.4), which used full information maximum likelihood (FIML) estimation in the presence of missing data. Robust maximum likelihood estimation (MLR) was used to account for non-normal distributions of the observed variables.

In case of common method bias, Harman's single factor was used to test the potential limitation of the self-reported parenting styles and IR. The total variance for a single factor was 23.43%, which is acceptable (Podsakoff et al., 2003).

RESULTS

Preliminary Analysis

The descriptive statistics of the research variables are reported in **Table 1**. The zero-order correlations between parenting styles and IR traits in Grades 6 and 8 are reported in **Table 2**. Parental education level and income level were included in the correlational analysis as indicators of family socioeconomic status.

MANOVA indicated no significant differences in IR and self-rated parenting styles between the students for whom two waves of data collection were completed and those who did not participate in Grade 8, Wilks' $\Lambda = 0.97$, $F_{(11,688)} = 1.80$, $p > 0.05$. MANOVA also indicated no significant differences in parent-rated parenting styles between those parents for whom two waves of data collection were completed and those who did not participate in Grade 8, Wilks' $\Lambda =.99$, $F_{(5,404)} = 0.75$, $p > 0.05$.

For student-rated variables, the overall effects of time, parental gender, and adolescent gender as well as their interactions were examined with a mixed repeated measure MANOVA. According to Cohen's (1988) guidelines for interpreting the F-test effect size (small, 0.01; medium, 0.059; large, 0.138), only time differences, Wilks' $\Lambda = 0.91$, $F_{(5, 385)} = 7.77$, $p = 0.00$, $\eta^2 = 0.09$, and parental gender differences, Wilks' $\Lambda = 0.84$, $F_{(5, 385)} = 14.82$, $p = 0.00$, $\eta^2 = 0.16$, were considered in the subsequent analyses. Univariate tests indicated that maternal behavioral control was significantly higher than paternal behavioral control, with a medium effect size, $F_{(1,389)} = 31.00$, $p = 0.00$, $\eta^2 = 0.07$. A significant decrease was observed in parental encouragement of filial piety from Grade 6 to Grade 8, with a medium effect size, $F_{(1, 389)} = 27.41$, $p = 0.00$, $\eta^2 = 0.07$. No other significant main effects or interaction effects were observed.

For parent-rated variables, the overall effects of time, parental gender, and adolescent gender as well as their interactions were examined with a mixed repeated measure MANOVA. According to Cohen's (1988) guidelines, only parental gender differences, Wilks' $\Lambda = 0.92$, $F_{(5,172)} = 3.08$, $p = 0.01$, $\eta^2 = 0.08$, and the time $\times$ adolescent gender interaction, Wilks' $\Lambda = 0.93$, $F_{(5,172)} = 2.59$, $p = 0.03$, $\eta^2 = 0.07$, were considered for further analyses. Univariate tests indicated non-significant differences.

Cross-Lagged Analyses of Parenting Styles and IR

Three cross-lagged models were tested to examine reciprocal longitudinal associations between parenting styles (including both student-rated and parent-rated) and IR (**Figure 1**). The cross-lagged relations between student-reported paternal and maternal parenting styles and IR were examined using Models 1 and 2, respectively, after autoregressive paths and the effects of adolescent gender and SES were controlled. Model 3 examined the relations between parent-reported parenting styles and IR.

Data on parental styles reported by mothers and fathers were combined to increase the sample size that was needed for analyses, and parental gender was included as the third control variable in Model 3. Within-time correlations were also included in the three models.

In the final models, the non-significant paths from the control variables to IR and parenting styles were deleted. The data exhibited a suitable fit with Model 1 ($\chi^2 = 84.45$, $df = 61$, CFI $= 0.98$, RMSEA $= 0.024$, SRMR $= 0.041$), Model 2 ($\chi^2 = 83.02$, $df = 64$, CFI $= 0.98$, RMSEA $= 0.022$, SRMR $= 0.038$), and Model 3 ($\chi^2 = 86.97$, $df = 57$, CFI $= 0.96$, RMSEA $= 0.036$, SRMR $= 0.064$). The results of Model 1 indicated a significant positive effect of self-reported paternal rejection on IR in Grade 6 and a negative effect of paternal behavioral control on IR in Grade 8. IR in Grade 6 positively predicted paternal warmth in Grade 8. The results of Model 2 indicated a significant positive effect of self-reported maternal rejection in Grade 6 on IR in Grade 8. IR in Grade 6 negatively predicted maternal rejection in Grade 8. The results of Model 3 supported a significant negative effect of parent-reported behavioral control and a significant positive effect of parent-reported filial piety style in Grade 6 on IR in Grade 8.

We conducted multigroup analyses to test whether the cross-lagged paths between parenting styles and IR were significantly moderated by adolescent gender in Models 1 and 2 and by adolescent gender and parental gender in Model 3. Significant differences would be indicated between models when at least two of the following three criteria were met: $\Delta\chi^2$ significant at $p < 0.05$, ΔCFI ≥ -0.01, and ΔRMSEA ≥ 0.015 (Negru-Subtirica et al., 2015). The results for Model 1 [$\Delta\chi^2_{(10)} = 8.80$, $p > 0.05$, ΔCFI $= 0.00$, ΔRMSEA $= -0.002$] and Model 2 [$\Delta\chi^2_{(10)} = 4.37$, $p > 0.05$, ΔCFI $= 0.01$, ΔRMSEA $= 0.001$] indicated that the unconstrained model in which parameters were free to vary across groups was not significantly different from the constrained model in which parameters were fixed across adolescent genders. The results for Model 3 indicated that the unconstrained model in which parameters were free to vary across groups was not significantly different from the constrained model in which parameters were fixed across adolescent genders [$\Delta\chi^2_{(10)} = 0.95$, $p > 0.05$, ΔCFI $= 0.01$, ΔRMSEA $= -0.005$] and parental genders [$\Delta\chi^2_{(10)} = 0.97$, $p > 0.05$, ΔCFI $= -0.00$, ΔRMSEA $= -0.001$]. Therefore, both adolescent gender (for the three models) and parental gender (for Model 3) did not significantly moderate the cross-lagged relations.

DISCUSSION

This longitudinal study explored the associations between parenting styles and adolescents' IR personality, mainly from the perspectives of the internal working model (Bowlby, 1980; Bretherton, 1990) and the environmental elicitation model (Belsky, 1984; Shiner and Caspi, 2003). We examined the associations of IR personality with parenting styles based on adolescents' reports and parental reports. Moreover, we included dimensions of personality and parenting styles that are relevant in the Chinese society, which may help achieve a better

TABLE 2 | Zero-order correlations among the research variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Edu_F	–	–	–	–	0.11*	0.07	0.12*	−0.10	−0.09	0.06	0.13*	0.21**	−0.10	−0.06	0.13*	0.19**	0.19**	−0.18**	−0.10	0.08
2. Edu_M	0.66**	–	–	–	0.05	0.06	0.09	−0.08	−0.08	0.00	0.07	0.09	−0.05	−0.11*	−0.04	0.12*	0.13*	−0.16**	−0.11*	0.02
3. Income_F	0.26**	0.22**	–	–	−0.01	0.05	0.13*	−0.12*	−0.02	0.03	0.05	0.12*	−0.03	0.02	0.04	0.11*	0.08	−0.06	−0.05	0.02
4. Income_M	0.22**	0.33**	0.42**	– –	0.02	−0.02	0.05	−0.15**	0.03	0.00	0.01	0.02	−0.03	−0.01	−0.03	0.12*	0.15**	−0.03	−0.05	0.08
5. IR	−0.05	−0.01	−0.02	0.02	–	0.32**	0.30**	−0.26**	−0.23**	0.15**	0.38**	0.27**	−0.31**	−0.22**	0.18**	0.24**	0.22**	−0.25**	0.02	0.20**
6. Warmth_M	0.05	0.06	0.01	0.04	0.38**	–	0.76**	−0.27**	−0.04	0.43**	0.58**	0.51**	−0.14**	−0.01	0.32**	0.27**	0.23**	−0.12*	−0.01	0.08
7. Independence_M	0.08*	0.11**	0.09*	0.07	0.33**	0.63**	–	−0.25**	−0.05	0.51**	0.50**	0.64**	−0.18**	−0.07	0.40**	0.19**	0.18**	−0.13**	−0.08	0.04
8. Rejection_M	−0.03	−0.01	0.00	−0.08*	−0.18**	−0.29**	−0.16**	–	0.38**	0.09	−0.17**	−0.13**	0.33**	0.28**	0.02	−0.12*	−0.12*	0.13**	0.00	−0.04
9. Control_M	0.01	−0.01	−0.01	−0.09*	−0.07	0.01	0.03	0.28**	–	0.32**	0.09	0.01	0.33**	0.55**	0.25**	−0.01	−0.04	0.09	0.12*	−0.01
10. Filial piety_M	0.01	−0.03	0.04	−0.07	0.25**	0.41**	0.41**	0.01	0.24**	–	0.31**	0.42**	0.04	0.11*	0.65**	0.09	0.04	−0.04	−0.04	0.05
11. Warmth_F	0.05	−0.01	0.06	0.02	0.29**	0.53**	0.43**	−0.13**	0.12**	0.36**	–	0.71**	−0.30**	0.07	0.41**	0.23**	0.15**	−0.13**	0.02	0.07
12. Independence_F	0.14**	0.09*	0.12**	0.05	0.27**	0.43**	0.59**	−0.10**	0.10**	0.43**	0.64**	–	−0.25**	−0.03	0.59**	0.17**	0.15**	−0.14**	−0.03	0.05
13. Rejection_F	−0.03	−0.01	−0.02	−0.03	−0.23**	−0.12**	−0.09*	0.36**	0.23**	−0.02	−0.25**	−0.21**	–	0.52**	0.08	0.01	0.01	0.08	0.01	−0.03
14. Control_F	−0.02	−0.07	−0.02	−0.01	−0.16**	0.07	0.06	0.19**	0.56**	0.10*	0.07*	0.04	0.38**	–	0.21**	−0.05	0.00	0.18**	0.12*	0.00
15. Filial piety_F	0.02	−0.04	0.02	−0.04	0.20**	0.33**	0.38**	0.00	0.18**	0.66**	0.40**	0.50**	0.03	0.25**	–	0.08	0.05	−0.06	0.02	0.07
16. Warmth_P	0.09*	0.14**	0.10*	0.08	0.19**	0.19**	0.09*	−0.07	−0.10*	0.06	0.14**	0.08*	−0.09*	−0.14**	−0.04	–	0.70**	−0.30**	0.22**	0.55**
17. Independence_P	0.08*	0.10**	0.08*	0.08	0.14**	0.12**	0.13**	−0.10**	−0.06	0.06	0.06	0.09*	−0.02	−0.08*	0.05	0.59**	–	−0.26**	0.26**	0.61**
18. Rejection_P	−0.06	−0.09*	0.04	−0.01	−0.18**	−0.17**	−0.09*	0.13**	0.13**	−0.03	−0.13**	−0.11**	0.15**	0.14**	−0.03	−0.35**	−0.27**	–	0.19**	−0.08
19. Control_P	−0.07	−0.08*	0.00	−0.05	−0.01	−0.08*	−0.07	0.09*	0.08*	0.03	−0.03	−0.03	0.06	0.03	−0.01	0.09*	0.11**	0.22**	–	0.49**
20. Filial piety_P	−0.03	0.00	0.06	−0.03	0.07	0.01	−0.02	0.00	0.02	0.08*	0.03	0.03	−0.01	−0.03	0.03	0.42**	0.48**	−0.11**	0.38**	–

IR, Interpersonal Relatedness. The letter following the variable name refers to the resource of the corresponding data: M, adolescent-rated maternal parenting style; F, adolescent-rated paternal parenting style; P, parent-rated parenting style. Edu_F, father's education level; Edu_M, mother's education level; Income_F, father's income level; Income_M, mother's income level. Correlations of the variables at Grade 6 are presented below the diagonal line. Correlations of the variables at Grade 8 are presented above the diagonal line (Edu_F, Edu_M, Income_F, and Income_M were collected in Grade 6). $^*p < 0.05$; $^{**}p < 0.01$.

FIGURE 1 | Cross-lagged model of IR and parenting styles from grade 6 to grade 8: **(A)** paternal styles rated by adolescents, **(B)** maternal styles rated by adolescents, and **(C)** parenting style rated by parents. For clarity, the non-significant paths in within-time correlations are not reported. The figure following the variable name refers to the time point of data collection in this study. F, father; M, mother; P, parent. N is 652 for Model **(A)**, 615 for Model **(B)**, and 396 for Model **(C)**.
*$p < 0.05$; ** $p < 0.01$.

understanding of the relations between parenting and personality in cultural contexts.

Adolescent-Rated Parenting Styles and Adolescents' IR

The results showed that adolescents rated maternal behavioral control as higher than paternal behavioral control. The results seem to support the argument that mothers have traditionally been regarded as primary caregivers in Chinese families and the findings that mothers are involved in various aspects of socialization (Zhao et al., 2015; Lan et al., 2019). It is possible that relative to fathers, mothers spend more time with children and have more opportunities to monitor and control adolescent's behaviors (Chen et al., 2000). The results also indicated a decrease in parental encouragement of filial piety over the 2 years. One possible explanation is that although filial piety is highly valued in China (Cheung et al., 2001), the primary task of students in junior high school, especially in the final year, is to concentrate on academic performance to prepare for the entrance examinations for senior high school, which is linked to opportunities to receive a higher education (Zhao, 2007). As such, when students are in Grade 8, parents may be more concerned about their academic work and pay less attention to learning of filial behaviors.

The results indicated that paternal and maternal rejection reported by students positively predicted their IR. This finding is somewhat surprising because empirical studies often showed that parental rejection negatively predicted adolescents' empathy (Guo and Feng, 2017) and social relationships (Feldman and Downey, 1994). Apparently, further research is needed to explore the nature of parental rejection in the Chinese context. For example, it is possible that adolescents who perceive parental rejection may be more eager to establish social relationships in non-family contexts than adolescents do not. Consistent with this argument, Qiu (2010) found that children were likely to have earlier intimate relationships when perceiving higher parental rejection than those who did not perceive such parenting style. Rowe et al. (2015) also found positive effects of perceived parental rejection on adolescents' rejection sensitivity, which is a part of social sensitivity related to the trait of IR.

The child-reported paternal behavioral control negatively predicted IR, which also indicated the contribution of parenting to personality development. This result is consistent with previous finding that parental control positively predicted social fearfulness and difficulties in navigating social relationships in children (Rubin et al., 1999; Wood et al., 2006) and reduced adolescents' agreeableness (Van Heel et al., 2019), which is related to IR (Cheung et al., 2008; Fan et al., 2011). According to the

self-system model of motivational development, a controlling parent-child relationship may disrupt children's self-system development and undermine their efforts toward relatedness (Grolnick, 2002).

Concerning contributions of personality to parenting, we found that adolescents' IR positively predicted paternal warmth and maternal rejection. The results were consistent with the findings of previous studies that adolescent benevolent (agreeable) characteristics are helpful to develop positive parent-child interactions through eliciting harmonious social interactions and avoidance of conflict (Cheung et al., 2008; Fan et al., 2011; Egberts et al., 2015). The bidirectional relations between IR and parenting may reflect adolescents' self-regulation in parent-child relationship as a form of active adaptation.

Parent-Rated Parenting Styles and Adolescents' IR

Results based on parent-rated parenting styles supported the working model. Parent-rated behavioral control negatively predicted adolescents' IR. The negative contribution of child-rated parental behavioral control to IR was consistent with the results concerning child-reported paternal behavioral control. Interestingly, parental encouragement of filial piety, which represents a set of culturally relevant virtues in Chinese culture, positively predicted IR. As indicated earlier, filial piety requires children to care for parents and elders in the family and to maintain family harmony (Chen, 2014; Jorgensen et al., 2017). The children of parents who emphasize filial piety may be more likely to develop positive interpersonal relationships than children of parents who do not emphasize filial piety.

In summary, our study did not show consistent results concerning the relations of parenting styles reported by children and parents with adolescents' personality. Such inconsistency has been observed by other researchers. For example, Tuvblad et al. (2013) found that the influence of youth's psychopathic personality on parental negative affect toward the child was found based on parental reports but not youth reports. García et al. (2006) also found differences in the relations among personality, parenting styles, and socialization outcomes based on parents' and children's reports. It is possible the two sources of information represent different perspectives. Whereas adolescents' reports focus on their perceptions of parenting, which is relevant to their reactions (Shelton et al., 1996), parental reports may be more sensitive in capturing the unobservable and complex parental attitudes and behaviors in interactions with their children (Bezdjian et al., 2011). Our study showed that it may be useful to use both parent- and child-reports to obtain more complete information in the study of parenting and adolescents' characteristics.

Conclusions, Implications, and Limitations

The present study provided valuable information about the associations between parenting styles and interpersonal personality in Chinese adolescents. A bi-directional relation between parenting and child characteristics has been highlighted in socialization theories (Bell, 1968; Belsky, 1984; Bronfenbrenner, 1989; Dodge, 1990). The results, specifically, indicated reciprocal contributions of parenting and adolescent

IR personality, supporting both the working model (Bretherton, 1990) and the environmental elicitation model (Shiner and Caspi, 2003). Our results also suggest that paternal and maternal styles may have different effects on adolescents' IR personality. In addition, the data from multiple informants allowed us to examine parenting styles from adolescent and paternal perspectives and their relations with IR personality.

The results of the present study, especially those related to the culturally relevant aspects of parenting and personality, have important implications in theory and practice. For example, beyond the bidirectional associations between the major personality traits and parenting dimensions that are identified in the literature (e.g., Van den Akker et al., 2014), our study highlighted the relevance of indigenous constructs of parenting and personality, such as encouragement of filial piety and IR in the Chinese context. Practically, the results concerning the bi-directional relations between parenting and IR personality suggest that it is important to consider the dynamic process of parent-adolescent interactions when designing prevention and intervention programs for adolescents with adjustment problems.

Specifically, the elicited effects of adolescents' IR personality on parenting suggest that intervention programs designed to improve parenting should consider adolescents' characteristics. For example, the one-child policy, which started in the late 1970s, has resulted in concerns about indulgence of Chinese parents in childrearing (e.g., Liang and Sugawara, 1992; Chen et al., 2000). The formation of parental indulgence may be related to parental attitude as well as the characteristics of children. The unique personality traits of only children in China (Cameron et al., 2013; Love et al., 2020) may play a role in shaping parenting styles to a certain extent. It will be useful to help parents understand the characteristics of children's personality in order to effectively promote healthy development.

Several limitations and weaknesses in the study should be noted. First, we used a two-wave longitudinal design. A multi-wave longitudinal study should be conducted to explore the relations between parenting styles and adolescent personality over a longer period of time. Second, our sample included secondary school students in Shanghai, which is a fast-developing city in China. Parenting behaviors may be different from those in other regions, particularly rural regions, in the country where traditional values may be more maintained in childrearing. Thus, future research should be conducted with samples from different regions in China. Relatedly, it will be important to conduct cross-cultural research to examine whether the results of the present study concerning the relations between personality and parenting styles can be generalized to other cultures. Third, because of the limited parent-rated data at Time 2, data from maternal and paternal reports of parenting styles were combined when exploring their relations with IR after controlling for parental gender. It will be important in the future to examine how parenting styles as reported by mothers and fathers separately are associated with adolescent personality in a larger sample. Finally, given that adolescence is the period of rapid development of meta-cognitive abilities, which may affect the accuracy of self-reports (Shaughnessy et al., 2008), future research should

assess meta-cognition when using self-report methods in adolescent studies.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Shanghai Normal University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

WF, ML, and XC substantially contributed to the conception and the design of the work and interpreted the data and prepared the draft and finalized it. WF and ML contributed to the acquisition of data. ML analyzed the data. All authors approved the final version of the manuscript for submission.

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REFERENCES

Anaya, B., and Pérez-Edgar, K. (2019). Personality development in the context of individual traits and parenting dynamics. *New Ideas Psychol.* 53, 37–46. doi: 10.1016/j.newideapsych.2018.03.002

Baumrind, D. (1971). Current patterns of parental authority. *Dev. Psychol.* 4, 1–103. doi: 10.1037/h0030372

Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychol. Rev.* 75, 81–95. doi: 10.1037/h0025583

Belsky, J. (1984). The determinants of parenting: a process model. *Child Dev.* 55, 83–96. doi: 10.2307/1129836

Bezdjian, S., Raine, A., Baker, L. A., and Lynam, D. R. (2011). Psychopathic personality in children: genetic and environmental contributions. *Psychol. Med.* 41, 589–600. doi: 10.1017/S0033291710000966

Block, J. H. (1965). *The Child-Rearing Practices Report*. Berkeley, CA: Institute of Human Development, University of California.

Bowlby, J. (1980). *Attachment and Loss: Vol. III.: Loss, Sadness and Depression*. Basic Books. London: Hogarth Press

Bretherton, I. (1990). Communication patterns, internal working models, and the intergenerational transmission of attachment relationships. *Infant Ment. Health J.* 11, 237–252. doi: 10.1002/1097-0355(199023)11:3<237::AID-IMHJ2280110306>3.0.CO;2-X

Bronfenbrenner, U. (1989). Ecological systems theory. *Ann. Child Dev.* 6, 187–249.

Cameron, L., Erkal, N., Gangadharan, L., and Meng, X. (2013). Little emperors: behavioral impacts of China's one-child policy. *Science* 339, 953–957. doi: 10.1126/science.1230221

Caspi, A., Roberts, B. W., and Shiner, R. L. (2005). Personality development: stability and change. *Annu. Rev. Psychol.* 56, 453–484. doi: 10.1146/annurev.psych.55.090902.141913

Chan, S. M., Bowes, J., and Wyver, S. (2009). Chinese parenting in Hong Kong: links among goals, beliefs and styles. *Early Child Dev. Care* 179, 849–862. doi: 10.1080/03004430701536525

Chao, R. K. (1994). Beyond parental control and authoritarian parenting style: understanding Chinese parenting through the cultural notion of training. *Child Dev.* 65, 1111–1119. doi: 10.2307/1131308

Chen, W. (2014). The relationship between perceived parenting style, filial piety, and life satisfaction in Hong Kong. *J. Fam. Psychol.* 28, 308–314. doi: 10.1037/a0036819

Chen, X. (2000). "Growing up in a collectivist culture: socialization and socioemotional development in Chinese children," in *International Perspectives on Human Development*, eds A. L. Comunian and U. P. Gielen (Lengerich, Germany: Pabst Science Publishers), 331–353.

Chen, X., Hastings, P. D., Rubin, K. H., Chen, H., Cen, G., and Stewart, S. L. (1998). Child-rearing attitudes and behavioral inhibition in Chinese and Canadian toddlers: a cross-cultural study. *Dev. Psychol.* 34, 677–686. doi: 10.1037/0012-1649.34.4.677

Chen, X., Liu, M., and Li, D. (2000). Parental warmth, control, and indulgence and their relations to adjustment in Chinese children: a longitudinal study. *J. Fam. Psychol.* 14, 401–419. doi: 10.1037/0893-3200.14.3.401

Chen-Bouck, L., Patterson, M. M., and Chen, J. (2019). Relations of collectivism socialization goals and training beliefs to chinese parenting. *J. Cross Cult. Psychol.* 50, 396–418. doi: 10.1177/0022022118822046

Cheung, F. M., Fan, W., Cheung, S. F., and Leung, K. (2008). Standardization of the Cross-cultural (Chinese) Personality Assessment Inventory for adolescents in Hong Kong: a combined emic-etic approach to personality assessment. *Acta Psychol. Sinica* 40, 839–852. doi: 10.3724/SP.J.1041.2008.01639

Cheung, F. M., Fan, W., and Yao, D. J. (2012). "Chinese personality and vocational behavior," in *The Handbook of Chinese Organizational Behavior: Integrating Theory, Research, and Practice*, eds X. Huang and M. H. Bond (Cheltenham: Edward Elgar), 359–379.

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z., et al. (2001). Indigenous Chinese personality constructs: is the five-factor model complete? *J. Cross Cult. Psychol.* 32, 407–433. doi: 10.1177/0022022101032004003

Cheung, F. M., Van de Vijver, F. J. R., and Leong, F. T. L. (2011). Toward a new approach to the study of personality in culture. *Am. Psychol.* 66, 593–603. doi: 10.1037/a0022389

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2nd Edn. Hillsdale, NJ: Erlbaum.

Coplan, R. J., Reichel, M., and Rowan, K. (2009). Exploring the associations between maternal personality, child temperament, and parenting: a focus on emotions. *Pers. Individ. Dif.* 46, 241–246. doi: 10.1016/j.paid.2008.10.011

Damon, W., Lerner, R. M., and Eisenberg, N. (2006). *Handbook of Child Psychology, Social, Emotional, and Personality Development*. Hoboken, NJ: John Wiley & Sons.

Darling, N., and Steinberg, L. (1993). Parenting style as context: an integrative model. *Psychol. Bull.* 113, 487–496. doi: 10.1037/0033-2909.113.3.487

de Haan, A. D., Dekovi,ć, M., and Prinzie, P. (2012). Longitudinal impact of parental and adolescent personality on parenting. *J. Pers. Soc. Psychol.* 102, 189–199. doi: 10.1037/a0025254

Dodge, K. A. (1990). Nature versus nurture in childhood conduct disorder: it is time to ask a different question. *Dev. Psychol.* 26, 698–701. doi: 10.1037/0012-1649.26.5.698

Egberts, M. R., Prinzie, P., Dekovi,ć, M., de Haan, A. D., and van den Akker, A. L. (2015). The prospective relationship between child personality and perceived parenting: mediation by parental sense of competence. *Pers. Individ. Dif.* 77, 193–198. doi: 10.1016/j.paid.2014.12.046

Fan, J., and Wu, G. (2009). The effect of parenting styles and students' personality on their thinking styles. *Psychol. Sci. (China)* 5, 1214–1217.

Fan, W., Cheung, F. M., Zhang, J. X., and Cheung, S. F. (2011). A combined emic-etic approach to personality: CPAI and cross-cultural applications. *Acta Psychol. Sinica* 43, 1418–1429.

Feldman, S., and Downey, G. (1994). Rejection sensitivity as a mediator of the impact of childhood exposure to family violence on adult attachment behaviour. *Dev. Psychopathol.* 6, 231–247. doi: 10.1017/S0954579400005976

Fu, A. S., and Markus, H. R. (2014). My mother and me: why tiger mothers motivate Asian Americans but not European Americans. *Pers. Soc. Psychol. Bull.* 40, 739–749. doi: 10.1177/0146167214524992

García, L. F., Aluja, A., and del Barrio, V. (2006). Effects of personality, rearing styles and social values on adolescents' socialisation process. *Pers. Individ. Dif.* 40, 1671–1682. doi: 10.1016/j.paid.2006.01.006

Grolnick, W. S. (2002). *The psychology of parental control: how well-meant parenting backfires*. New York, NY:Psychol. Press. doi: 10.4324/9781410606303

Guo, Q., and Feng, L. (2017). The associations between perceived parenting styles, empathy, and altruistic choices in economic games: a study of Chinese children. *Front. Psychol.* 8:1843. doi: 10.3389/fpsyg.2017.01843

Ho, D. Y. F. (1996). "Filial piety and its psychological consequences," in *The Handbook of Chinese Psychology* ed M. H. Bond (Hong Kong: Oxford University Press), 155–165.

Hong, R. Y., Tan, C. S., Lee, S. S., Tan, S. H., Tsai, F. F., Poh, X. T., et al. (2015). Interactive effects of parental personality and child temperament with parenting and family cohesion. *Parenting* 15, 92–118. doi: 10.1080/15295192.2015.1020143

Hou, Y., Benner, A. D., Kim, S. Y., Chen, S., Spitz, S., Shi, Y., et al. (2020). Discordance in parents' and adolescents' reports of parenting: a meta-analysis and qualitative review. *Am. Psychol.* 75, 329–348. doi: 10.1037/amp0000463

Hsu, F. L. K. (1981). *Americans and Chinese: Passages to differences.* 3rd Edn. Honolulu: University of Hawaii Press.

Huver, R. M. E., Otten, R., de Vries, H., and Engels, R. C. M. E. (2010). Personality and parenting style in parents of adolescents. *J. Adolesc.* 33, 395–402. doi: 10.1016/j.adolescence.2009.07.012

Jorgensen, N. A., Nelson, L. J., and Duan, X. (2017). Perceived parenting practices and adjustment: moderation by cultural values in Chinese emerging adults. *Emerg. Adulthood* 5, 371–376. doi: 10.1177/2167696817694800

Kawabata, Y., Alink, L. R., Tseng, W. L., Van Ijzendoorn, M. H., and Crick, N. R. (2011). Maternal and paternal parenting styles associated with relational aggression in children and adolescents: a conceptual analysis and meta-analytic review. *Dev. Rev.* 31, 240–278. doi: 10.1016/j.dr.2011.08.001

Kim, S. Y., Wang, Y., Orozco-Lapray, D., Shen, Y., and Murtuza, M. (2013). Does "tiger parenting" exist? Parenting profiles of Chinese Americans and adolescent developmental outcomes. *Asian Am. J. Psychol.* 4, 7–18. doi: 10.1037/a0030612

Kim, U., Yang, K. S., and Hwang, K. K. (2006). *Indigenous and Cultural Psychology: Understanding People in Context.* New York, NY: Springer.

Kitamura, T., Shikai, N., Uji, M., Hiramura, H., Tanaka, N., and Shono, M. (2009). Intergenerational transmission of parenting style and personality: direct influence or mediation? *J. Child Fam. Stud.* 18, 541–556. doi: 10.1007/s10826-009-9256-z

Klimstra, T. A., Noftle, E. E., Luyckx, K., Goossens, L., and Robins, R. W. (2018). Personality development and adjustment in college: a multifaceted, cross-national view. *J. Pers. Soc. Psychol.* 115, 338–361. doi: 10.1037/pspp0000205

Lan, X., Scrimin, S., and Moscardino, U. (2019). Perceived parental guan and school adjustment among Chinese early adolescents: the moderating role of interdependent self-construal. *J. Adolesc.* 71, 18–27. doi: 10.1016/j.adolescence.2018.12.003

Latzman, R. D., Elkovitch, N., and Clark, L. A. (2009). Predicting parenting practices from maternal and adolescent sons' personality. *J. Res. Pers.* 43, 847–855. doi: 10.1016/j.jrp.2009.05.004

LeVine, R. A. (1974). Parental goals: a cross-cultural view. *Teach. Coll. Rec.* 76, 226–239.

Li, M. (2021). The contributions of indigenous personality and parenting style to life satisfaction development in Chinese adolescents. *Front. Psychol.* 12:3385. doi: 10.3389/fpsyg.2021.702408

Li, M., Fan, W., Chen, X., and Cheung, F. M. (2019). Independent and interdependent personalities at individual and group levels: predicting loneliness in Chinese adolescents. *Pers. Individ. Dif.* 147, 85–90. doi: 10.1016/j.paid.2019.04.031

Liang, S., and Sugawara, A. I. (1992). Reflections on parenting practices in urban China today. *Early Child Dev. Care* 81, 15–24. doi: 10.1080/0300443920810102

Lim, S., and Smith, J. (2008). The structural relationships of parenting style, creative personality, and loneliness. *Creat. Res. J.* 20, 412–419. doi: 10.1080/10400410802391868

Lin, E. J., and Church, A. T. (2004). Are indigenous Chinese personality dimensions culture-specific? An investigation of the Chinese Personality Assessment Inventory in Chinese American and European American samples. *J. Cross Cult. Psychol.* 35, 586–605. doi: 10.1177/0022022104268390

Little, T. D., Cunningham, W. A., Shahar, G., and Widaman, K. F. (2002). To parcel or not to parcel: exploring the question, weighing the merits. *Struct. Eq. Model.* 9, 151–173. doi: 10.1207/S15328007SEM0902_1

Love, H., Cui, M., Hong, P., and McWey, L. M. (2020). Parent and child perceptions of indulgent parenting and female emerging adults' depressive symptoms. *J. Fam. Stud.* doi: 10.1080/13229400.2020.1794932

McCrae, R. R., and Costa, P. T. (2008). "The five-factor theory of personality," in *Handbook of Personality: Theory and Research*, eds O. P. John, R. W. Robins, and L. A. Pervin. 3rd Edn. (New York, NY: Guilford Press), 159–181.

Milevsky, A., Schlechter, M., Netter, S., and Keehn, D. (2007). Maternal and paternal parenting styles in adolescents: associations with self-esteem, depression and life-satisfaction. *J. Child Fam. Stud.* 16, 39–47. doi: 10.1007/s10826-006-9066-5

Negru-Subtirica, O., Pop, E. I., and Crocetti, E. (2015). Developmental trajectories and reciprocal associations between career adaptability and vocational identity: a three-wave longitudinal study with adolescents. *J. Vocat. Behav.* 88, 131–142. doi: 10.1016/j.jvb.2015.03.004

Podsakoff, P. M., MacKenzie, S. B., Lee, J., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88, 879–903. doi: 10.1037/0021-9010.88.5.879

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychol. Bull.* 135, 322–338. doi: 10.1037/a0014996

Prinzie, P., Dekovi,ć, M., van den Akker, A. L., de Haan, A. D., Stoltz, S. E., and Hendriks, A. J. (2012). Fathers' personality and its interaction with children's personality as predictors of perceived parenting behavior six years later. *Pers. Individ. Dif.* 52, 183–189. doi: 10.1016/j.paid.2011.10.012

Prinzie, P., Stams, G. J. J., Dekovi,ć, M., Reijntjes, A. H., and Belsky, J. (2009). The relations between parents' Big Five personality factors and parenting: a meta-analytic review. *J. Pers. Soc. Psychol.* 97, 351–362. doi: 10.1037/a0015823

Qiu, L. (2010). *Research on Parenting Style and Puppy Love Attitude in High School* (Master thesis), Chinese Western South University.

Rogers, M. E., Creed, P. A., and Glendon, A. I. (2008). The role of personality in adolescent career planning and exploration: a social cognitive perspective. *J. Vocat. Behav.* 73, 132–142. doi: 10.1016/j.jvb.2008.02.002

Rowe, S. L., Gembeck, M. J., Zimmer, R. J., and Nesdale, D. (2015). A longitudinal study of rejecting and autonomy-restrictive parenting, rejection sensitivity, and socioemotional symptoms in early adolescents. *J. Abnorm. Child Psychol.* 43, 1107–1118. doi: 10.1007/s10802-014-9966-6

Rubin, K. H., Nelson, L. J., Hastings, P., and Asendorpf, J. (1999). The transaction between parents' perceptions of their children's shyness and their parenting styles. *Int. J. Behav. Dev.* 23, 937–957. doi: 10.1080/016502599383612

Sameroff, A. (1987). *The Transactional Model of Development: How Children and Contexts Shape Each Other.* Washington, DC: American Psychological Association.

Sanson, A. V., Letcher, P. L., and Havighurst, S. S. (2018). Child characteristics and their reciprocal effects on parenting. In *Handbook of Parenting and Child Development Across the Lifespan*, eds M. R. Sanders, A. Morawska (Cham: Springer), 337–370.

Schaefer, E. S. (1965). Children's reports of parental behavior: an inventory. *Child Dev.* 36, 413–424. doi: 10.2307/1126465

Schofield, T. J., Conger, R. D., Donnellan, M. B., Jochem, R., Widaman, K. E., and Conger, K. J. (2012). Parent personality and positive parenting as predictors of positive adolescent personality development over time. *Merrill Palmer Q.* 58, 255–283. doi: 10.1353/mpq.2012.0008

Shaughnessy, M. F., Veenman, M., and Kennedy, C. K. (2008). *Meta-Cognition: A Recent Review of Research, Theory, and Perspectives.* New York, NY: Nova Science Publishers.

Shelton, K. K., Frick, P. J., and Wootton, J. (1996). Assessment of parenting practices in families of elementary school-age children. *J. Clin. Child Psychol.* 25, 317–329. doi: 10.1207/s15374424jccp2503_8

Shiner, R., and Caspi, A. (2003). Personality differences in childhood and adolescence: measurement, development, and consequences. *J. Child Psychol. Psychiatry* 44, 2–32. doi: 10.1111/1469-7610.00101

Skinner, O. D., Sun, X., and McHale, S. M. (2019). Longitudinal Links between expressivity and African American parent-adolescent relationships: a dyadic approach. *J. Child Fam. Stud.* 29, 442–454. doi: 10.1007/s10826-019-01578-3

Specht, J. (2017). *Personality Development Across the Lifespan*. Cambridge, MA: Academic Press.

Super, C., and Harkness, S. (1997). "The cultural structuring of child development," in *Handbook of Cross-Cultural Psychology: Basic Process and Human Development*, eds J. W. Berry, P. R. Dasen, and T. S, Saraswathi (Boston, MA: Allyn & Bacon), 1–39.

Szapocznik, J., and Kurtines, W. M. (1993). Family psychology and cultural diversity: opportunities for theory, research, and application. *Am. Psychol.* 48, 400–407. doi: 10.1037/0003-066X.48.4.400

Tuvblad, C., Bezdjian, S., Raine, A., and Baker, L. A. (2013). Psychopathic personality and negative parent-to-child affect: a longitudinal cross-lag twin study. *J. Crim. Justice* 41, 331–341. doi: 10.1016/j.jcrimjus.2013.07.001

Van den Akker, A. L., Dekovi,ć, M., Asscher, J., and Prinzie, P. (2014). Mean-level personality development across childhood and adolescence: a temporary defiance of the maturity principle and bidirectional associations with parenting. *J. Pers. Soc. Psychol.* 107, 736–750. doi: 10.1037/a0037248

Van Heel, M., Bijttebier, P., Colpin, H., Goossens, L., Van Den Noortgate, W., Verschueren, K., et al. (2019). Investigating the interplay between adolescent personality, parental control, and externalizing problem behavior across adolescence. *J. Res. Pers.* 81, 176–186. doi: 10.1016/j.jrp.2019.06.005

Wan, S. L. Y., and Cheung, F. M. (2016). "Personality predictors of vocational interests of Chinese high school students: incremental contributions of the emic interpersonal relatedness factor [paper presentation]," in *The 31st International Congress of Psychology (ICP2016), Pacifico Yokohama, Yokohama, Japan*.

Weiss, L. H., and Schwarz, J. C. (1996). The relationship between parenting types and older adolescents' personality, academic achievement, adjustment, and substance use. *Child Dev.* 67, 2101–2114. doi: 10.2307/1131612

Winsler, A., Madigan, A. L., and Aquilino, S. A. (2005). Correspondence between maternal and paternal parenting styles in early childhood. *Early Child. Res. Q.* 20, 1–12. doi: 10.1016/j.ecresq.2005.01.007

Wood, J. J., Piacentini, J. C., Southam-Gerow, M., Chu, B. C., and Sigman, M. (2006). Family cognitive behavioral therapy for child anxiety disorders. *J. Am. Acad. Child Adolesc. Psychiatry* 45, 314–321. doi: 10.1097/01.chi.0000196425.88341.b0

Xie, Q., Fan, W., Wong, P., and Cheung, F. M. (2016). Personality and parenting style as predictors of life satisfaction among Chinese secondary students. *Asia Pacific Educ. Res.* 25, 423–432. doi: 10.1007/s40299-015-0271-0

Xu, Y., Farver, J. A. M., Zhang, Z., Zeng, Q., Yu, L., and Cai, B. (2005). Mainland Chinese parenting styles and parent-child interaction. *Int. J. Behav. Dev.* 29, 524–531. doi: 10.1177/01650250500147121

Yan, J., Hou, Y., Shen, Y., and Kim, S. Y. (2021). family obligation, parenting, and adolescent outcomes among Mexican American families. *J. Early Adolesc.* doi: 10.1177/02724316211016064

Young, R. A., Ball, J., Valach, L., Turkel, H., and Wong, Y. S. (2003). The family career development project in Chinese Canadian families. *J. Vocat. Behav.* 62, 287–304. doi: 10.1016/S0001-8791(02)00022-2

Zhao, S., Chen, X., and Wang, L. (2015). Maternal parenting and social, school, and psychological adjustment of migrant children in urban China. *Int. J. Behav. Dev.* 39, 541–551. doi: 10.1177/0165025415576815

Zhao, Y. (2007). China and the whole child. *Educ. Leadership* 64, 70–73.

Zhong, C., Wang, M., Shou, Y., Zhang, X., and Deng, J. (2020). Maternal parenting mediate the relationship between maternal psychopathic traits and child callous-unemotional traits: a longitudinal multiple mediation model. *J. Child Fam. Stud.* 29, 3142–3152. doi: 10.1007/s10826-020-01814-1

APPENDIX

APPENDIX 1 | Measurement invariance tests of parenting style and IR scales.

	Model	χ^2	df	RMSEA	CFI	$\Delta\chi^2$ (Δdf)	ΔRMSEA	ΔCFI
Adolescent-reported	Configural invariance	169.791	34	0.065	0.956			
maternal warmth	Metric invariance	183.684	39	0.062	0.953	13.893[*] (5)	0.003	0.003
Adolescent-reported	Configural invariance	115.656	53	0.035	0.972			
maternal independence	Metric invariance	119.436	59	0.033	0.973	3.78 (6)	0.002	0.006
Adolescent-reported	Configural invariance	80.400	34	0.038	0.954			
maternal control	Metric invariance	83.279	39	0.034	0.956	2.879 (5)	0.004	0.002
Adolescent-reported	Configural invariance	181.785	53	0.050	0.947			
maternal filial piety	Metric invariance	200.588	59	0.050	0.942	18.803[**] (6)	0.000	0.005
Adolescent-reported	Configural invariance	186.226	34	0.069	0.951			
paternal warmth	Metric invariance	196.625	39	0.065	0.949	10.399 (5)	0.004	0.002
Adolescent-reported	Configural invariance	139.447	53	0.041	0.969			
paternal independence	Metric invariance	147.814	59	0.040	0.968	8.367 (6)	0.001	0.001
Adolescent-reported	Configural invariance	82.174	34	0.039	0.972			
paternal control	Metric invariance	82.998	39	0.034	0.974	0.824 (5)	0.005	0.002
Adolescent-reported	Configural invariance	119.347	53	0.036	0.977			
paternal filial piety	Metric invariance	123.558	59	0.034	0.978	4.211 (6)	0.002	0.001
Parent-reported	Configural invariance	64.963	19	0.077	0.904			
warmth	Metric invariance	67.292	23	0.069	0.907	2.329 (4)	0.008	0.003
Parent-reported	Configural invariance	160.921	53	0.071	0.868			
independence	Metric invariance	167.107	59	0.067	0.868	6.186 (6)	0.004	0.000
Parent-reported	Configural invariance	50.654	19	0.064	0.888			
rejection	Metric invariance	59.534	23	0.062	0.871	8.88 (4)	0.002	0.017[a]
Parent-reported	Configural invariance	71.412	19	0.082	0.885			
control	Metric invariance	76.062	23	0.075	0.884	4.65 (4)	0.007	0.001
Parent-reported	Configural invariance	29.524	8	0.081	0.945			
filial piety	Metric invariance	31.531	11	0.068	0.948	2.007 (3)	0.013	0.003
IR	Configural invariance	53.517	8	0.077	0.980			
	Metric invariance	55.483	11	0.065	0.980	1.966 (3)	0.012	0.000

IR, Interpersonal Relatedness; CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation. [*]$p < 0.05$; [**]$p < 0.01$. [a] *ΔCFI or ΔRMSEA higher than cutoffs.*

Are Personality-Based Intellectual Styles Culture Specific or Universal?

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Traditionally, it had been commonly believed that individuals in the same culture have personalities distinct from those of individuals in other cultures. This article examines this belief by critically reviewing relevant literature generated from two of the most widely investigated personality-based style constructs in the field of intellectual styles: the Jungian personality styles and the career personality styles proposed by Holland. It aims at answering the question of whether personality-based intellectual styles are culture specific or they are universal. To achieve this aim, based on the two broad cultural systems derived from Hofstede's model of four cultural dimensions and two major style types from Zhang and Sternberg's threefold model of intellectual styles, two research hypotheses were made. To test the hypotheses, two types of empirical literature centered on each of the two personality-based styles are reviewed: (1) cross-cultural comparative studies; and (2) within-culture studies investigating the association of the two style constructs with other human attributes and outcomes. Results suggest that although personality-based styles are related to culture, they cannot be culture specific; rather, they are fundamentally universal. These findings carry scientific value and have practical implications for education and beyond.

Keywords: Jungian personality styles, career personality styles, culture specific, universality, cultural stereotypes

One of the eternal scholarly pursuits in the field of psychology is to investigate the cultural specificity and universality of personalities (Heine and Buchtel, 2009). Such a sustained research endeavor among scholars is chiefly motivated by the fact that stereotypical views about the personalities of people from different cultures continue to be strongly held by many. In this era of globalization and with the world's heightened focus on cultural awareness, deepening our understanding of the said issue has become more important than ever before. The present article investigates the cultural specificity and universality of personality-based intellectual styles by testing two hypotheses guided by the two broad cultural systems derived from Hofstede's (1980) theory of four cultural dimensions and further by two types of styles based on Zhang and Sternberg (2005) threefold model of intellectual styles. In general, it was hypothesized that in cultural contexts characterized by low power distance, low uncertainty-avoidance, individualism, and masculinity (Hofstede, 1980), people would be more likely to use creativity-generating personality-based intellectual styles; Furthermore, the use of such styles would be more likely to be associated with better attributes and outcomes. It was also hypothesized that in cultural contexts characterized by high power distance, high uncertainty-avoidance, collectivism, and femininity, people would be more likely to use norm-favoring styles; Moreover, the use of such styles would be more conducive to better attributes and outcomes (see specific hypotheses under "Personality-based Styles and the Four Cultural Dimensions: Conceptual Links and Hypotheses").

Intellectual styles, an all-encompassing term for such constructs as cognitive styles, learning styles, teaching styles, personality-based styles, and thinking styles, refer to people's preferred ways of processing information and dealing with tasks (Zhang and Sternberg, 2005).

In their threefold model of intellectual styles, Zhang and Sternberg (2005) classified all individual styles in the existing style constructs into three types: Type I, Type II, and Type III styles. Type I styles are more creativity-generating and they denote higher levels of cognitive complexity. This type of styles can be considered to be more adaptive because they are routinely associated with more desirable human attributes and outcomes such as higher levels of cognitive development, creativity, and open mindedness. Type II styles suggest a norm-favoring tendency, and they denote lower levels of cognitive complexity. This type of styles can be considered maladaptive because they are more often related to undesirable human attributes and outcomes such as lower levels of identity development, surface learning approach, and rigidity. Type III styles may show the characteristics of either Type I or Type II styles, depending on the stylistic demands of specific situations or tasks. The adaptivity of Type III styles is variable because the ways in which this type of styles are related to other human attributes and outcomes have been largely inconsistent (see also Zhang, 2017).

Like personalities and abilities, styles are significantly associated with human learning and performance in different cultural contexts. However, styles are neither personalities nor abilities; but rather, they are at the interface between personalities and abilities (Sternberg, 1997). Styles can be activity-centered, cognition-centered, and personality-centered (Grigorenko and Sternberg, 1995).

This article focuses on the two most widely researched personality-based intellectual styles: Jung's (1923) construct of personality styles (also known as personality types) and Holland's (1973) construct of career personality styles (also known as career interest types). The key question to be answered is: Are personality-based intellectual styles culture specific, or are they universal?

Before explaining what is meant to be universal or culture specific in terms of personality-based intellectual styles, it should be acknowledged that the concept of universality, or precisely, psychological universality, is a complex phenomenon (e.g., Norenzayan and Heine, 2005; Van de Vijver and Leung, 2021). Indeed, based on a comprehensive review of the literature, Norenzayan and Heine (2005) identified four levels of universality: accessibility, functional, existential, and non-universal.

In the context of this article, universality (and cultural specificity, for that matter) lies in its functionality. Specifically, personality-based intellectual styles are considered universal if the same styles can be identified and function (i.e., the manner in which styles are associated with other human attributes and outcomes) in the same way in different cultural systems. By contrast, personality-based styles are deemed culture specific if particular styles are found to be consistently pervasive in some cultural contexts, but not in others (i.e., non-universal); and if the same types of styles function systematically differently in different cultural systems (see under the heading "Personality-based Intellectual Styles and Hofstede's Model of Four Cultural Dimensions" for details regarding style types and cultural systems).

It is argued that although personality-based intellectual styles are influenced by culture, they cannot be culture specific. Instead,

personality-based intellectual styles are fundamentally universal. To substantiate this argument, the remainder of this article is divided into four parts. The first part introduces the two personality-based style constructs and the primary measure for each construct; highlights Hofstede's (1980) four cultural dimensions; establishes the conceptual link between culture and the two personality-based style constructs; specifies the two research hypotheses concerning the relationships between culture and intellectual styles; and describes the method for selecting the relevant literature. To test the first hypothesis, the second part of this article presents research evidence from cross-cultural comparative studies of each of the style constructs. To test the second hypothesis, the third part reviews studies on the association of each of the two style constructs with other human attributes and outcomes. The fourth and final part makes concluding remarks.

PERSONALITY-BASED INTELLECTUAL STYLES AND HOFSTEDE'S MODEL OF FOUR CULTURAL DIMENSIONS

Personality-Based Intellectual Styles and Key Measurements

Of the many intellectual style constructs documented in the literature (e.g., Zhang and Sternberg, 2005), two personality-based style constructs have been most widely investigated in different cultural contexts. These are Jung's (1923) construct of personality styles, and Holland (1973) construct of career personality styles.

Jungian Personality Style and the Myers-Briggs Type Indicator

Jung (1923) contended that individuals have a propensity for attending selectively to elements in a learning environment, looking for learning environments compatible with their reported personality types (or styles; the term "personality styles" is used hereafter to align with the literature on intellectual styles), and shying away from incompatible ones. According to Jung, these psychological preferences fall along three dimensions: extroversion-introversion, sensing-intuitive, and thinking-feeling. Myers and McCaulley (1985) extended Jung's classification by adding a fourth dimension—judging-perceiving. *Extraverted* (E) individuals tend to be oriented toward the outer world of actions, objects, and people, whereas *introverted* (I) individuals prefer the inner world of concepts and ideas. *Sensing* (S) individuals prefer to seek the fullest possible experience of what is immediate and real, whereas *intuitive* (N) individuals tend to seek the broadest view of what is insightful and possible. *Thinking* (T) individuals tend to make decisions on the basis of logical and rational planning, whereas *feeling* (F) individuals have an inclination for making decisions based on harmony among subjective values. *Judging* (J) individuals have a predisposition to seek closure, at times without adequate exploratory activities, whereas *perceiving* (P) individuals tend to be attuned to incoming information and open to new events and changes until they have to make a decision. Based on the three-fold model of intellectual styles (Zhang and Sternberg, 2005),

the perceiving and intuitive personality styles are Type I styles; the judging and sensing personality styles are Type II styles; and thinking, feeling, introversion, and extraversion are Type III personality styles (see also Zhang, 2017 for empirical evidence).

The *Myers-Briggs Type Indicator* (MBTI), first published in 1943 (Myers and Briggs, 1943) and at present in its 19th print (Myers et al., 1998), a forced-choice self-administered test, is the inventory most frequently used to assess the four dimensions of preferences. The various versions of the MBTI have been translated into different languages and administered in different cultural contexts; they have proven to possess good psychometric properties (see Myers et al., 1998; Zhang, 2013).

Jung (1958) argued that psychological preferences can be manifested not only among individuals but also among civilizations, cultures, nationalities. Indeed, the four underlying personality dimensions as assessed by the MBTI have been found in different cultural contexts.

Career Personality Style and the Self-Directed Search

According to Holland (1973), people can be classified into six personality types corresponding to six occupational environments: realistic, investigative, artistic, social, enterprising, and conventional. *Realistic* individuals like to work with things and enjoy out-door activities but may lack social skills. *Investigative* individuals like to be engaged in scientific work but often lack leadership skills. *Artistic* individuals are inclined to deal with tasks that provide them with opportunities to utilize their imagination but often lack clerical skills. *Social* individuals prefer to work in situations in which they can interact and collaborate with others but may lack mechanical and scientific skills. *Enterprising* individuals, like *social* individuals, prefer to work in environments in which they can interact with others but, unlike *social* individuals, they enjoy taking on leadership roles in their collaborative endeavors. Finally, *conventional* individuals prefer to work on data in well-structured situations but often lack artistic skills. According to the threefold model of intellectual styles (Zhang and Sternberg, 2005), the artistic and investigative career personality types are Type I career personality styles; the conventional and realistic career personality styles are Type II career personality styles; and the enterprising and social career personality styles are Type III styles (see also Zhang, 2017 for empirical evidence).

First published in 1971 (with the latest version published in 1994), the *Self-Directed Search* (SDS, Holland, 1994) is the most popular inventory used to assess the six career personality styles. The SDS is a self-administered and self-scored inventory in which the respondents indicate their likes and dislikes of the activities and occupations in the six types of career environments and rate their competencies in each of the six areas. The SDS has been translated into more than 30 languages and has generated thousands of empirical studies all over the world (e.g., Swan, 2005). The great majority of these studies resulted in satisfactory reliability and validity data. The *SDS Manual* (Holland, 1994) reported good internal consistency (using KR-20) and test-retest reliability data as well as good concurrent and predictive validity data.

To overcome the gender bias for which the SDS is often criticized, Zhang (1999) designed the *Short-version Self-directed Search* (SVSDS). The SVSDS is a self-report questionnaire containing 24 items, with each set of four items contributing to the assessment of one of the six career personality styles. Reliability and validity data of the SVSDS were recorded in a number of publications (e.g., Zhang, 2001; Ng, 2015).

Culture and Hofstede's Model of Four Cultural Dimensions
Culture
Various insightful definitions of culture (e.g., Tylor, 1958; Adler, 2001) have been proposed. In this article, Hofstede's (1990) definition of culture— "the collective programming of the mind that distinguishes the members of one category of people from another" (p.4), is adopted. This article restricts its survey of cross-cultural studies of personality-based intellectual styles to cultural distinctions as a function of jurisdictions[1] and ethnic groups within a jurisdiction.

Hofstede's Model of Four Cultural Dimensions
In the latter half of the Twentieth Century, several theoretical models on culture were put forward by scholars in different academic fields, including anthropology (Hall, 1976), psychology (Markus and Kitayama, 1991), and sociology (Berry, 1991). Relatively more recently, Yamagishi et al. (2008) analyzed the culture-bound nature of human behaviors from the game-theoretic perspective. However, Hofstede's (1980) model of four cultural dimensions constructed based on his investigation in the field of management has been selected to guide the present discussion for its conceptual links with the two personality-based intellectual style constructs (see under "Personality-based Styles and the Four Cultural Dimensions: Conceptual Links and Hypotheses"). In the data gathered from 40 countries, Hofstede (1980) identified four basic cultural dimensions: Power distance, uncertainty avoidance, individualism (vs. collectivism), and masculinity (vs. femininity).

Power distance concerns human inequality. It refers to the extent to which the less powerful members of a society accept the unequal distribution of power and expect this to be the case. The level of power distance is socially determined and is endorsed by both the followers and the leaders. A low power distance society is creativity-generating because it allows individuals more freedom, whereas a high power-distance society tends to stifle creativity because a much stronger emphasis is put on conformance, hierarchies, and rules (Jones and Herbert, 2000).

Uncertainty avoidance pertains to a society's tolerance for ambiguity. People in low uncertainty-avoidance societies are likely to be more tolerant of novel ideas and are less rule-oriented. In contrast, people in high uncertainty-avoidance societies tend to be less tolerant of novel ideas and to seek clarity through rules and regulations. People from higher uncertainty-avoidance

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[1]The term "jurisdiction" is used here to refer to both a country and a special administrative region of a particular country. For example, as a special administrative region of the People's Republic of China, Hong Kong is referred to as a jurisdiction, as are other countries.

societies may reduce uncertainty by relying on guidance of other people as opposed to thinking for themselves, whereas people from low uncertainty-avoidance societies are more likely to be reflective and to think for themselves.

Individualism vs. collectivism concerns the relationship between the individual and the collectivity in a given society. This relationship does not merely refer to people's ways of living together (e.g., in families); but also, "it is intimately linked with societal norms" (Hofstede, 1980, p. 214). This means that this relationship influences individuals' "mental programming" (Hofstede, 1980, p. 214). Individualist societies are more tolerant of individual thoughts and behaviors. For this reason, individuals in such societies are less concerned with doing "safe" things and are more risk-taking. By contrast, collectivist societies are less tolerant of individual thoughts and behaviors, which makes individuals more concerned about doing things in ways that are accepted by other members of the society through avoiding risk-taking.

Masculinity vs. Femininity refers to the distribution of emotional roles between males and females. The predominant socialization patterns are for males to be more assertive and for females to be more nurturing. The stability of gender-role patterns has more to do with socialization than with biological factors (Hofstede, 1980). Assertiveness and decisiveness are more valued in masculine societies, whereas rule-following and obedience are more valued in feminine societies. It follows that people from masculine societies tend to be engaged in new ways of thinking, whereas people from feminine societies tend to be engaged in more conventional thinking (Hofstede, 1980, 1990).

Hofstede's conceptualization of the four cultural dimensions has gained strong empirical support. By the year 2001, Hofstede had constructed an index for each of the four cultural dimensions for 66 jurisdictions. Despite some exceptions, a general trend emerged. That is, the economically more developed jurisdictions normally fall on one end of each of the four continua: low power distance (L_{PD}), low uncertainty avoidance (L_{UA}), individualism (I), and masculinity (M)—referred to as "$L_{PD}L_{UA}IM$" hereafter; while the economically less developed jurisdictions usually fall on the other end of each of the four continua: high power distance (H_{PD}), high uncertainty avoidance (H_{UA}), collectivism (C), and femininity (F)—referred to as "$H_{PD}H_{UA}CF$" hereafter.

Personality-Based Styles and the Four Cultural Dimensions: Conceptual Links and Hypotheses

Observant readers must have noticed the strong resemblance between the characteristics of Type I personality-based intellectual styles and those of Hofstede's $L_{PD}L_{UA}IM$ societies, despite the fact the former represent individual characteristics and the latter, societal ones. Similarly, one could hardly fail in noticing the correspondence between the characteristics of Type II styles and those of $H_{PD}H_{UA}CF$ societies.

On the basis of the conceptual similarities between intellectual styles and Hofstede's cultural dimensions, one should expect that people in Hofstede's $L_{PD}L_{UA}IM$ jurisdictions and ethnic groups be more likely to use Type I personality-based intellectual styles, and that people in Hofstede's $H_{PD}H_{UA}CF$ jurisdictions and ethnic groups be more likely to use Type II styles (*Hypothesis 1*)[2]. One should further anticipate that in $L_{PD}L_{UA}IM$ jurisdictions or ethnic groups, Type I personality-based intellectual styles serve individuals better in that a more frequent use Type I personality-based intellectual styles would be related to more adaptive attributes and better outcomes. By contrast, in $H_{PD}H_{UA}CF$ jurisdictions and ethnic groups, Type II personality-based styles would serve individuals better in that a more frequent use of Type II personality-based styles would be associated with more adaptive attributes and better outcomes (*Hypothesis 2*). In the next section, the method of selecting the literature for testing these hypotheses is described.

Literature Selection Method

For a study to be included in this review, its research must, first and foremost, involve one of the two personality-based intellectual style constructs: the Jung personality styles and career personality styles. Furthermore, the study has to be one of the following two types of empirical investigations. The first type concerns cross-cultural comparison—either direct or indirect comparison. Direct comparative studies refer to those involving actual comparison of measurement scores of research participants from two or more cultural groups; while indirect comparative studies refer to those conducted independently within a cultural group (i.e., either a jurisdiction or an ethnic/racial group), but with the patterns of their findings compared across studies. The second type of studies investigated the association of either of the two personality-based intellectual style constructs with other human attributes and outcomes.

In what follows, the above mentioned two types of studies are introduced. Cross-cultural comparative studies will be presented first, followed by research on personality-based intellectual styles and their outcomes.

CROSS-CULTURAL COMPARATIVE RESEARCH ON PERSONALITY-BASED INTELLECTUAL STYLES[3]

To what extent can the hypothesis that people from $L_{PD}L_{UA}IM$ jurisdictions and ethnic groups (i.e., cultures) would tend to use Type I styles and that people from $H_{PD}H_{UA}CF$ cultures would tend to use Type II styles be confirmed? What do these findings say about the cultural specificity and universality of the two personality-based style constructs? In answering these questions, this part reviews cross-cultural comparative studies on the Jungian personality styles (Jung, 1923) and career personality styles (Holland, 1973).

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[2]Hypothesis 1 is derived from a more general hypothesis on the relationships between culture and intellectual styles in the work by myself and Sternberg, titled "Culture and Intellectual styles," published in *Handbook of Intellectual Styles* (Zhang et al., 2012).

Jungian Personality Styles: Cross-Cultural Comparative Studies

Based on Zhang and Sternberg (2005) classification of intellectual styles and the specifications of Hofstede's cultural dimensions, individuals from societies that fall on the $L_{PD}L_{UA}IM$ ends of Hofstede's cultural continua would be more intuitive and perceiving (i.e., scoring higher on these two Type I personality styles), whereas people from societies that fall on the $H_{PD}H_{UA}CF$ ends would be more sensing and judging (i.e., scoring higher on these two Type II styles)[4]. Although this prediction has been confirmed by findings in the majority of studies (e.g., Hedegard and Brown, 1969; Levy et al., 1972; Hammer and Mitchell, 1996; Broer and McCarley, 1999), it has also been challenged by those in a number of studies (e.g., Shade, 1983, 1986; Tobacyk and Cieslicka, 2000).

The majority of the studies supporting the prediction have been conducted at the within-jurisdiction level. The primary interest of the researchers of these studies was to identify the predominant Jungian personality styles of their research participants from different ethnic groups. In 1969, Hedegard and Brown found that, compared with their Caucasian counterparts, students of African descent exhibited a preference for using more tangible ways (i.e., more sensing) than intellectual ways (i.e., less intuitive) in dealing with their environments. Likewise, Levy et al. (1972) identified significantly higher proportions of judging and sensing types among university students of African descent than among students of European descent. In a national sample (1,267 adults aged 18–94 years) ethnically matched in proportion to the 1990 census in the United States, Hammer and Mitchell (1996) found a significantly higher proportion of sensing types among African Americans in comparison with the general sample highly dominated by European Americans.[3,4]

Findings confirming the hypothesis have also been obtained at a broader cultural level. For instance, research on the Jungian personality styles among mainland Chinese business administrators and professionals (e.g., Yao, 1993; Broer and McCarley, 1999) revealed that the Type II sensing and judging styles were prevalent. In the same vein, Huang and Huang (1991) found an overrepresentation of sensing and judging styles among Taiwanese university students.

Nevertheless, the first hypothesis has also been challenged by empirical findings that were either statistically insignificant or directly opposed to the hypothesis. For example, given the economic and social disadvantages that African Americans have commonly experienced in comparison with their European-American counterparts in the United States, one should expect African Americans to score higher on the judging and sensing personality styles and European Americans to score higher on the perceiving and intuitive personality styles, on average.

Nevertheless, according to Shade (1986) review of the literature, no significant difference was found in the MBTI styles of people of African descent in comparison with those of European descent before school grade 3 or after the first year of college. Furthermore, contrary to the hypothesis, Shade (1983, 1986) empirical research on ninth-grade students consistently found that students of African descent were generally more perceiving, whereas European Americans were more judging.

Summary

In this section, the existing cross-cultural comparative studies involving the two Type I and two Type II Jungian personality styles have been highlighted. Although the existing literature is pretty outdated, with the most recent study having been conducted in the year 2000, the research findings have well-addressed the first hypothesis. The hypothesis has surely been supported by the majority of the empirical studies. Nevertheless, it has also been challenged by some of the studies. That is, compared with individuals in the $H_{PD}H_{UA}CF$ cultural systems, those in the $L_{PD}L_{UA}IM$ ones did score higher on the Type I intuitive and perceiving personality styles more frequently; however, the reverse has also been found—at a level that was higher than statistical chance. Given the mixed findings, one should say that although culture does matter significantly in people's Jungian personality styles, they are not culture specific.

Career Personality Styles: Cross-Cultural Comparative Studies

Typically, cross-cultural studies of career personality styles based on Holland's (1973) model have one of the following three objectives: (1) to identify different patterns of career personality styles among different cultural groups; (2) to examine the criterion-related validity of the *Self-Directed Search* (SDS); and (3) to test the underlying structure (i.e., structural fit) of the career personality styles of racial-ethnic groups within jurisdictions (Zhang, 2013).

Patterns of career personality styles refer to the ways in which test respondents' scores on the aforementioned six scales (i.e., realistic, investigative, artistic, social, enterprising, and conventional) are ranked. Based on the classification of the threefold model of intellectual styles (Zhang and Sternberg, 2005) and further founded on the characteristics of the four cultural dimensions (Hofstede, 1990), it was anticipated that individuals from societies that fall on the $L_{PD}L_{UA}IM$ ends of Hofstede's cultural continua would be more likely to score higher on the Type I artistic and investigative career personality styles (i.e., express stronger interest in these two types of career environments), whereas individuals from societies that fall on the $H_{PD}H_{UA}CF$ ends would be more likely to score higher on the Type II conventional and realistic career personality styles[5].

Criterion-related validity concerns both concurrent validity (i.e., how well the test takers' SDS results correspond to their

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[3]This part of the literature review is largely drawn on a chapter by myself and Sternberg, titled "Culture and Intellectual styles," published in *Handbook of Intellectual Styles* (Zhang et al., 2012).

[4]In line with the conceptual links between the two broad cultural systems (i.e., $L_{PD}L_{UA}IM$ and $H_{PD}H_{UA}CF$) and Zhang and Sternberg's threefold model of intellectual styles, only the two Type I and two Type II Jungian personality styles are pertinent to the two general hypotheses in this article.

[5]In line with the conceptual links between the two broad cultural systems (i.e., $L_{PD}L_{UA}IM$ and $H_{PD}H_{UA}CF$) and Zhang and Sternberg's threefold model of intellectual styles, only the two Type I and two Type II career personality styles are pertinent to the two general hypotheses in this article.

current jobs or academic majors) and predictive validity (i.e., the degree to which the test takers' SDS results are consistent with their career aspirations). According to Hofstede's (1980) model, the $H_{PD}H_{UA}CF$ societies would inevitably put constraints on individuals' career personality styles, including depriving individuals of the opportunities to be exposed to certain types of occupations and to develop the career personality styles they might have developed had they been socialized in a $L_{PD}L_{UA}IM$ culture. Following this logic, one would be on solid grounds for anticipating that such constraints would bring about poorer prediction of people's career personality styles and poorer Holland's model fit for individuals in $H_{PD}H_{UA}CF$ cultures.

Structural fit refers to how well the SDS data obtained from test respondents fit Holland's model. For the same reason just mentioned with respect to criterion-related validity, one would expect that data from $L_{PD}L_{UA}IM$ cultures show better fit with Holland's model than do those from $H_{PD}H_{UA}CF$ cultures.

Given the popularity and long history of Holland's (1973) theory and the use of the SDS, research testing the above predictions has not been as fruitful as one would expect. Support and challenges for the above mentioned predictions are, nevertheless, informative with respect to the cultural specificity and universality of career personality styles.

Patterns: Empirical Evidence

Regarding the anticipation on the patterns of career personality styles among people of different cultural contexts, only two studies have been identified. In a first study, Gade et al. (1984) compared the career personality styles (as assessed by the SDS) between Native American high school students from two Indian tribes—Swampy Cree students, who were boarding students in an all-white community school district, and Peguis students, who were enrolled in a local reserve school district. The Swampy Cree female students scored significantly higher on the Type I investigative personality style, whereas the Peguis males scored significantly higher on the Type II conventional style. Irrespective of the fact that significant difference was not found across genders between the two tribal groups, the difference identified may suggest that there might have been an acculturation effect related to students' being exposed to the culture in the all-white community on their career personality styles. That is, the Swampy Cree students' displaying more of the characteristics of the investigative career personality style could partially be attributed to their interaction with white students. In other words, although individuals' career personality styles certainly have a great deal to do with culture, one cannot claim that people from different cultures possess distinct career personality styles that are static. Instead, career personality styles are dynamic—with the necessary stimuli, they can be developed in individuals of any cultural context. This suggests that career personality styles cannot be culture specific.

Results from a more recent study (Morris, 2016) communicated mixed messages regarding the cultural aspect of career personality styles. After analyzing data gathered (between 2005 and 2014) from over one million residents of different ethnic groups in the U.S., Morris (2016) concluded that "although generally very small" (p.612), some

differences in career personality styles have been found. For example, in comparison with those who did not indicate ethnicity, Asians, Indians, and Middle easterners tended to score higher on the investigative personality style. It can be contended that this finding supported the anticipation regarding the patterns of career personality styles because in the United States, the Asians, Indians, and Middle easterners tend to be economically better off compared with other ethnic minority groups. Such an economic advantage might have provided individuals from these groups with opportunities to be exposed to environments in which their Type I investigative career personality style was developed. Nevertheless, contrary to the anticipation, Blacks and Native Americans, despite being two of the most economically disadvantaged ethnic groups in the United States, scored significantly lower on the Type II realistic career personality style. Therefore, once again, the cultural specificity of career personality styles was not established.

Criterion-Related Validity: Empirical Evidence

Two criterion-related studies were identified and both lent support to the anticipation that the SDS's predictive validity would be relatively lower for individuals from Hofstede's $H_{PD}H_{UA}CF$ cultures. Khan et al. (1990) found that Pakistani university students' SDS codes were not good predictors for their career readiness. Likewise, Leung and Hou (2001) found that compared with the predictive validity reported in previous studies conducted in the United States, the correspondence between the Hong Kong Chinese high school students' SDS high-point career interest codes and their tentative choices of university majors and careers was generally lower.

The question that arises is: Do the above hypothesis-supporting findings indicate that career personality styles are culture specific? The answer is negative. The lower predictive validities could have been attributable to educational systems (assuming that educational systems are part of cultural practices) that tend to exercise more power and control, placing constraints on students' development of career personality styles. Take the study by Leung and Hou (2001) as an example, Hong Kong students were, at the time when the study was conducted, required to choose either a science stream or an arts stream at the end of junior high school (i.e., 9th grade in the United States). Such early and often blind commitment to an area of study might have prevented students from developing Type I career personality styles. One of the major objectives of the 2012 school (and university) curricular reform in Hong Kong was to broaden students' career personality styles. If Leung and Hou's (2001) study is replicated in Hong Kong today, the predictive validity of the SDS for the same population will likely to be improved. Put differently, career personality styles are not unique to people of particular cultures. With necessary conditions, career personality styles can be developed within individuals from any cultural context. In fact, abundant empirical evidence for the malleability of intellectual styles, including that of personality-based styles, has been documented (Zhang, 2013).

Structural Fit: Empirical Evidence

It was anticipated that the SDS data from $L_{PD}L_{UA}IM$ cultures would have a better structural fit with Holland's model than those from $H_{PD}H_{UA}CF$ cultures. Findings concerning this anticipation have been equivocal. For example, Einarsdòttir et al. (2002) found that the underlying structure of career personality styles of university students in Iceland (an $L_{PD}L_{UA}IM$ jurisdiction) resembled that of U.S. benchmark samples. The researchers of the study attributed this resemblance chiefly to the fact that the Icelandic culture and the U.S. culture held similar rankings on Hofstede's cultural dimensions and that both jurisdictions are noted for a high level of economic prosperity.

Incorporating the notion of economic development (as evaluated by gross domestic product per capita; GDPPC) and two of the four Hofstede's cultural dimensions (masculinity-femininity and individualism-collectivism), Rounds and Tracey (1996) conducted a meta-analysis of data sets from 76 international samples (representing 18 jurisdictions), 20 ethnic samples in the United States, as well as 73 benchmark samples in the United States. Although the degree of data fit with Holland's model was not significantly associated with masculinity-femininity and GDPPC, better model fit was achieved for jurisdictions with more individualistic values than for those with more collective values.

Nonetheless, the conjecture concerning Holland's model fit with respect to Hofstede's cultural system continua was also challenged. For example, within the U.S., Swanson (1992) concluded that the structure of career personality styles among African-American university students resembled that of European-American university students. Likewise, at the level of nations/jurisdictions, contrary to the anticipation, data from the Australian and Canadian samples (individuals from $L_{PD}L_{UA}IM$ cultures) demonstrated a significantly poorer model fit in comparison with the U.S. benchmark data. These findings clearly disputed the argument for the cultural specificity of career personality styles.

Cross-nationally, holding gender and occupation constant, Fouad and Dancer (1992) identified strikingly similar structures of career personality styles among engineers in Mexico and in the United States. Similar research findings had been obtained as early as the 1960s. For example, Lonner (1968) concluded that American, German, Swiss, and Austrian psychologists were more similar to one another than to accountants within their respective countries. Such empirical evidence is indicative that career personality styles could be universal.

Summary

In this section, each of the three conjectures (i.e., patterns, predictive validity, and structural fit) has been empirically examined through reviewing cross-cultural comparative research on career personality styles. Although both support and challenges have been found for the research hypothesis tested, it is fair to state that the amount of challenges outweighed that of support. Given this and the dynamic nature of career personality styles (Iliescu et al., 2013; Zhang, 2013), one should say that

although individuals' career personality styles can be significantly affected by culture, they cannot be culture specific.

PERSONALITY-BASED INTELLECTUAL STYLES AND THEIR OUTCOMES

The second hypothesis in this article states that Type I personality-based intellectual styles would serve individuals better in $L_{PD}L_{UA}IM$ cultural systems and that Type II styles would serve individuals better in $H_{PD}H_{UA}CF$ cultural systems. To what extent has this hypothesis been empirically supported? What does the literature say about the nature of personality-based styles in terms of their cultural specificity and universality? This part addresses these questions by reviewing research on the association of the two personality-based style constructs with diverse human attributes and outcomes.

In her monograph "The Value of Intellectual Styles," Zhang (2017) critically reviewed studies concerning the relationship of a wide range of intellectual style constructs (including the Jungian personality styles and career personality styles) with various human attributes and outcomes. Therefore, those studies will not be recapitulated here; instead, they are briefly introduced in the first section of this part. In the second section, studies beyond Zhang's (2017) work will be examined in greater detail.

Studies in Zhang's Review

Within the context of elucidating the value of intellectual styles (i.e., whether or not some styles carry more adaptive values than do others), Zhang (2017) analyzed studies investigating the relationship of each of the two personality-based styles with other human attributes and outcomes. In terms of the studies centered on the personality styles defined by Jung (1923), 54 studies involving 20 other attributes and outcomes were reviewed. Some examples of these attributes and outcomes are character strengths, creativity, creative and critical thinking, leadership behaviors and practices, leadership styles, organizational seniority, personality traits, teaching excellence, teaching performance, and tendency for embracing new teaching technology. Spanning more than five decades, these studies were conducted among students, teachers, and personnel in the workplace in seven jurisdictions, including Canada, Finland, France, South Africa, Taiwan, the United Kingdom, and the United States (see the **Appendix** for more details on each study).

As shown by the findings presented in the **Appendix**, with the exception of seven studies that yielded results that either were statistically non-significant or partially (or fully) disconfirmed the hypothesis that in $L_{PD}L_{UA}IM$ cultures, Type I styles would better serve individuals, the remaining 47 studies indicated that the Type I Jungian personality styles (i.e., intuitive and perceiving) were conducive to desirable attributes and outcomes, regardless of cultural contexts. Interestingly, the seven exceptional results suggesting that Type II styles served individuals better did not occur in the studies conducted in South Africa and Taiwan ($H_{PD}H_{UA}CF$ societies); but rather, they were all obtained in studies carried out in $L_{PD}L_{UA}IM$ cultures (i.e., six in the United States and one in Finland). Certainly,

one could argue that because the majority of the studies shown in the **Appendix** were conducted in the U.S., it is reasonable that these exceptional results occurred in studies conducted in the U.S. Statistically, such an argument is sound. Be that as it may, these results did show that Type II personality styles were occasionally associated with desirable outcomes in $L_{PD}L_{UA}IM$ cultures; at the same time, Type I personality styles were proven equally desirable in $H_{PD}H_{UA}CF$ cultural contexts such as South Africa and Taiwan. Furthermore, given that the great majority (i.e., 47) of the 54 studies suggested that Type I personality styles served individuals better in terms of their being associated with desirable attributes and outcomes in all seven jurisdictions and due to the absence of evidence showing that Type II personality styles served individuals better in $H_{PD}H_{UA}CF$ cultural systems, the Jungian personality styles can only be deemed fundamentally universal, not culture specific.

In the same book, Zhang (2017) reviewed 14 studies that tested individuals' career personality styles (Holland, 1973) against five other attributes and outcomes: achievement motivation, the big three and the big five personality traits, creativity, educational satisfaction, and job satisfaction. Spanning more than four decades, these studies were conducted among students, teachers, and working adults in five jurisdictions: Australia, Belgium, Hong Kong, mainland China, and the United States (see also the **Appendix** for more details on each study).

With no exception, all of the 14 studies suggested that Type I career personality styles (i.e., artistic and investigative) were related to adaptive attributes and outcomes and that Type II styles (i.e., conventional and realistic) were related to maladaptive attributes and outcomes. This finding fully disconfirmed the prediction that Type II styles would serve individuals better in $H_{PD}H_{UA}CF$ cultural systems such as in Hong Kong and mainland China. Thus, these studies suggested that career personality styles are universal, not culture specific.

Studies Beyond Zhang's Review

In order to verify if the above conclusion would hold true in studies outside Zhang's (2017) review, a thorough search of the literature (published between 2012 and March 2021) was conducted. As expected, both Jung's (1923) conceptualization of personality styles and Holland's (1973) model on career personality styles continued to be productive in generating empirical work. However, only 12 studies are relevant to the topic of this article – nine centered on the Jungian personality styles and three on career personality styles. Other studies are not suitable for being examined here because they either only focused on the Type III[6] Jungian introversion-extraversion personality styles (e.g., Al-Dujaily et al., 2013; Murphy et al., 2017) or dealt with the relationships of personality styles with attributes that are not obviously value laden (e.g., investment behaviors in Insler et al., 2016; whistleblowing in Park et al., 2014).

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[6]Recall that the two key hypotheses in this article only concern Type I and Type II personality-based intellectual styles.

Studies Centered on the Jungian Personality Styles

Of the nine studies centered on the Jungian personality styles, four involved cognitive outcomes (Karimnia and Mahjubi, 2013; Kim et al., 2013; Ayoubi and Ustwani, 2014; Rashid and Duys, 2015), two concerned affective outcomes (Ahmed, 2015; Choi et al., 2018), one pertained to ego development (Vincent et al., 2013), and two concerned interpersonal behaviors (Brandt and Laiho, 2013; Furnham and Crump, 2014). In the following, these studies are introduced.

Cognitive Outcomes With the Jungian Personality Styles

A first study was conducted among 35 Iranian university students majoring in translation (Karimnia and Mahjubi, 2013). The participants took a 72-item version of the *Myers-Briggs Type Indicator* (MBTI) and were evaluated on the quality of their translation (from English to Persian) of three short paragraphs conceptualized within Reiss (1971) text typology—operative, informative, and expressive. Results showed that although students' personality styles did not make a significant difference in their performance on translating operative and informative texts, students classified as higher on the intuitive personality style (a Type I style) significantly outperformed their sensing (Type II style) counterparts in translating expressive text.

The superiority of the intuitive personality style over the sensing style has also been demonstrated in Ayoubi and Ustwani (2014) research among 89 university students in Syria. The researchers examined the relationship between students' scores on an Arabic version of the MBTI (From M) and their grade point averages (GPAs). As asserted by the researchers, the most critical conclusion drawn from this study was that intuitive students had significantly higher GPAs than did their sensing peers.

The positive association of the intuitive personality style with better cognitive performance has also been revealed in Kim et al. (2013) study of 85 third-year computer science university students in New Zealand. The participants took the MBTI (version not specified) and responded to 40 questions (20 on declarative knowledge and 20 on procedural knowledge) after learning and discussing all of material learned on computer. Although students did not differ in their performance on declarative knowledge as a function of personal styles, those classified as intuitive performed significantly better on procedural knowledge than did those classified as sensing.

Finally, in the study conducted among 74 students pursuing their Master's degree in counseling in the United States (Rashid and Duys, 2015), the Type I perceiving personality style showed superiority over the Type II judging personality style. The participants took the MBTI (Myers et al., 1998) and the *Role Category Questionnaire* (RCQ; Burleson and Waltman, 1988) measuring cognitive complexity in counselor trainees. Results suggested that higher scores on the RCQ were positively related to the perceiving personality style, but negatively related to the sensing style.

Affective Outcomes and the Jungian Personality Styles

Both studies concerning the association between affective outcomes and personality styles were carried out in Asia. In the first study (Ahmed, 2015), 130 postgraduate students in

business management in India responded to the MBTI (Myers et al., 1998) and the *Resilience Inventory* (Guttman, 1999). Results revealed that compared with sensing students, intuitive students were significantly more resilient in that they demonstrated stronger abilities to either bounce back or thrive when faced with perpetual uncertainty and chaos.

Conducted in South Korea, the second study (Choi et al., 2018) addressed the relationship between emotional intelligence and the Jungian personality styles. Participants were 72 long-term practitioners of mind-body training (MBT) and a comparative group of 62 healthy individuals. Form G of the MBTI and a Korean version of the *Saehan Media EQ Test* (Moon, 1999) were used to assess the two aforementioned constructs. Although no statistically significant relationship was found between personality styles and emotional intelligence in the comparative group, a significantly positive relationship was identified between the intuitive personality style and emotional intelligence in the MBT group.

Ego Development and the Jungian Personality Styles
Ego development, individuals' growth in ways of constructing meaning throughout the lifespan (Loevinger, 1976), has long been recognized as one of the most comprehensive constructs in developmental psychology (Westenberg and Block, 1993). Its positive development unfolds along the hierarchy of achieving greater self and interpersonal awareness; decreasing defensiveness and increasing flexibility; becoming more reflective, more skilled in interacting with the environment, more tolerant of differences and ambiguity; increasing cognitive complexity; and achieving a stronger sense of responsibility and personal autonomy (Cook-Greuter, 1999).

Although only one study (Vincent et al., 2013) has investigated the relationship between ego development and the Jungian personality styles, its findings aligned well with the anticipation that Type I personality styles would be related to adaptive attributes. The study was conducted among 374 adults participating in 11 community leadership development and two professional development programs in Australia. Participants responded to the MBTI (Form M) and the *Washington University Sentence Completion Test* (Hy and Loevinger, 1996). Results indicated that the intuitive personality style was significantly related not only to higher levels of ego development on program entry but also to greater ego development in the process of the programs.

Interpersonal Behaviors and the Jungian Personality Styles
The term "interpersonal behaviors" is adopted here as a broad concept to refer to two specific attributes: (1) transformational leadership behivors; and (2) interpersonal dysfunctional behaviors. Each of the attributes has been tested against the Jungian personality styles. The first study (Brandt and Laiho, 2013) was conducted among 459 leaders and 378 subordinates working in various sectors in Finland. The leaders took the Finnish research "F-version" of the MBTI (Myers et al., 1998) and evaluated themselves on transformational leadership as measured by the *Leadership Practice Inventory* (LPI; Posner and Kouzes, 1988); while the subordinates evaluated their leaders

on the LPI. Intuitive male leaders and perceiving leaders (both male and female) rated themselves as more challenging (a key dimension of transformational leadership) than did their sensing and judging counterparts. Moreover, the subordinators also considered male leaders with stronger perceiving personality style as more challenging. Together, these results suggested that the Type I intuitive and perceiving styles were positively associated with practicing the transformational leadership style—a leadership style that has long been proven to be adaptive in various cultural contexts (Majauskaite and Alonderiene, 2015).

In the second study, Furnham and Crump (2014) investigated the relationship between personality styles and dysfunctional interpersonal behaviors among 4,812 British working adults. The participants responded to the MBTI-Form G (Briggs and Myers, 1987) and the *Hogan Development Survey* (Hogan and Hogan, 1997). Results showed that the participants classified as judging (a Type II style) scored significantly higher on five of the 11 dysfunctional interpersonal behaviors.

Summary
In this section, nine studies investigating the Jungian personality styles with four categories of human attributes and outcomes were reviewed. Although each of the studies was conducted in a different jurisdiction (Australia, Finland, India, Iran, New Zealand, South Korea, Syria, the United Kingdom, and the United States), the results from all of these studies, like the studies reviewed in Zhang's (2017) book, pointed to one direction—that is, the Type I intuitive and perceiving personality styles were invariantly positively related to the more desirable attributes and outcomes involved in the studies; while the Type II sensing and judging styles were consistently negatively associated with desirable attributes and outcomes—irrespective of cultural contexts. That is to say, these studies outside Zhang's (2017) review also have disconfirmed the anticipation that Type II styles would better serve individuals in $H_{PD}H_{UA}CF$ cultural systems. Once again, it could be contended that the Jungian personality styles are universal, not culture specific.

Studies Centered on Career Personality Styles
As noted earlier, the literature search conducted for the purpose of writing this article merely secured three relevant studies beyond Zhang's (2017) review. Nevertheless, the research findings are informative vis-à-vis the hypothesis on how each of the two types of career personality styles would be related to human attributes and outcomes in Hofstede's (1990) two broad types of cultural systems.

In the first study, Littman-Ovadia et al. (2014) investigated the relationship between career personality styles and mindfulness among 156 full-time employees in Israel. Mindfulness in this context refers to the tendency for being open-minded to novelty whereby the individual actively makes cognitive classifications and distinctions (Langer, 1978). The participants took the Hebrew version of the occupations section of the SDS (Holland, 1985) and the 14-item *Langer Mindfulness Scale* (Pirson et al.,

2012). Results suggested that the two Type I career personality styles (i.e., artistic and investigative) as well as the Type II realistic style were significantly related to mindfulness. This finding is in line with Zhang's (2015) notion of successful intellectual styles—in that mindfulness requires both Type I and Type II styles, especially the former.

In the second study, Ding et al. (2015) examined the relationship between career personality styles and performance on the *Graduate Record Examination* (GRE) among 106 graduate students majoring in school counseling and mental health counseling in the United States. The SDS-Form R (Holland, 1994) was used for assessing the participants' career personality styles. Results indicated that the Type I investigative career personality style statistically predicted students' scores on all sections of the GRE.

In the third and final study, Pellerone et al. (2015) tested the association of career personality styles with school performance, identity development, and school absences among 417 senior secondary school students in Italy. The participants' career personality styles were assessed with the SDS, and their identity development was evaluated by the *Ego Identity Process Questionnaire* (Balistreri et al., 1995). It was found that the Type I investigative personality style was positively significantly related to students' performance in all four subject areas (i.e., human performance, scientific performance, language performance, and technical performance). By contrast, the Type II realistic personality style was negatively correlated with students' performance in all four subject areas, while the Type II conventional style was negatively related to human performance. Furthermore, the artistic career personality style was positively associated with adaptive identity statuses (i.e., exploration and achievement), but negatively with diffusion—a maladaptive identity status. In addition, while the investigative career personality style was negatively related to school absences, the realistic style was positively so.

Summary

In this brief section, three studies, each conducted in a different jurisdiction, were introduced. Each study examined the relationship of career personality styles (Holland, 1973) to a different attribute or outcome. Across the three studies, the Type I artistic and investigative styles were positively related to adaptive attributes and outcomes, but negatively with maladaptive ones; whereas the Type II conventional and realistic styles were negatively related to students' performance. Interestingly, it was in the study of participants from Israel, an economically advanced (and an increasingly more individualistic society since the 1960s) jurisdiction that the Type II realistic style was found to make a positive contribution to mindfulness (Littman-Ovadia et al., 2014). Thus, like the studies centered on the Jungian personality styles, studies on the career personality styles disconfirmed the prediction that Type II styles would better serve individuals in Hofstede's (1990) $H_{PD}H_{UA}CF$ cultural systems. Such a dispute against the said hypothesis suggests, once again, that career personality styles cannot culture specific.

CLOSING REMARKS: CONCLUSIONS, LIMITATIONS, FUTURE DIRECTIONS, SCIENTIFIC SIGNIFICANCE, AND PRACTICAL IMPLICATIONS

The aim of this article was to ascertain whether the Jungian personality styles and career personality styles are culture specific or universal. Two hypotheses made based on Hofstede's (1990) model of four cultural systems and Zhang and Sternberg (2005) threefold model of intellectual styles were tested with relevant empirical work. This part draws conclusions on the basis of the findings presented in the preceding two parts; critiques the existing research on the relationship between culture and the two personality-based intellectual style constructs, pointing out its limitations and possible future research directions; explains the scientific value of the present review; and discusses the practical implications of the key findings for education and beyond.

Conclusions

Cross-cultural comparative studies yielded largely mixed results, with some confirming the first hypothesis (i.e., individuals from $L_{PD}L_{UA}IM$ cultural systems would be more likely to adopt Type I personality-based styles, while individuals from $H_{PD}H_{UA}CF$ cultural systems would be more likely to adopt Type II styles) and others disconfirming it. Such mixed findings suggest that personality-based styles cannot be culture specific for the simple reason that it has not been empirically established that individuals from one broad cultural system consistently scored higher on particular types of personality-based styles than did those from the other.

At the same time, the universality of personality-based intellectual styles has been strongly revealed by the empirical findings challenging the second general hypothesis of this article. Unlike hypothesized, regardless of the cultural contexts in which the empirical studies were conducted, Type I personality-based intellectual styles invariably served the research participants better in that individuals scoring higher on these styles tended to display more desirable attributes and achieve better outcomes, whereas Type II styles generally served people poorly. Furthermore, on several exceptional occasions when Type II personality-based styles did serve individuals better, those exceptions occurred in $L_{PD}L_{UA}IM$ cultures, not in $H_{PD}H_{UA}CF$ ones.

Consequently, considering the two bodies of the literature collectively, one should say that although culture certainly plays a crucial role in personality-based intellectual styles, none of the styles is unique to, or "owned" by, any culture. As a matter of fact, personality-based intellectual styles have long been proven to be accessible to people in different cultural contexts and similar patterns of Jungian personality styles (e.g., ESTJ—extraversion-sensing-thinking-judging personality style) and those of career personality styles (e.g., IAS—investigative-artistic-social career personality style) have been ascertained in different cultural contexts (e.g., Holland, 1994; Myers et al., 1998). Culture is dynamic, and so are personality-based intellectual

styles (Zhang, 2013). Based on both the existing literature and the present findings, and further founded on the dynamic nature of personality-based styles, one must conclude: personality-based intellectual styles cannot be culture specific; but rather, they are principally universal.

Indeed, the personality-based intellectual styles cannot be culture specific for four additional reasons—at the very least. First, jurisdiction/ethnic group is not the only dimension along which each of the cultural-dimension indices (i.e., power distance, uncertainty avoidance, individualism vs. collectivism, and masculinity vs. femininity) varies. The indices also vary as a function of other socialization variables, most evidently, age, gender, academic discipline, educational level, and occupation (Hofstede, 1980). Second, within each jurisdiction/ethnic group, individuals of different social classes and, of course, people of the same social class, may fall on different points along each of the four cultural-dimension continua. Third, with temporal evolution and the increasingly faster speed of modernization (as commonly seen in economic growth—except for some periods such as the current era of the COVID-19 pandemic), and in this highly globalized world, those cultures that once tended toward, say, collectivism, might begin to manifest more individualism (Matsumoto, 2002; Zhang, 2013). Finally, individuals of the same cultural system may exhibit quite different characteristics in relation to Hofstede's cultural dimensions. For instance, the Japanese culture is usually featured by its avoidance of conflict and of overt criticism at the individual level. However, at the group or organizational level, uncertainty is often well-acknowledged (Westwood and Low, 2003). In fact, it was with these caveats that the two general hypotheses regarding the relationship between Hofstede's (1980) two broad cultural systems and Zhang and Sternberg (2005) Type I and II personality-based intellectual styles were put forward.

Limitations and Future Research Directions

Obviously, very few studies concerning the second hypothesis (i.e., the one concerning how the two different types of personality-based intellectual styles would serve individuals differently in each of the two broad cultural systems) have been conducted in $H_{PD}H_{UA}CF$ cultural systems. Thus, conclusions drawn here might cast doubt in the minds of some readers. However, it should be remembered that there is also variability among jurisdictions within each the two broad cultural systems (i.e., $H_{PD}H_{UA}CF$ and $L_{PD}L_{UA}IM$)—with respect to both styles and positions along each of Hofstede's (1980) four cultural-dimension continua. As such, the conclusions drawn from the existing findings obtained from research participants from various cultural contexts (despite being predominantly $L_{PD}L_{UA}IM$ ones) should ease the minds of individuals who may be less confident in the present conclusions. Nevertheless, future researchers are encouraged to conduct more empirical studies in $H_{PD}H_{UA}CF$ cultural contexts, particularly studies that test the association of personality-based intellectual styles with human attributes and outcomes.

Scientific Significance

Guided by the model of four cultural dimensions (Hofstede, 1980) and the threefold model of intellectual styles (Zhang and Sternberg, 2005), this article pioneered the examination of the link between culture and personality-based intellectual styles. The present findings carry scientific value.

Traditionally, in trying to understand cultural differences in personality (or, in any other human attributes or outcomes, for that matter), researchers tended to target directly at identifying differences as a function of nation/jurisdiction and racial/ethnic groups. Results from these between-group comparative studies, despite playing an important role in understanding people's differences in personality, may have unintended negative consequences. For example, according to the representativeness heuristic (Bordalo et al., 2016), between-group comparisons are likely to perpetuate stereotypes. Precisely, group differences found and reported in publications often mislead receivers of such information to form stereotypical views about groups investigated (Bordalo et al., 2016; Quinn, 2020). The present finding that the cultural specificity of personality-based intellectual styles cannot be established echoes previous scholars' call for cautioning against stereotypes (Bordalo et al., 2016; Quinn, 2020). Researchers who are engaged in between-group cross-cultural comparative studies are reminded to be prudent in presenting, interpreting, and generalizing their findings.

Furthermore, the present finding that Type I personality-based styles are desirable in virtually all jurisdictions and racial/ethnic groups suggests that in studying cultural differences in personality-based styles, researchers should go far beyond engaging in between-group comparisons. They are advised to examine how personality-based intellectual styles are related to other human attributes and outcomes within each cultural context and to ascertain meaningful patterns and commonalities of relevant relationships across cultural contexts. In this way, the nature of personality-based intellectual styles in relation to culture can be better understood.

Finally, the evidence-based conclusion that personality-based intellectual styles are fundamentally universal reinforces the long-standing argument for the value-laden nature of intellectual styles (Kogan, 1989; Renzulli and Sullivan, 2009, Zhang, 2017). That is, largely irrespective of cultural contexts, some styles are regarded more desirable than are others. In the same vein, the present conclusion highlights the argument for the malleability of intellectual styles (Henson and Borthwick, 1984; Sternberg, 1997; Zhang, 2013). Personality-based intellectual styles are accessible to people in virtually all cultural contexts. With appropriate stimuli, desired intellectual styles can be fostered in all cultural contexts. From Yamagishi's et al. (2008) game-theoretic perspective, behaviors that are newly developed in particular cultures would be interpreted as "strategies adapted to a set of collectively created social incentives" (p. 579). However, researchers in the field of intellectual styles (e.g., Witkin, 1962; Sternberg, 1997; Zhang, 2017) would argue that such development manifests the beginning of a process for preferences to be formulated. Having been a passionate researcher in the field

of intellectual styles and with the abundant empirical support (e.g., Zhang, 2013, 2017), the present author strongly endorses the latter view.

Practical Implications

Apart from being scientifically significant, the present findings also have two practical implications for education and beyond. The first is derived from the finding that people from $H_{PD}H_{UA}CF$ cultural systems do not necessarily use less creativity-generating personality-based intellectual styles than do people from $L_{PD}L_{UA}IM$ ones. With this knowledge, while working with students, educational practitioners should not only take students' cultural backgrounds into consideration, but also be vigilant against forming or holding stereotypical views about students from any culture. The same should apply to the general public when interacting with people from different cultural contexts.

The second practical implication is enlightened by the key finding that, regardless of cultural contexts, Type I personality-based intellectual styles serve individuals far better than do Type II styles. With this knowledge, individuals from all cultures should be more conscious of cultivating Type I styles—both within themselves and among others (see Zhang and Sternberg, 2020).

CONTRIBUTION TO THE FIELD

Grounded in the conceptual link between the two broad cultural systems informed by Hofstede's model of four cultural dimensions and those of Type I and Type II intellectual styles proposed by Zhang and Sternberg, two research hypotheses were made and tested. Although some crosscultural comparative studies suggested cultural differences as hypothesized, others either failed in identifying any significant cultural difference in the personality-based styles or sustained differences challenging the hypothesis. Meanwhile, within-culture studies consistently showed the desirability of creativity-generating personality-based intellectual styles in terms of their association with adaptive attributes and outcomes-regardless of cultural contexts. Supporting the conclusion that personality-based intellectual styles are fundamentally universal, these findings offer a new lens through which researchers could investigate the nature of personalities in relation to culture. Meanwhile, these hard data should remind us all, people in and outside the education arena, of guarding against cultural stereotypes about personality styles.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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REFERENCES

Adler, N. J. (2001). *International Dimensions of Organizational Behavior, 4th edn.* Cincinnati, OH: South-Western College Publishing.

Ahmed, A. (2015). Resilience in relation with personality, cognitive styles and decision making styles. *J. Ind. Acad. Appl. Psychol.* 41, 151–158.

Al-Dujaily, A., Kim, J., and Ryu, H. (2013). Am I extravert or introvert? Considering the personality effect toward e-learning system. *Educ. Technol. Soc.* 16, 14–27.

Ayoubi, R. M., and Ustwani, B. (2014). The relationship between students' MBTI preferences and academic performance at a Syrian university. *Educ. Train.* 56, 78–90. doi: 10.1108/ET-09-2012-0090

Balistreri, E., Busch-Rossnagel, N. A., and Geisinger, K. F. (1995). Development and preliminary validation of the ego identity process questionnaire. *J. Adolesc.* 18, 179–192. doi: 10.1006/jado.1995.1012

Berry, J. W. (1991). "Cultural variations in field dependence-independence," in *Field Dependence-Independence*, eds S. Wapner, and J. Demick (Hillside, NJ: Lawrence Erlbaum), 289–307.

Bordalo, P., Coffman, K., Gennaioli, N., and Shleifer, A. (2016). Stereotypes. *Q. J. Econ.* 131, 1753–1794. doi: 10.1093/qje/qjw029

Brandt, T., and Laiho, M. (2013). Gender and personality in transformational leadership context: an examination of leader and subordinate perspectives. *Leaders. Organ. Dev. J.* 34, 44–66. doi: 10.1108/01437731311289965

Briggs, K. C., and Myers, I. B. (1987). *Myers-Briggs Type Indicator: Form G.* Palo Alto, CA: Consulting Psychologists Press.

Broer, E., and McCarley, N. G. (1999). Using and validating the myers-briggs type indicator in mainland China. *J. Psychol. Type* 51, 5–21.

Burleson, B. R., and Waltman, M. S. (1988). "Cognitive complexity: using the role category questionnaire measure," in *A Handbook for the Study of Human Communication: Methods and Instruments for Observing, Measuring, and Assessing Communication Processes*, ed C. Tardy (Norwood, NJ: Ablex), 1–35.

Choi, S. H., An, S. C., Lee, U. S., Yun, J. Y., Jang, J. H., and Kang, D. H. (2018). In-depth relationships between emotional intelligence and personality traits in meditation practitioners. *Clin. Psychopharmacol. Neurosci.* 16, 391–397. doi: 10.9758/cpn.2018.16.4.391

Cook-Greuter, S. (1999). *Postautonomous Ego Development: A Study of Its Nature and Measurement.* (Doctoral dissertation). Available online at: http://search. proquest.com/docview/304503009?accountid=8203

Ding, Y., Salyers, K., Kozelka, S., and Laux, J. (2015). Vocational personality traits in counselor education and school psychology students. *J. Employ. Counsel.* 52, 158–170. doi: 10.1002/joec.12021

Einarsdòttir, S., Rounds, J., Agisottir, S., and Gerstein, L. H. (2002). The structure of vocational interests in Iceland: examining Holland's and Gati's RIASEC models. *Eur. J. Psychol. Assess.* 18, 85–95. doi: 10.1027//1015-5759.18.1.85

Fouad, N. A., and Dancer, L. S. (1992). Cross-cultural structure of interests: mexico and the United States. *J. Vocat. Behav.* 40, 129–143. doi: 10.1016/0001-8791(92)90061-4

Furnham, A., and Crump, J. (2014). The dark side of the MBTI: psychological type and interpersonal derailers. *Psychology* 5, 166–171. doi: 10.4236/psych.2014.52026

Gade, E. M., Fuqua, D., and Hurlburt, G. (1984). Use of the self-directed search with native American high school students. *J. Counsel. Psychol.* 31, 584–587. doi: 10.1037/0022-0167.31.4.584

Grigorenko, E. L., and Sternberg, R. J. (1995). "Thinking styles," in *International Handbook of Personality and Intelligence*, eds D. Saklofske, and M. Zeidner (New York, NY: Plenum), 205–229. doi: 10.1007/978-1-4757-5571-8_11

Guttman, M. (1999). Find out how resilient you are. *USA Weekend*. 5–7.

Hall, E. T. (1976). *Beyond Culture*. Garden City, NY: Anchor Press/Doubleday.

Hammer, A. L., and Mitchell, W. D. (1996). The distribution of MBTI types in the US by gender and ethnic group. *J. Psychol. Type* 37, 2–15.

Hedegard, J. M., and Brown, D. R. (1969). Encounters of some Negro and white freshmen with a public university. *J. Soc. Issues* 25, 131–144. doi: 10.1111/j.1540-4560.1969.tb00611.x

Heine, S. J., and Buchtel, E. E. (2009). Personality: the universal and the culturally specific. *Ann. Rev. Psychol.* 60, 369–394. doi: 10.1146/annurev.psych.60.110707.163655

Henson, K. T., and Borthwick, P. (1984). Matching styles: a historical look. *Theory Pract.* 23, 3–9. doi: 10.1080/00405848409543083

Hofstede, G. H. (1980). *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills, CA: Sage.

Hofstede, G. H. (1990). "Empirical models of cultural differences," in *Contemporary Issues in Cross-Cultural Psychology*, eds N. Bleichrodt, and P. J. D. Drenth (Amsterdam: Swets & Zeitlinger), 4–20.

Hogan, R., and Hogan, J. (1997). *Hogan Development Survey Manual*. Tulsa, OK: HAS.

Holland, J. L. (1973). *Making Vocational Choices: A Theory of Careers*. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1985). *Manual for the Self-Directed Search*. Odessa, FL: Psychological Assessment Resources.

Holland, J. L. (1994). *Self-Directed Search*. Odessa, FL: Psychological Assessment Resources.

Huang, C. H., and Huang, C. E. (1991). *Chinese University Students on the MBTI*. Garden Grove, CA: InfoMedia, Program D203-CS68.

Hy, L. X., and Loevinger, J. (1996). *Measuring Ego Development, 2nd Edn*. Mahwah, NJ: Lawrence Erlbaum Associates.

Iliescu, D., Ispas, D., Ilie, A., and Ion, A. (2013). The structure of vocational interests in Romania. *J. Counsel. Psychol.* 60, 294–302. doi: 10.1037/a0032199

Insler, M., Compton, J., and Schmitt, P. (2016). The investment decisions of young adults under relaxed borrowing constraints. *J. Behav. Exp. Econ.* 64, 106–121. doi: 10.1016/j.socec.2015.07.004

Jones, G. K., and Herbert, J. (2000). National culture and innovation: implications for locating global R&D operations. *Manage. Int. Rev.* 40, 11–39.

Jung, C. G. (1923). *Psychological Types*. New York, NY: Harcourt Brace.

Jung, C. G. (1958). *Psychology and Religion: West and East. Collected Works 11*, ed R. F. C. Hull. Princeton, NJ: Princeton University Press.

Karimnia, A., and Mahjubi, M. (2013). Individual differences and quality of translation: a personality-based perspective. *Psychol. Lang. Commun.* 17, 37–64. doi: 10.2478/plc-2013-0003

Khan, S. B., Alvi, S. A., Shaukat, N., Hussain, M. A., and Baig, T. (1990). A study of the validity of Holland's theory in a non-Western culture. *J. Vocat. Behav.* 36, 132–146. doi: 10.1016/0001-8791(90)90021-S

Kim, J., Lee, A., and Ryu, H. (2013). Personality and its effects on learning performance: design guidelines for an adaptive e-learning system based on a user model. *Int. J. Indust. Ergon.* 43, 450–461. doi: 10.1016/j.ergon.2013.03.001

Kogan, N. (1989). "A stylistic perspective on metaphor and aesthetic sensitivity in children," in *Cognitive Style and Cognitive Development, Vol. 3*, eds T. Globerson, and T. Zelniker (Norwood, NJ: Ablex Publishing Corporation), 192–213.

Langer, E. J. (1978). "Rethinking the role of thought in social interaction," in *New Directions in Attribution Research, Vol. 2*, eds J. Harvey, W. Ickes, and R. Kidd (Hillsdale, NJ: Erlbaum), 35–58. doi: 10.4324/9780203780978-3

Leung, S. A., and Hou, Z. J. (2001). Concurrent validity of the 1994 self-directed search for Chinese high school students in Hong Kong. *J. Career Assess.* 9, 283–296. doi: 10.1177/106907270100900305

Levy, N., Murphy, C., and Carlson, R. (1972). Personality types among Negro college students. *Educ. Psychol. Measure.* 32, 641–653. doi: 10.1177/001316447203200307

Littman-Ovadia, H., Zilcha-Mano, S., and Langer, E. (2014). Vocational personalities and mindfulness. *J. Employ. Counsel.* 51, 170–179. doi: 10.1002/j.2161-1920.2014.00050.x

Loevinger, J. (1976). *Ego Development*. San Francisco, CA: Jossey-Bass.

Lonner, W. J. (1968). Cross-cultural measurement of vocational interests. *Dissert. Abstr. Int. Hum. Soc. Sci.* 28, 5226–5227A.

Majauskaite, M., and Alonderiene, R. (2015). Leadership style and job satisfaction in higher education institutions. *Int. J. Educ. Manage.* 30, 140–164. doi: 10.1108/IJEM-08-2014-0106

Markus, H. R., and Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion and motivation. *Psychol. Rev.* 98, 224–253. doi: 10.1037/0033-295X.98.2.224

Matsumoto, D. R. (2002). *The New Japan: Debunking Seven Cultural Stereotypes*. Yarmouth, ME: Intercultural Press.

Moon, Y. (1999). *Report of the Saehan Media EQ Test*. Seoul: Saehan Media.

Morris, M. L. (2016). Vocational interests in the United States: sex, age, ethnicity, and year effects. *J. Counsel. Psychol.* 63, 604–615. doi: 10.1037/cou0000164

Murphy, L., Eduljee, N. B., Croteau, K., and Parkman, S. (2017). Extraversion and introversion personality type and preferred teaching and classroom participation: a pilot study. *J. Psychosoc. Res.* 12, 437–450.

Myers, B., McCaulley, M., Quenk, N., and Hammer, A. (1998). *Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator, 3rd Edn*. Palo Alto, CA: Consulting Psychologist Press, Inc.

Myers, I. B., and Briggs, K. C. (1943). *Myers-Briggs Type Indicator—Form E*. Princeton, NJ: Educational Testing Service.

Myers, I. B., and McCaulley, M. H. (1985). *Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.

Ng, P. (2015). *The Association of Intellectual Styles, Personality Traits, and Learning Environment With Academic Achievement and Career Satisfaction Among Adult Learners*. (Unpublished doctoral thesis), Hong Kong, SAR China: The University of Hong Kong.

Norenzayan, A., and Heine, S. J. (2005). Psychological universals: what are they and how can we know? *Psychol. Bull.* 131, 763–784. doi: 10.1037/0033-2909.131.5.763

Park, H., Blenkinsopp, J., and Park, M. (2014). The influence of an observer's value orientation and personality type on attitudes toward whistleblowing. *J. Bus. Ethics* 120, 121–129. doi: 10.1007/s10551-013-1908-7

Pellerone, M., Passanisi, A., and Bellomo, M. F. P. (2015). Identity development, intelligence structure, and interests: a cross-sectional study in a group of Italian adolescents during the decision-making process. *Psychol. Res. Behav. Manage.* 8, 239–249. doi: 10.2147/PRBM.S88631

Pirson, M., Langer, E. J., Bodner, T., and Zilcha-Mano, S. (2012). *The Development and Validation of the Langer Mindfulness Scale - Enabling a Socio-Cognitive Perspective of Mindfulness in Organizational Contexts*. New York, NY: Fordham University Schools of Business Research Paper. Available online at: http://ssrn.com/abstract=2158921

Posner, B. Z., and Kouzes, J. M. (1988). Development and validation of the leadership practices inventory. *Educ. Psychol. Measure.* 48, 483–496. doi: 10.1177/0013164488482024

Quinn, D. M. (2020). Experimental effects of "achievement gap: news reporting on viewers' racial stereotypes, inequality explanations, and inequality prioritization. *Educ. Res.* 49, 482–492. doi: 10.3102/0013189X20932469

Rashid, G. J., and Duys, D. K. (2015). Counselor cognitive complexity: correlating and comparing the myers-briggs type indicator with the role category questionnaire. *J. Employ. Counsel.* 52, 77–86. doi: 10.1002/joec.12006

Reiss, K. (1971). "Type, kind and individuality of text: decision making in translation," in *The Translation Studies Readers*, ed L. Venuti (London: Routledge), 180–192.

Renzulli, J. S., and Sullivan, E. E. (2009). "Learning styles applied: Harnessing students' instructional style preferences," in *Perspectives on the Nature of Intellectual Styles*, eds L. F. Zhang and R. J. Sternberg (New York, NY: Springer Publishing Company), 209–231.

Rounds, J. B., and Tracey, T. J. (1996). Cross-cultural structural equivalence of the RIASEC models and measures. *J. Counsel. Psychol.* 43, 310–329. doi: 10.1037/0022-0167.43.3.310

Shade, B. J. (1983). *Afro-American Patterns of Cognition*. Madison, WI: Final report to the Wisconsin Center for Education Research.

Shade, B. J. (1986). Is there an Afro-American cognitive style? An exploratory study. *J. Black Psychol.* 13, 13–16. doi: 10.1177/00957984860130 0102

Sternberg, R. J. (1997). *Thinking Styles.* New York, NY: Cambridge University Press. doi: 10.1017/CBO9780511584152

Swan, K. C. (2005). Vocational interests (the self-directed search) of female carpenters. *J. Counsel. Psychol.* 52, 655–657. doi: 10.1037/0022-0167.52. 4.655

Swanson, J. L. (1992). The structure of vocational interests for African-American college students. *J. Vocat. Behav.* 40, 144–157. doi: 10.1016/0001-8791(92)9 0062-5

Tobacyk, J., and Cieslicka, A. (2000). Compatibility between psychological type and academic major in Polish university students. *J. Psychol. Type* 54, 22–30.

Tylor, E. B. (1958). *Primitive Culture.* New York, NY: Harper & Row.

Van de Vijver, F. J. R., and Leung, K. (2021). *Methods and Data Analysis for Cross-Cultural Research, 2nd Edition.* New York, NY: Cambridge University Press. doi: 10.1017/9781107415188

Vincent, N., Ward, L., and Denson, L. (2013). Personality preferences and their relationship to ego development in Australian leadership program participants. *Adult Dev.* 20, 197–211. doi: 10.1007/s10804-013-9171-9

Westenberg, P. M., and Block, J. (1993). Ego development and individual differences in personality. *J. Pers. Soc. Psychol.* 65, 792–800. doi: 10.1037/0022-3514.65.4.792

Westwood, R., and Low, D. R. (2003). The multicultural muse: culture, creativity, and innovation. *Int. J. Cross Cult. Manage.* 3, 235–259. doi: 10.1177/14705958030032006

Witkin, H. A. (1962). *Psychological Differentiation; Studies of Development.* New York, NY: Wiley. doi: 10.1037/13128-000

Yamagishi, T., Hashimoto, H., and Schug, J. (2008). Preferences versus strategies as explanations for culture-specific behavior. *Psychol. Sci.* 19, 579–584. doi: 10.1111/j.1467-9280.2008.02126.x

Yao, Y. P. (1993). *Analyses of the MBTI Personality Types of Chinese Female School Administrators in Liaoning Province, the People's Republic of China.* (Unpublished doctoral dissertation). Starkville, MS: Mississippi State University.

Zhang, L. F. (1999). *Short-Version Self-directed Search.* (Unpublished test), Hong Kong: Faculty of Education, The University of Hong Kong.

Zhang, L. F. (2001). Thinking styles and personality types revisited. *Pers. Indiv. Diff.* 31, 883–894. doi: 10.1016/S0191-8869(00)00189-6

Zhang, L. F. (2013). *The Malleability of Intellectual Styles.* New York, NY: Cambridge University Press. doi: 10.1017/CBO9780511973055

Zhang, L. F. (2015). Fostering successful intellectual styles for creativity. *Asia Pac. Educ. Rev.* 16, 183–192. doi: 10.1007/s12564-015-9378-5

Zhang, L. F. (2017). *The Value of Intellectual Styles.* New York, NY: Cambridge University Press. doi: 10.1017/9781316014561

Zhang, L. F., and Sternberg, R. J. (2005). A threefold model of intellectual styles. *Educ. Psychol. Rev.* 17, 1–53. doi: 10.1007/s10648-005-1635-4

Zhang, L. F., and Sternberg, R. J. (2020). "Intellectual styles," in *The Oxford Encyclopedia of Educational Psychology,* ed L. F. Zhang (New York, NY: Oxford University Press). doi: 10.1093/acrefore/9780190264093.013.883

Zhang, L. F., Sternberg, R. J., and Rayner, S. (eds.). (2012). *Handbook of Intellectual Styles: Preferences in Cognition, Learning, and Thinking.* New York, NY: Springer Publishing Company.

APPENDIX: STUDIES ON CULTURE AND PERSONALITY-BASED INTELLECTUAL STYLES IN ZHANG (2017)

Jungian Personality Styles (measured with MBTI) with Other Attributes and Outcomes (see under "Construct")

Author (year)	Construct	Measure assessing the construct	Sample description	Jurisdiction	Key findings
[PU]Barrett (1991)	Congenial classroom environment	The Stern Classroom Environment Index (Stern, 1971)	34 vocational teachers and their 622 students	the United States	P^+; J^- teachers S+; N+ teachers; but S teachers as more than N teachers, unexpectedly
[Non−sig.]Brown and Reilly (2009)	Transformational leadership	the Multifactor Leadership Questionnaire (Bass and Avolio, 1990)	408 leaders and 2,411 followers	the United States	Leaders' self-ratings: N^+; S^-; Subordinates' ratings of their leaders: non-significant
Chambers et al. (2003)	Willingness to use educational technology	A 20-item questionnaire (Callister and Burbules, 1990)	164 novice teachers	the United States	N^+; S^-
Chenhall and Morris (1991)	Resource allocation decision-making behaviors	A brief case study of decisions on relevance of opportunity costs	64 middle- and senior-level managers	France	N managers were more thoughtful than S managers
Choong and Britton (2007)	Creativity	The Values in Action Inventory of Strengths (Peterson and Seligman, 2004)	98 adult volunteers	the United States	N^+; S^-
Dollinger et al. (2004)	Creativity	the Creativity Behavior Inventory (Hocevar, 1979); the Creative Personality Scale (Gough, 1979); and the Test for Creative Thinking - Drawing Production (Urban and Jellen, 1996)	94 undergraduate students	the United States	N^+; S^-
Furnham (1996)	Big 5 PTs	NEO-PI (Costa and McCrae, 1985)	160 middle to senior managers	the United Kingdom	N^+, P^+; S^-, J^- with openness
Furnham et al. (2003)	Big 5 PTs	NEO-PI - Form S (Costa and McCrae, 1985)	900 British adults	the United Kingdom	N^+; S^- with openness
Furnham et al. (2007)	Big 5 PTs	NEO-PI (Costa and McCrae, 1985)	over 3,000 managers	the United Kingdom	N^+, P^+; S^-, J^- with openness
Furnham et al. (2009)	Creativity	The Consequences test (Christensen et al., 1953)	2603 middle and senior managers of multinational communication organizations	the United Kingdom	N^+, P^+; S^-, J^-
[FU]Gentry et al. (2007)	Managerial derailment	The observer-form of BENCHMARKS (Lombardo and McCauley, 1994)	6,124 managers	the United States	N^+; P^+
[PU]Hautala (2006)	Transformational leadership	the Leadership Practices Inventory (Posner and Kouzes, 1988)	439 leaders and 380 subordinates	Finland	Leaders' self-ratings: N^+ and P^+; [Subordinates' ratings of their leaders: S^+ (unexpected)]
Hough and Ogilvie (2005)	Leaders' behaviors in a simulated strategic decision-making environment	Decisiveness and perceived effectiveness in responding to problems in "The Looking Glass Experience" (a week-long seminar)	749 experienced managers	the United States	N managers made most effective decisions; S managers made least effective decisions.
Houtz et al. (1994)	Creative thinking	The Torrance Test of Creative Thinking (Torrance, 1984)	46 pre-service teachers	the United States	N^+, P^+; S^-, J^-
Kagan and Smith (1988)	Teachers' classroom behaviors	Teacher Structure Checklist (Webster, 1972), records of the frequency of six types of verbal behaviors, and a classroom map	51 kindergarten teachers	the United States	N^+, P^+ positively with child-centered; S^+, J^+ negatively with teacher-centered

(Continued)

Continued

Author (year)	Construct	Measure assessing the construct	Sample description	Jurisdiction	Key findings
MacDonald et al. (1994)	Big 5 PTs	NEO-PI - Form S (Costa and McCrae, 1985)	209 university students	Canada	N$^+$; S$^-$ with openness
Mills (2003)	Teaching excellence	Award-winning versus non-award-winning	63 exemplary teachers and 1,128 middle school teachers	the United States	Compared with the normative teachers, the exemplary teachers were more intuitive but less sensing
[**1] Moutafi et al. (2007)	Organizational seniority	Self-reported managerial level	900 adults	the United Kingdom	N$^+$; S$^-$
Munro et al. (2012)	Character strengths	The Values in Action Inventory of Strengths (Peterson and Seligman, 2004)	69 pre-service teachers	South Africa	N$^+$; S$^-$ with transcendence
Overbay et al. (2009)	Dispositional resistance to change	The Resistance to Change Scale (Oreg, 2003)	237 elementary and middle school teachers	the United States	N$^-$; S$^+$
Purcell and Wilcox (2007)	Satisfaction in using educational technology	A short reflection paper	56 pre-service teachers	the United States	N$^+$; S$^-$
Quenk (1966)	Optimism	Daydreams recorded over 10 days	57 adults	the United States	N$^+$
Reid (1999)	Job Satisfaction	the Maslach Burnout Inventory - Form Ed (Maslach and Jackson, 1981)	189 female elementary school teachers	the United States	N$^+$
Ross et al. (2005)	Dogmatism	The Troldahl-Powell Dogmatism Scale (1965)	422 female pre-service teachers	the United Kingdom	N$^-$, P$^-$; S$^+$, J$^+$
Rushton et al. (2006)	Teaching excellence Award-winning versus non-award-winning	39 school district-level Teacher of the Year (ToY) recipients;	993 school teachers	the United States	ToY recipients: N$^+$, P$^+$; Normative teachers: S$^+$, J$^+$
Rushton et al. (2007)	Teaching excellence	Award-winning versus non-award-winning	58 exemplary teachers; 993 school teachers	the United States	The exemplary teachers were more intuitive and perceiving than the two "normative" groups
[PU]Schmidt (1989)	Teaching behaviors	the researcher's live observation of a one-hour lesson of each participant	43 graduate associate instructors	the United States	N+; S$^-$ with reinforcement, approval, and teacher modeling; J$^+$; P- with reinforcement (unexpected)
Smith et al. (1995)	Willingness to use educational technology	A 20-item questionnaire (Callister and Burbules, 1990)	138 teachers	the United States	N$^+$; S$^-$
Srivastava et al. (2010)	Creativity	the Barron-Welsh Art Scale (Barron, 1963), the Adjective Checklist Creative Personality Scale (Gough, 1979), and the Torrance Tests of Creative Thinking - Figural and Verbal versions (Torrance, 1990)	32 bipolar disorder patients, 21 unipolar major depressive disorder patients, 22 creative controls, and 42 healthy controls	the United States	N$^+$; S$^-$
[Non-sig.]Vaughan and Knapp (1963)	Pessimism	25 items describing an optimistic and a pessimistic outlook	75 male undergraduates	the United States	Not statistically significant
Walla (1988)	Congenial classroom environment	Classroom Environment Index (long form, CEI-971) - students' evaluation of teachers	34 vocational teachers and 638 vocational students	the United States	N$^+$, P$^+$; S$^-$, J$^-$ teachers
[PU]Watson and Hillison's (1991)	Job Satisfaction	The Minnesota Satisfaction Questionnaire (Weiss et al., 1967)	63 teachers	the United States	S$^-$-P$^-$ (P$^-$ unexpected)
Yang and Lin (2004)	Creativity	the Chopsticks Creativity Test (Wu, 1998)	1119 male students of a senior high school	Taiwan	N$^+$; S$^-$

[1]This finding corroborated findings concerning Jungian personality style distributions reported in 21 studies of managerial samples from North America (see Zhang, 2017, pp.224–226).

Continued

Career Personality Styles (measured with SDS, SVSDS, or VPI) with Other Attributes and Outcomes (see under "Construct")

Author (year)	Construct	Measure assessing the construct	Sample description	Jurisdiction	Key findings
Carless (1999)	Big 5 PTs	The NEO-PI-R (Costa and McCrae, 1992)	139 working adults and students	Australia	A$^+$ with openness (for both genders); A$^+$ with openness (for males)
Costa et al. (1984)	Big 3 Personality traits	The Neuroticism-Extraversion-Openness Inventory (Costa and McCrae, 1980)	394 adults	the United States	A$^+$; C$^-$ with openness (for both gemders) I$^+$ with openness (for females)
De Fruyt and Mervielde (1997)	Big 5 PTs	The NEO-PI-R (Costa and McCrae, 1992)	934 university students	Belgium	A$^+$; I$^+$ with openness
Fu (2017)	Achievement motivation	The Achievement Motivations Measure - Revised (Elliot and Murayama, 2008)	282 university students	mainland China	I$^+$ with performance approach; C$^+$ with mastery avoidance and performance avoidance
Gade et al. (1988)	Educational satisfaction	Survey of Study Habits and Attitudes (Brown and Holtzman, 1967)	596 Native American school students	Canada	I$^+$; R$^-$
Gottfredson et al. (1993)	Big 5 PTs	The NEO-PI (Costa and McCrae, 1985)	725 Navy trainees	the United States	A$^+$ with openness (for both males and females) I$^+$ with openness (for females).
Holland et al. (1994)	Big 5 PTs	The NEO-PI (Costa and McCrae, 1989)	298 adults	the United States	A$^+$; I$^+$ with openness (both genders); I$^-$ with neuroticism (males)
Kelly and Kneipp (2009)	Creativity	Scale of Creative Attributes and Behaviors (Kelly, 2004)	115 undergraduate students	the United States	A$^+$ with all five creativity components. R$^+$ with spontaneity
Larson and Borgen (2002)	Big 5 PTs	The NEO-PI-R (Costa and McCrae, 1992)	323 adolescents	the United States	A$^+$; I$^+$ with openness
Schinka et al. (1997)	Big 5 PTs	The NEO-PI-R (Costa and McCrae, 1992)	1,034 working adults	the United States	A$^+$; I$^+$; C$^-$ with openness
Tokar and Swanson (1995)	Big 5 PTs	The NEO Five-Factor Inventory (Costa and McCrae, 1992)	679 employed adults	the United States	A$^+$; I$^+$; C$^-$ with openness
Tokar et al. (1995)	Big 5 PTs	The NEO-PI (Costa and McCrae, 1985)	193 university students	the United States	A$^+$; I$^+$ with openness
Wiggins (1976)	Job satisfaction	The Job Satisfaction Blank (Hoppock, 1935)	110 teachers of the educable mentally disabled	the United States	I$^+$; R$^-$, C$^-$
Wiggins et al. (1983)	Job satisfaction	the Job Satisfaction Blank (Hoppock, 1935)	247 teachers	the United States	I$^+$; R$^-$
Zhang (2008)	Big 5 PTs	the NEO-FFI (Costa and McCrae, 1992)	79 second-year university students	Hong Kong	A$^+$ with openness; C$^+$ with conscientiousness

^{FU}, Fully unexpected; ^{PU}, Partially unexpected; MBTI, Myers-Briggs Type Indicator; N, Intuitive; S, Sensing; P, Perceiving; J, Judging; SDS, Self-Directed Search; SVSDS, Short-version Self-Directed Search; VPI, Vocational Preference Inventory; A, Artistic, I, Investigative, C, Conventional, R, Realistic; Big 5 PTs, Big Five personality traits; NEO-PI, NEO Personality Inventory; NEO-PI-R, NEO Personality Inventory-Revised; $^+$Positively associated with the attribute/outcome variable concerned; and $^-$Negatively associated with the attribute/outcome variable concerned.

The Dark Triad Traits and the Prediction of Eudaimonic Wellbeing

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Although numerous studies have focused on personality traits related to well-being, the relationship between the Dark Triad Traits and eudaimonic well-being is still unclear. The purpose of the present study was to explore how the Dark Triad Traits (i.e., narcissism, Machiavellianism, and psychopathy) affect eudaimonic well-being. Further, this study also aimed to explore the mediation effect of family support and hedonic wellbeing. The results showed that the present model had a good model fit (χ^2/df = 1.91, $p < 0.001$, comparative-fit-index (CFI) = 0.96, tucker-lewis-index (TLI) = 0.95, root mean square error of approximation (RMSEA) = 0.04, standardized root mean square residual (SRMR) = 0.04). There is a significant association between the Dark Triad Traits and eudaimonic wellbeing. Specifically, narcissism directly predicts eudaimonic wellbeing, while the effects of Machiavellianism and psychopathy on eudaimonic wellbeing are serial two-mediator models, which are mediated by family support and hedonic wellbeing. The results would enrich theoretical studies on personality while providing some practical evidence on how to improve the subjective well-being of individuals.

Keywords: Machiavellianism, narcissism, psychopathy, family support, hedonic well-being, eudaimonic wellbeing, the Dark Triad Traits

INTRODUCTION

Numerous studies have paid attention to the association between personality traits and wellbeing (e.g., Henningsgaard and Arnau, 2008; Lavigne et al., 2013; Burton et al., 2015). The relationship between the Dark Triad Traits (i.e., Machiavellianism, psychopathy, and narcissism) and wellbeing has also been well-documented (Volmer et al., 2016; Joshanloo, 2021; Van Groningen et al., 2021). Most of these studies had focused on hedonic wellbeing, a kind of wellbeing, which emphasized the momentary emotional balance (Paleari et al., 2021). It is important to indicate that well-being is a complex construct that refers to both optimal psychological experience and functioning (Ryan and Deci, 2001). Different from hedonic wellbeing, eudaimonic wellbeing reflects the "true self," which focuses on the subjective cognitive-affective experience, such as the experience of meaning and purpose in life (Paleari et al., 2021).

The current study intended to investigate the relationship between the Dark Triad Traits and eudaimonic wellbeing. The study of the issue would extend our understanding of the Dark Triad Traits in two ways: first, investigating the Dark Triad Traits of people in collectivistic culture can extend the understanding of its cultural universality, while the Dark Triad Traits were originated from Western culture, and most previous studies had relied on Western samples. Second, the study would explore the psychological mechanisms between the Dark Triad Traits and eudaimonic wellbeing, which can provide some practical implications in improving the subjective well-being of individuals.

The Dark Triad Traits and Eudaimonic Wellbeing

The Dark Triad Traits include Machiavellianism, psychopathy, and narcissism (Paulhus and Williams, 2002). Machiavellianism is characterized by a tendency to manipulate others in a cold way to achieve their own ends (Jakobwitz and Egan, 2006). Those who score high on the psychopathy scale tend to seek excitement (Rauthmann and Will, 2011), whereas narcissists tend to show dominance and egoism and usually experience a feeling of superiority over others (Lee and Ashton, 2005). In general, most studies have demonstrated that these dark traits are highly associated with negative psychological outcomes, such as disagreeableness, emotional coldness, aggressiveness, and lack of empathy among others (Miao et al., 2018). Additionally, these dark traits also have many negative effects on the behaviors of individuals, resulting in deception, aggression, impulsive behavior, bullying, and cigarette, alcohol, and substance abuse (Jones and Paulhus, 2010).

Eudaimonic wellbeing is one of subjective wellbeing, which consists of meaningful activity, actualizing one's potential, and understanding the meaning of life rather than hedonic experiences (Joshanloo, 2021). Previous research has suggested that interpersonal relationship contributes greatly to meaning in the life of individuals (Zhao et al., 2017). However, characterized by coldness and disagreeableness, Machiavellianism and psychopathy are maladaptive especially in the interpersonal domain (Paulhus and Williams, 2002; Jonason et al., 2015). Accordingly, many studies have found that Machiavellianism and psychopathy predict eudaimonic wellbeing negatively; those who score high on these two dimensions would experience less eudaimonic wellbeing (Bartels and Pizarro, 2011; Egan et al., 2014; Aghababaei and Błachnio, 2015). However, when it comes to narcissism, things become more complicated (Zondag, 2005; Ng et al., 2014; Abeyta et al., 2017). Some studies have shown that narcissism has a negative effect on eudaimonic wellbeing (e.g., Ng et al., 2014); while some other studies have found that narcissism is a positive predictor of eudaimonic wellbeing (e.g., Abeyta et al., 2017). We argued that narcissism, as the "brighter" side of the dark traits, would have a positive association with eudaimonic wellbeing (Zondag, 2005; Aghababaei and Błachnio, 2015). Many studies have indicated that narcissists are good at facilitating the active and passive accruals of a social network (Jonason and Schmitt, 2012). They tend to make a better impression in the initial encounter with others and thus were more popular, and they could also be attractive leaders who have a lot of followers (Furtner et al., 2011; Rauthmann, 2012). Moreover, narcissists think highly of judgments and evaluations of others, especially in the context of Chinese culture, which was characterized by collectivism (Raskin and Terry, 1988; Cai et al., 2012). Therefore, we proposed the first hypothesis:

Hypothesis 1: *Machiavellianism and psychopathy would negatively predict eudaimonic wellbeing, while narcissism would positively predict it.*

The Mediation Effect of Family Support

Researchers have found that social support from significant others contributes greatly to meaning in the life of one (Dunn and O'Brien, 2009; Lee et al., 2017). The results of a longitudinal study also show that early social support significantly predicts a later sense of meaning in life (Krause, 2007). Familialism is considered particularly important in collectivistic cultures, and support from family members can be an extremely important source of social support for people in collectivistic cultures (Chen et al., 2007; Cai et al., 2012). Consistent with the above views, many studies have found that family support can greatly improve the eudaimonic well-being of Chinese people, among both children and adults (Jiang et al., 2016). Therefore, we proposed that social support from the family would be a positive predictor of eudaimonic wellbeing (Zhao and Zhao, 2020).

However, individuals with different personality traits have different perceptions of family support (Nakayama, 2010; Láng and Birkás, 2014). Studies have argued that high emotional intelligence individuals could perceive more social support and have better social relationships (Salovey et al., 2002). In contrast, those who score high on dark personality traits (i.e., Machiavellianism and psychopathy) are emotionally deficit (Jonason and Krause, 2013). Therefore, individuals with high Machiavellianism and high psychopathy are not likely to feel social support from their family members (Láng and Birkás, 2014). Meanwhile, narcissists, who tend to seek outside attention and recognition and have higher emotional intelligence, emphasize the importance of family support and thus perceive more of it (Nakayama, 2010; Jonason and Schmitt, 2012). Based on this understanding, we proposed the second hypothesis:

Hypothesis 2: *The link between the Dark Triad Traits and eudaimonic wellbeing is mediated by family support.*

The Mediation Effect of Hedonic Wellbeing

Hedonic wellbeing and eudaimonic wellbeing are two concepts that are closely related (Fowersa et al., 2010). Different from eudaimonic wellbeing focusing on the meaning in life, hedonic wellbeing refers to the general satisfaction with present life (Joshanloo, 2019). As an important source of meaning, hedonic wellbeing contributes greatly to eudaimonic wellbeing (Howell et al., 2013). Specifically, those with a higher level of hedonic wellbeing usually experience greater eudaimonic well-being; hedonic wellbeing could be a strong predictor of eudaimonic wellbeing (Gao et al., 2014; Zhao and Zhao, 2020). However, Machiavellianism and psychopathy are associated with lower positive moods, and they have a negative effect on hedonic wellbeing (Egan et al., 2014; Kaufman et al., 2019). Meanwhile, narcissism is associated with a more positive mood and can be a positive predictor of hedonic wellbeing (Egan et al., 2014; Van Groningen et al., 2021). Therefore, the third hypothesis was proposed as follows:

Hypothesis 3: *Hedonic well-being would play a mediating role in the relationship between the Dark Triad Traits and eudaimonic well-being.*

The Relationship Between Family Support and Hedonic Well-Being

As an important buffer for stress and other negative life events, social support from family could improve the life quality of individuals and could be a significant source of hedonic wellbeing (Chu et al., 2010). Studies have also shown that perceived family support positively predicts the hedonic well-being of individuals (Heng et al., 2020; Ling et al., 2020).

Combined with the above arguments, we argued that individuals with high Machiavellianism and psychopathy would be less likely to feel support from family, thus experiencing less hedonic wellbeing and less eudaimonic wellbeing. Meanwhile, narcissists seemed to perceive more family support and thereby would have a higher level of hedonic and eudaimonic wellbeing. Therefore, we proposed a chain mediation model as our fourth hypothesis:

Hypothesis 4: *The Dark Triad Traits would indirectly predict the eudaimonic well-being of individuals through the intermediary chain from family support to hedonic wellbeing.*

In addition, many studies have indicated that demographic variables, such as gender, age, marital status, and educational level, could affect the eudaimonic well-being of individuals (Zhao and Xue, 2019; Fu et al., 2021; Lu et al., 2021), thus these demographic variables were tested in the present study.

MATERIALS AND METHODS

Participants

This study was approved by the Ethics Committee of the Department of Psychology of the Central University of Finance and Economics. The survey was carried out through Sojump (a survey company) in China in 2020. Through online advertisements and the WeChat Moments, by convenient sampling, samples of 737 adults were recruited. All participants completed a questionnaire booklet that included (1) the Dark Triad Traits, (2) eudaimonic wellbeing, (3) hedonic wellbeing, and (4) family support. Each question in the questionnaire was compulsory, and the participants could not submit the link without answering all the questions. All subjects participated voluntarily after providing informed consent, and no incentive was provided to them. Thirty-two participants were excluded since their time to fill in the questionnaire was less than 300 s, with a response rate of 95.66%. The samples of 705 adults (278 males, 39.4%; M_{age} = 25.46 years, SD_{age} = 7.98 years) covered Wuhan, Zhejiang, Bejing, He'nan, Fujian provinces. As for their education and civil status, 6.8% of the participants had attained an educational level of senior high school or below, 93.2% had a bachelor's degree or above; 25.2% were married, 74.2% were unmarried, 0.1% were widowed, and the rest 0.5% were divorced or separated.

Measurements
The Dark Triad Traits

The validated Chinese version of the *Dirty Dozen* scale (Jonason and Webster, 2010) was used in the current study

(Geng et al., 2015). The scale consists of three subscales: Machiavellianism (e.g., "I tend to manipulate others to get my way"), psychopathy (e.g., "I tend to not be too concerned with morality or the morality of my actions"), and narcissism (e.g., "I tend to expect special favors from others"). Each subscale consists of four items with a total of 12 items. Participants were asked to rate each item on a 7-point scale from 1 ("definitely does not apply") to 7 ("definitely applies.") Higher total scores for all items indicated greater levels of dark personality traits. Cronbach's alphas for the three dimensions (Machiavellianism, psychopathy, and narcissism) were 0.88, 0.75, and 0.86, respectively. Three latent variables were created for the Dark Triad Traits. The residuals of items 9 and 10 in the narcissistic dimension were correlated. The fit of the measurement model of the Dark Triad Traits was acceptable, χ^2 (50) = 205.33, p < 0.001, comparative-fit-index (CFI) = 0.97, tucker-lewis-index (TLI) = 0.95, Root Mean Square Error of Approximation (RMSEA) = 0.07, standardized root mean square residual (SRMR) = 0.04, with factor loadings ranging from 0.56 to 0.90.

Eudaimonic Well-Being

Participants completed the 10-item Meaning in Life Questionnaire (MLQ), which represented eudaimonic wellbeing in a previous study (Nelson et al., 2014). The item named "My life has no clear purpose" was deleted because of its too low factor loading. Therefore, the final version of the scale consists of nine items. Sample items include "I understand my life's meaning" and "I am always searching for something that makes my life feel significant." The participants were asked to indicate the extent to which they agreed or disagreed with each statement on a 7-point scale (1 = "completely disagree"; 7 = "completely agree"), where higher scores indicate higher levels of eudaimonic wellbeing. The Cronbach's alpha for the current study was 0.91. A latent variable for eudaimonic wellbeing was created. The residuals of items 2, 3, 7, 8, and 10 were correlated. The fit of the measurement model of eudaimonic wellbeing was acceptable, χ^2 (19) = 109.69, p < 0.001, CFI = 0.98, TLI = 0.96, RMSEA = 0.08, SRMR = 0.05, with factor loadings ranging from 0.37 to 0.88.

Hedonic Well-Being

Life satisfaction, as a key component of subjective wellbeing, is usually used to assess hedonic wellbeing (Ryan and Deci, 2001). A validated Chinese version of the Satisfaction with Life Scale (SWLS) comprising five items was used to measure hedonic wellbeing. We asked the participants to indicate the extent to which they agreed or disagreed with the items of this scale (e.g., "I am satisfied with my life.") on a 7-point Likert scale (1 = "completely disagree"; 7 = "completely agree"), where higher scores indicate higher levels of hedonic wellbeing. The Cronbach's alpha for the current study was 0.90. The residuals of items 4 and 5 were correlated. The fit of the measurement model of hedonic wellbeing was acceptable, χ^2 (4) = 16.95, p < 0.01, CFI = 0.99, TLI = 0.99, RMSEA = 0.07, SRMR = 0.01, with factor loadings ranging from 0.69 to 0.90.

Family Support

To assess people's perceived family support, we used 15 items taken from the Perceived Social Support from Friends and

from Family Scales (Procidano and Heller, 1983). The scale was translated from English to Chinese. Considering the differences in the expressions of these two languages, we deleted item 4 (named "When I confide in members of my family, it makes me uncomfortable"), item 11 (named "When I confide in the members of my family who are closest to me, I get the idea that it makes them uncomfortable"), and item 12 (named "My family is sensitive to my personal needs"), which had vague semantic meanings and too low factor loadings. Therefore, the final version of the scale consists of 12 items (e.g., "My family gives me the moral support I need"). As for scoring, "Yes" corresponds to 1, and "No" stands for 0. Items 10, 14, and 15 were reversing items. Higher scores indicate a stronger perception of family support. The Cronbach's alpha for the current study was 0.84. The residuals of items 10, 14, and 15 were correlated. The fit of the measurement model of perceived family support was acceptable, χ^2 (51) = 156.48, $p < 0.001$, CFI = 0.96, TLI = 0.95, RMSEA = 0.05, SRMR = 0.03, with factor loadings ranging from 0.30 to 0.80.

Statistical Analyses

Descriptive statistics for all study variables and correlations of key variables were obtained using SPSS 21.0. Structural equation modeling (SEM) was used to test the hypotheses using Mplus 8.3.

RESULTS

Descriptive Results

Descriptive statistics and correlations for all variables are presented in **Table 1**. The results indicated that there was a significant positive correlation among the three dimensions of the Dark Triad Traits. Moreover, the three dark triad personality traits were negatively associated with family support. Psychopathy was negatively associated with hedonic well-being, while both Machiavellianism and psychopathy were negatively associated with eudaimonic well-being. In addition, family support was also positively correlated with hedonic well-being. Family support and hedonic well-being both were positively correlated with eudaimonic wellbeing.

Analysis of Demographic Variables

Demographic variables (i.e., gender, age, marriage, and education) were tested in the present study. The results suggested

that gender [t (703) = 0.79, p = 0.429] and age [β = 0.06, p = 0.114] had no significant effect on eudaimonic well-being. We handled the marital status as two groups (married/others) and found that there was no significant difference between the two groups on eudaimonic wellbeing, t (703) = 1.57, p = 0.118. However, educational level had a significant effect on eudaimonic wellbeing, F (4, 700) = 3.65, $p < 0.01$. Therefore, only education was controlled for in the SEM.

Structural Model Analysis

A latent structural analysis was used to explore the relationship among the Dark Triad Traits, family support, hedonic wellbeing, and eudaimonic wellbeing. To formally test the indirect effects, 95% CIs were computed from 1,000 bootstrap samples. In general, when CIs exclude zero, we can conclude that mediation is significant. After controlling for education, a good model fit was attained, χ^2 (673) = 1,282.22, χ^2/df = 1.91, $p < 0.001$, CFI = 0.96, TLI = 0.95, RMSEA = 0.04, SRMR = 0.04.

All direct paths in our model are shown in **Figure 1**. Machiavellianism (β = −0.08, SE = 0.13, p = 0.505) and psychopathy (β = −0.13, SE = 0.14, p = 0.356) had no significant direct effect on eudaimonic wellbeing, but the direct effect of narcissism on eudaimonic wellbeing was significant (β = 0.10, SE = 0.04, $p < 0.05$). The results also illustrated that psychopathy negatively predicted family support (β = −0.63, SE = 0.16, $p < 0.001$), Machiavellianism positively predicted it (β = 0.36, SE = 0.15, $p < 0.05$), while narcissism had no significant effect on it (β = −0.07, SE = 0.04, p = 0.070). Machiavellianism (β = 0.20, SE = 0.11, p = 0.069), narcissism (β = −0.06, SE = 0.04, p = 0.115), and psychopathy (β = −0.14, SE = 0.12, p = 0.246) all had no significant effect on hedonic wellbeing. Family support positively predicted hedonic wellbeing (β = 0.33, SE = 0.05, $p < 0.001$) and eudaimonic well-being (β = 0.10, SE = 0.05, $p < 0.05$). Hedonic wellbeing had a significant positive effect on eudaimonic wellbeing (β = 0.56, SE = 0.04, $p < 0.001$). Education had no significant effect on eudaimonic wellbeing (β = −0.01, SE = 0.04, p = 0.808).

To further examine the indirect effects, we conducted bootstrapping analyses based on 1,000 bootstrap resamples. The results showed that the total indirect effect of narcissism on eudaimonic wellbeing was significant, β = −0.05, SE = 0.03, $p < 0.05$, 95% CI = (−0.11, −0.002). However, the indirect effect of narcissism on eudaimonic wellbeing through perceived family support was not significant [β = −0.01, SE = 0.01, p = 0.223, 95%

TABLE 1 | Descriptive statistics and correlations for all study variables (n = 705).

Variable	M (SD)	1	2	3	4	5	6
1. Age	25.46 (7.98)						
2. Machiavellianism	7.17 (4.31)	−0.05					
3. Psychopathy	7.81 (4.36)	−0.05	0.66***				
4. Narcissism	15.13 (5.99)	−0.05	0.36***	0.34***			
5. Family support	8.75 (3.16)	0.16***	−0.16***	−0.29***	−0.14***		
6. Hedonic well-being	20.53 (7.41)	0.12**	0.02	−0.12***	−0.06	0.33***	
7. Eudaimonic well-being	5.05 (1.08)	0.06	−0.13***	−0.20***	0.05	0.29***	0.51***

All the means, variances, and correlations of the variables were estimated using SPSS 21.0.
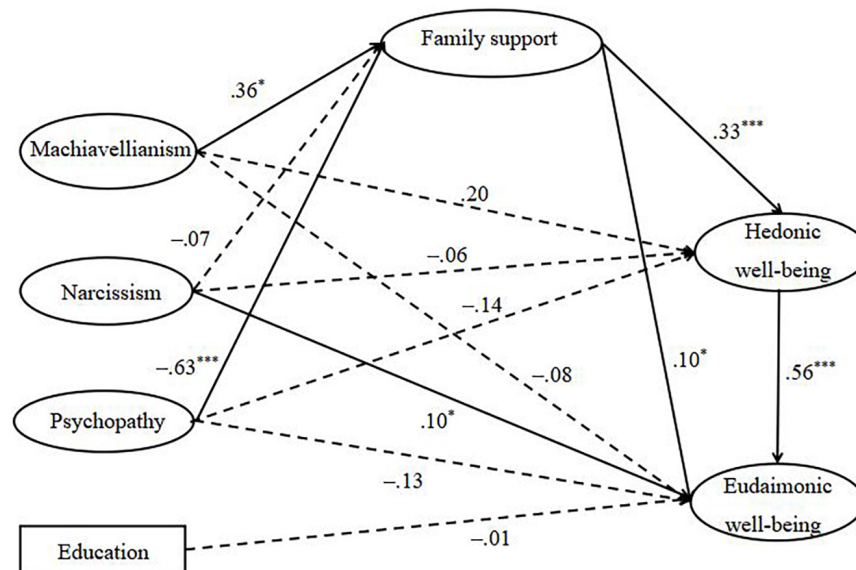*** p < 0.01, *** p < 0.001.*

FIGURE 1 | The role of the DarkP Triad Trait on eudaimonic wellbeing of individuals *via* perceived family support and hedonic well-being. Values presented are standardized coefficients. The dash lines represent non-significant paths. Endogenous error correlations and control variables have not been drawn for parsimony. * $p < 0.05$, *** $p < 0.001$.

$CI = (−0.02, 0.001)$], and neither was it mediated by hedonic wellbeing [$\beta = −0.03$, $SE = 0.02$, $p = 0.114$, 95% $CI = (−0.08, 0.01)$] nor the intermediary chain from perceived family support to hedonic wellbeing [$\beta = −0.01$, $SE = 0.01$, $p = 0.085$, 95% $CI = (−0.03, 0.001)$].

The total indirect effect of Machiavellianism on eudaimonic wellbeing was significant [$\beta = 0.22$, $SE = 0.08$, $p < 0.01$, 95% $CI = (0.09, 0.41)$]. Specifically, the indirect effect of Machiavellianism on eudaimonic wellbeing through the intermediary chain from perceived family support to hedonic wellbeing was significant [$\beta = 0.07$, $SE = 0.03$, $p < 0.05$, 95% $CI = (0.02, 0.14)$], but the indirect effects through perceived family support [$\beta = 0.04$, $SE = 0.03$, $p = 0.134$, 95% $CI = (−0.001, 0.09)$] and through hedonic wellbeing [$\beta = 0.11$, $SE = 0.06$, $p = 0.075$, 95% $CI = (−0.004, 0.25)$] were not significant.

The total indirect effect of psychopathy on eudaimonic wellbeing was significant, $\beta = −0.26$, $SE = 0.09$, $p < 0.01$, 95% $CI = (−0.47, −0.13)$. Specifically, the indirect effect of psychopathy on eudaimonic wellbeing through the intermediary chain from perceived family support to hedonic wellbeing was significant [$\beta = −0.12$, $SE = 0.03$, $p < 0.01$, 95% $CI = (−0.19, −0.06)$], but the indirect effects through perceived family support [$\beta = −0.06$, $SE = 0.04$, $p = 0.078$, 95% $CI = (−0.14, 0.002)$] and through hedonic wellbeing [$\beta = −0.08$, $SE = 0.07$, $p = 0.251$, 95% $CI = (−0.23, 0.05)$] were not significant.

DISCUSSION AND CONCLUSION

The purpose of the current study is to examine the predictive role of the Dark Triad Traits on eudaimonic wellbeing, the relationship of which is mediated by family support

and hedonic wellbeing. Findings demonstrated that narcissism predicted eudaimonic wellbeing directly and positively, while Machiavellianism and psychopathy predicted eudaimonic well-being as mediated by family support and hedonic wellbeing.

In line with most prior research (Zondag, 2005; Rauthmann and Kolar, 2012; Aghababaei and Błachnio, 2015), our findings indicate the "brighter" side of the narcissism trait. That is, narcissists are not only more successful at work and have better social relationships, but they also intend to experience more eudaimonic wellbeing (Rauthmann, 2012; Abeyta et al., 2017). However, the present study did not distinguish different types of narcissism. Rose (2002) has proposed covert and overt narcissism as two subtypes of narcissism. Overt narcissists tend to rely on overt strategies to regulate the self (e.g., self-enhancement and devaluing others), while covert narcissists are more likely to seek social approval to modulate their fragile egos (Ng et al., 2014). Therefore, the experience of subjective wellbeing may vary depending on the types of narcissism (Zondag et al., 2009). Future research should distinguish between the two subtypes and further investigate the role of covert and overt narcissism in predicting the subjective well-being of individuals.

Our results suggest that family support plays an important role in the relationship between the Dark Triad Traits and wellbeing. The findings extend our understanding of the importance of family support to Chinese people. Previous studies have demonstrated that a sense of home or family may be essential in collectivistic cultures (Yang et al., 2020). China is a classical collectivistic country and Chinese people often report higher familial (rather than dyadic connections or the individual) than some individualistic countries (Cai et al., 2012; Chang et al., 2016). In the present study, for those who scored higher in Machiavellianism and psychopathy, family support still played

an indispensable role in subjective wellbeing (both hedonic and eudaimonic wellbeing). The results also enlighten us that family members can provide people with more social support to enhance their subjective well-being.

Interestingly, we have found a positive effect of Machiavellianism, which is contrary to our hypothesis. Many previous studies on the Dark Triad Traits have indicated that Machiavellianism is as "dark" as psychopathy, and it has repeatedly been proven to have a significant adverse impact on physical and mental health (Egan et al., 2014; Aghababaei and Błachnio, 2015; Zhu et al., 2021). However, our results might imply a powerful adaptive function of Machiavellianism in Chinese society. We propose two potential explanations for the inconsistency: first, Machiavellianism originated and developed in the Western value system, and literature on it relied mostly on samples from Western countries (Rogoza et al., 2020); thus, more studies in collectivistic culture are needed to further examine whether cross-cultural differences exist. Second, researchers have found that as societies become more advanced, citizens would become more Machiavellian (Jonason et al., 2020). In the rapidly developing Chinese society, utilitarianism and Machiavellianism have become more popular (Zhao and Liao, 2013). Therefore, with more people becoming Machiavellian, Machiavellians may receive and experience more social support from significant others and thus experience higher subjective well-being. Further research is needed to explore this interesting finding.

However, there are some limitations of the present study. First, this study was based on cross-sectional data, so the causal relationships could not be exactly determined from the current study; therefore, future studies need a longitudinal design to interpret cause and effect and direction of causality. Second, the present study relied on questionnaires from a single source (i.e., self-reports of individuals) to collect data. These self-report measures are vulnerable to response bias (e.g., recall bias and social desirability), and the effects may be overestimated due to shared method variance. It is important to consider the extent to which such self-reports converge with other measures, such as informant reports or observations of actual behavior. Third, the description of the characteristics of Machiavellianism originated from the West, which was very straightforward (e.g., "I tend to manipulate others to get my way"). Nevertheless, Chinese people generally prefer more reserved expressions, thus they may tend to choose smaller points when filling in the scale. According to the results of the present study, with the mean of 7.17 (the total scores of four items), the scores of Machiavellianism were much lower than that of psychopathy and narcissism, thus we might be experiencing the floor effect. Therefore, appropriate caution should be used in interpreting the above findings.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Psychological Ethics Committee of Central University of Finance and Economics. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.693778/full#supplementary-material

REFERENCES

Abeyta, A., Routledge, C., and Sedikides, C. (2017). Material meaning: narcissists gain existential benefits from extrinsic goals. *Soc. Psychol. Personal. Sci.* 8, 219–228. doi: 10.1177/1948550616667618

Aghababaei, N., and Błachnio, A. (2015). Well-being and the Dark Triad. *Personal. Individ. Differ.* 86, 365–368. doi: 10.1016/j.paid.2015.06.043

Bartels, D. M., and Pizarro, D. A. (2011). The mismeasure of morals: antisocial personality traits predict utilitarian responses to moral dilemmas. *Cognition* 121, 154–161. doi: 10.1016/j.cognition.2011.05.010

Burton, C. M., Plaks, J. E., and Peterson, J. B. (2015). Why do conservatives report being happier than liberals? The contribution of neuroticism. *J. Soc. Polit. Psychol.* 3, 89–102. doi: 10.5964/jspp.v3i1.117

Cai, H., Sedikides, C., and Jiang, L. (2012). Familial self as a potent source of affirmation: evidence from China. *Soc. Psychol. Personal. Sci.* 4, 529–537. doi: 10.1177/1948550612469039

Chang, E. C., Yang, H., and Yu, T. (2016). Perceived interpersonal sources of life satisfaction in Chinese and American students: cultural or gender differences? *J. Posit. Psychol.* 12, 414–424. doi: 10.1080/17439760.2016.1198925

Chen, Y. J., Lu, W. Z., and Du, M. (2007). A review of family support for college student. *Mod. Educ. Sci.* 3, 137–140.

Chu, P. S., Saucier, D. A., and Hafner, E. (2010). Meta-analysis of the relationships between social support and well-being in children and adolescents. *J. Soc. Clin. Psychol.* 29, 624–645. doi: 10.1521/jscp.2010.29.6.624

Dunn, M. G., and O'Brien, K. M. (2009). Psychological health and meaning in life: stress, social support, and religious coping in Latina/Latino immigrants. *Hisp. J. Behav. Sci.* 31, 204–227. doi: 10.1177/0739986309334799

Egan, V., Chan, S., and Shorter, G. W. (2014). The Dark Triad, happiness and subjective well-being. *Personal. Individ. Differ.* 67, 17–22. doi: 10.1016/j.paid.2014.01.004

Fowersa, B. J., Mollicab, C. O., and Procaccic, E. N. (2010). Constitutive and instrumental goal orientations and their relations with eudaimonic and

hedonic well-being. *J. Posit. Psychol.* 5, 139–153. doi: 10.1080/1743976100363 0045

Fu, G., Tan, L., and Tang, Z. (2021). Marital status, social support and life satisfaction of community elderly in Nanning city. *Chin. J. Gerontol.* 6, 2641–2644.

Furtner, M. R., Rauthmann, J. F., and Sachse, P. (2011). The self-loving self-leader: an examination of the relationship between self-leadership and the Dark Triad. *Soc. Behav. Personal.* 39, 369–380. doi: 10.2224/sbp.2011.39.3.369

Gao, J., Lv, S., Zhao, Y., Zou, Y., Yin, H., and Li, L. (2014). The relationship between students' special perfectionism, life satisfaction and life of meaning. *China J. Health Psychol.* 22, 1273–1274.

Geng, Y., Sun, Q., Huang, J., Zhu, Y., and Han, X. (2015). Dirty Dozen and short Dark Triad: a Chinese validation of two brief measures of the Dark Triad. *Chin. J. Clin. Psychol.* 23, 246–250. doi: 10.16128/j.cnki.1005-3611.2015.02.013

Heng, M. A., Fulmer, G. W., Blau, I., and Pereira, A. (2020). Youth purpose, meaning in life, social support and life satisfaction among adolescents in Singapore and Israel. *J. Educ. Change* 21, 299–322. doi: 10.1007/s10833-020-09381-4

Henningsgaard, J. M., and Arnau, R. C. (2008). Relationships between religiosity, spirituality, and personality: a multivariate analysis. *Personal. Individ. Differ.* 45, 703–708. doi: 10.1016/j.paid.2008.07.004

Howell, A. J., Passmore, H. A., and Buro, K. (2013). Meaning in nature: meaning in life as a mediator of the relationship between nature connectedness and well-being. *J. Happiness Stud.* 14, 1681–1696. doi: 10.1007/s10902-012-9403-x

Jakobwitz, S., and Egan, V. (2006). The Dark Triad and normal personality traits. *Personal. Individ. Differ.* 40, 331–339. doi: 10.1016/j.paid.2005.07.006

Jiang, H., Ma, H., Yang, L., and Xie, J. (2016). The impact mechanism of family-friendly workplace supports on life satisfaction: from work-home resources perspective. *Stud. Psychol. Behav.* 14, 270–276.

Jonason, P. K., and Krause, L. (2013). The emotional deficits associated with the Dark Triad traits: cognitive empathy, affective empathy, and alexithymia. *Personal. Individ. Differ.* 55, 532–537. doi: 10.1016/j.paid.2013.04.027

Jonason, P. K., and Schmitt, D. P. (2012). What have you done for me lately? Friendship selection in the shadows of Dark Triad Traits. *Evol. Psychol.* 10, 400–421.

Jonason, P. K., and Webster, G. D. (2010). The Dirty Dozen: a concise measure of the Dark Triad. *Psychol. Assess.* 22, 420–432. doi: 10.1037/a0019265

Jonason, P. K., Baughman, H. M., Carter, G. L., and Parker, P. (2015). Dorian Gray without his portrait: psychological, social, and physical health costs associated with the Dark Triad. *Persona. Individ. Differ.* 78, 5–13. doi: 10.1016/j.paid.2015.01.008

Jonason, P. K., Żemojtel-Piotrowska, M., Piotrowski, J., Sedikides, C., Campbell, W. K., Gebauer, J. E., et al. (2020). Country-level correlates of the Dark Triad traits in 49 countries. *J. Personal.* 88, 1252–1267. doi: 10.1111/jopy.12569

Jones, D., and Paulhus, D. (2010). Different provocations trigger aggression in narcissists and psychopaths. *Soc. Psychol. Personal. Sci.* 1, 12–18. doi: 10.1177/1948550609347591

Joshanloo, M. (2019). Lay conceptions of happiness: associations with reported well-being, personality traits, and materialism. *Front. Psychol.* 10:2377. doi: 10.3389/fpsyg.2019.02377

Joshanloo, M. (2021). Conceptions of happiness mediate the relationship between the Dark Triad and well-being. *Front. Psychol.* 12:1711. doi: 10.3389/fpsyg.2021.643351

Kaufman, S. B., Yaden, D. B., Hyde, E., and Tsukayama, E. (2019). The Light vs. Dark Triad of personality: contrasting two very different profiles of human nature. *Front. Psychol.* 10:467. doi: 10.3389/fpsyg.2019.00467

Krause, N. (2007). Longitudinal study of social support and meaning in life. *Psychol. Aging* 22, 456–469. doi: 10.1037/0882-7974.22.3.456

Láng, A., and Birkás, B. (2014). Machiavellianism and perceived family functioning in adolescence. *Personal. Individ. Differ.* 63, 69–74. doi: 10.1016/j.paid.2014.01.065

Lavigne, K. M., Hofman, S., Ring, A. J., Ryder, A. G., and Woodward, T. S. (2013). The personality of meaning in life: associations between dimensions of life meaning and the Big Five. *J. Posit. Psychol.* 8, 34–43. doi: 10.1080/17439760.2012.736527

Lee, K., and Ashton, M. C. (2005). Psychopathy, Machiavellianism, and Narcissism in the five-factor model and the HEXACO model of personality structure. *Personal. Individ. Differ.* 38, 1571–1582. doi: 10.1016/j.paid.2004.09.016

Lee, S. H., Nam, H. S., Kim, H. B., Kim, E. J., Won, S., and Chae, J. (2017). Social support as a mediator of posttraumatic embitterment and perceptions of meaning in life among Danwon survivors of the Sewol Ferry Disaster. *Yonsei Med. J.* 58, 1211–1215. doi: 10.3349/ymj.2017.58.6.1211

Ling, Y., Hu, H., Lu, J., and Cheng, M. (2020). The relationship between family support and life satisfaction in left-behind children: a chain mediating effect of hope and gratitude. *Chin. J. Clin. Psychol.* 28, 1021–1024. doi: 10.16128/j.cnki.1005-3611.2020.05.033

Lu, L., Meng, A., Cheng, F., Shan, J., Zhu, P., and Zhi, X. (2021). Status quo and the influencing factors of life meaning perception in breast cancer patients undergoing chemotherapy. *Mod. Clin. Nurs.* 20, 8–14. doi: 10.3969/j.issn.1671-8283.2021.03.002

Miao, C., Humphrey, R. H., Qian, S., and Pollack, J. M. (2018). The relationship between emotional intelligence and the Dark Triad personality traits: a meta-analytic review. *J. Res. Personal.* 78, 189–197. doi: 10.1016/j.jrp.2018.12.004

Nakayama, R. (2010). Narcissism and contingency of self-worth among Japanese adolescents. *Japanese J. Personal.* 19, 178–180. doi: 10.2132/personality.19.178

Nelson, S. K., Fuller, J. A. K., Choi, I., and Lyubomirsky, S. (2014). Beyond self-protection: self-affirmation benefits hedonic and eudaimonic well-being. *Personal. Soc. Psychol. Bull.* 40, 998–1011. doi: 10.1177/0146167214533389

Ng, H. K., Cheung, R. Y. H., and Tam, K. P. (2014). Unraveling the link between Narcissism and psychological health: new evidence from coping flexibility. *Personal. Individ. Differ.* 70, 7–10. doi: 10.1016/j.paid.2014.06.006

Paleari, F. G., Pivetti, M., Galati, D., and Fincham, F. D. (2021). Hedonic and eudaimonic well-being during the COVID-19 lockdown in Italy: the role of stigma and appraisals. *Br. J. Health Psychol.* 26, 657–678. doi: 10.1111/bjhp.12508

Paulhus, D. L., and Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and Psychopathy. *J. Res. Personal.* 36, 556–563. doi: 10.1016/S0092-6566(02)00505-6

Procidano, M. E., and Heller, K. (1983). Measures of perceived social support from friends and from family: three validation studies. *Am. J. Community Psychol.* 11, 1–24. doi: 10.1007/BF00898416

Raskin, R., and Terry, H. (1988). A principal-components analysis of the Narcissistic personality inventory and further evidence of its construct validity. *J. Personal. Soc. Psychol.* 54, 890–902. doi: 10.1037//0022-3514.54.5.890

Rauthmann, J. F. (2012). The Dark Triad and interpersonal perception: similarities and differences in the social consequences of Narcissism, Machiavellianism, and Psychopathy. *Soc. Psychol. Personal. Sci.* 3, 487–496. doi: 10.1177/1948550611427608

Rauthmann, J. F., and Kolar, G. P. (2012). How "dark" are the dark triad traits? Examining the perceived darkness of Narcissism, Machiavellianism, and Psychopathy. *Personal. Individ. Differ.* 53, 884–889. doi: 10.1016/j.paid.2012.06.020

Rauthmann, J. F., and Will, T. (2011). Proposing a multidimensional Machiavellianism conceptualization. *Soc. Behav. Personal.* 39, 391–404. doi: 10.2224/sbp.2011.39.3.391

Rogoza, R., Żemojtel-Piotrowska, M., Jonason, P. K., Piotrowski, J., Campbell, K. W., Gebauer, J. E., et al. (2020). Structure of Dark Triad Dirty Dozen across eight world regions. *Assessment* 28, 1125–1135. doi: 10.1177/1073191120922611

Rose, P. (2002). The happy and unhappy faces of Narcissism. *Personal. Individ. Differ.* 33, 379–391. doi: 10.1016/S0191-8869(01)00162-3

Ryan, R. M., and Deci, E. L. (2001). On happiness and human potentials: a review of research on hedonic and eudaimonic well-being. *Annu. Rev. Psychol.* 52, 141–166. doi: 10.1146/annurev.psych.52.1.141

Salovey, P., Mayer, J. D., and Caruso, D. (2002). "The positive psychology of emotional intelligence," in *Handbook of Positive Psychology*, eds C. R. Snyder and S. J. Lopez (New York, NY: Oxford University Press), 159–171.

Van Groningen, A. J., Grawitch, M. J., Lavigne, K. N., and Palmer, S. N. (2021). Every cloud has a silver lining: Narcissism's buffering impact on the relationship between the Dark Triad and well-being. *Personal. Individ. Differ.* 171:110549. doi: 10.1016/j.paid.2020.110549

Volmer, J., Koch, I. K., and Göritz, A. S. (2016). The bright and dark sides of leaders' dark triad traits: effects on subordinates' career success and well-being. *Personal. Individ. Differ.* 101, 413–418. doi: 10.1016/j.paid.2016.06.046

Yang, Z., Sedikides, C., Yue, X., and Cai, H. (2020). Sense of home buffers threats to the self. *Asian J. Soc. Psychol.* 23, 313–318. doi: 10.1111/ajsp.12403

Zhao, J., and Liao, J. (2013). The review of Machiavellianism. *East China Econ. Manag.* 27, 145–148. doi: 10.3969/j.issn.1007-5097.2013.04.030

Zhao, N., and Xue, Y. (2019). Study on the status of life meaning and influencing factors of patients with advanced cancer. *Psychologies* 6, 1–3. doi: 10.19738/j.cnki.psy.2019.06.001

Zhao, N., and Zhao, R. (2020). The influence of family support on the construction of life meaning of medical care group under the epidemic situation of new crown pneumonia. *Bull. Beijing Union Univers.* 34, 1–6. doi: 10.16255/j.cnki.ldxbz.2020 03.001

Zhao, N., Ma, M., and Xin, Z. (2017). Mental mechanism and the influencing factors of meaning in life. *Adv. Psychol. Sci.* 25, 1003–1011. doi: 10.3724/SP.J.1042.2017.01003

Zhu, X., Wang, F., and Geng, Y. (2021). Machiavellianism on quality of life: the role of lifestyle, age, gender, social support. *Personal. Individ. Differ.* 173:110609. doi: 10.1016/j.paid.2020.110609

Zondag, H. (2005). Between imposing one's will and protecting oneself: Narcissism and the meaning of life among Dutch pastors. *J. Relig. Health* 44, 413–426. doi: 10.1007/s10943-005-7180-0

Zondag, H. J., Van Halen, C., and Wojtkowiak, J. (2009). Overt and covert Narcissism in Poland and the Netherlands. *Psychol. Rep.* 104, 833–843. doi: 10.2466/PR0.104.3.833-843

Short Forms of the Cross-Cultural (Chinese) Personality Assessment Inventory: Reliability, Validity, and Measurement Invariance Across Gender

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Filling out long questionnaires can be frustrating, unpleasant, and discouraging for respondents to continue. This is why shorter forms of long instruments are preferred, especially when they have comparable reliability and validity. In present study, two short forms of the Cross-cultural (Chinese) Personality Assessment Inventory (CPAI-2) were developed and validated. The items of the short forms were all selected from the 28 personality scales of the CPAI-2 based on the norm sample. Based on some priori criteria, we obtained the appropriate items and constructed the 56-item Chinese Personality Assessment Inventory (CPAI) and the 28-item CPAI. Then, we examined the factor structure of both short forms with Exploratory SEM (ESEM) and replicated the four-factor structure of the original CPAI-2, reflecting the four personality domains of Chinese people, namely, Social Potency, Dependability, Accommodation, and Interpersonal Relatedness. Further analyses with ESEM models demonstrate full measurement invariance across gender for both short forms. The results show that females score lower than males on Social Potency. In addition, these four factors of both short forms have adequate internal consistency, and the correlation patterns of the four factors, the big five personality traits, and several health-related variables are extremely similar across the two short forms, reflecting adequate and comparable criterion validity, convergent validity, and discriminant validity. Overall, the short versions of CPAI-2 are psychometrically acceptable and have practically implications for measuring Chinese personality and cross-cultural research.

Keywords: CPAI, CPAI-2, interpersonal relatedness, social potency, ESEM, measurement invariance

INTRODUCTION

Lengthy, time-consuming questionnaires may evoke impatience or frustration in respondents, leading to temporary measurement errors and increasing the likelihood of careless responses, withdrawal from data collection, and refusal to further participation (Schmidt et al., 2003; Donnellan et al., 2006). Consequently, brief measures within the framework of the big five model have become increasingly available and shorter, including the 60-item NEO five-factor inventory (NEO-FFI, Costa and McCrae, 1992), the 44-item Big Five Inventory (BFI, John et al., 2008), the 30-item BFI-2-S and 15-item BFI-2-XS (Soto and John, 2017a), the 20-item Mini International Personality Item Pool (Donnellan et al., 2006), and even the 10-item short version of BFI (Rammstedt and John, 2007). These widely used measures have demonstrated that the short version is sufficient to provide a valuable assessment of personality constructs (e.g., Dale et al., 2020; Perry et al., 2020; Shchebetenko et al., 2020).

However, the big five model has been challenged in terms of cross-cultural adaptability (Cheung et al., 2011; Li et al., 2019; Wang et al., 2019; Dong et al., 2021). As a theory derived in western society, the big five model may include specific traits that are more valued in western societies than in non-western societies (Church, 2001), or it may not include some traits that are more prominent in non-western societies than in western societies. To avoid these blind spots, Cheung et al. (2011) proposed the combined etic-emic approach that can take into account both cultural-specific (indigenous) and cultural-universal personality traits. Using this approach, several forms are developed, namely, the Chinese Personality Assessment Inventory (CPAI, Cheung et al., 1996), the Cross-Cultural (Chinese) Personality Assessment Inventory (CPAI-2, Cheung et al., 2008), and the Cross-cultural (Chinese) Personality Assessment Inventory for Adolescents (CPAI-A, Cheung et al., 2008).

The CPAI measures can serve as omnibus indigenous personality inventories for the Chinese people and as cross-culturally valid instruments for people from non-Chinese societies (Cheung et al., 2003; Wada et al., 2004; Born and Jooren, 2009; Iliescu and Ion, 2009; Dang et al., 2010; Cheung et al., 2013). However, there are too few short forms of CPAI measures compared to the prosperity of the brief measures of the big five model, and even only one short form of the CPAI-A has been developed recently (Dong et al., 2021). In the present study, we developed two short forms for the CPAI-2.

To develop the CPAI, researchers explored multiple sources of folk personality descriptions, including contemporary Chinese novels, Chinese proverbs, and psychological research literature. They collected descriptions about oneself from an informal street survey and descriptions about others from surveys of various professionals (Cheung et al., 1996). At the same time, the researchers drew on the existing Western personality measurement literature. The CPAI personality profile were generated from those descriptions with an integrated and balanced treatment of universal and culture-specific aspects, including 22 normal personality scales, 12 clinical scales, and

3 validity scales with a total of 510 items. To date, the CPAI has been developed and repeatedly revised over 20 years, resulting in two versions: an adolescent version (CPAI-A) and an adult version (CPAI-2). The adult version, CPAI-2, consists of 28 normal personality scales, 12 clinical scales, and 3 validity scales with a total of 541 items. The present study focuses on the normal personality scales (Form B).

Explanatory factor analyses reveal that the 28 personality scales of the CPAI-2 reflect four deeper latent domains, namely, Social Potency, Dependability, Accommodation, and Interpersonal Relatedness (IR; Cheung et al., 2008), which are identical to the structure of the original CPAI personality scales. Of particular note is that the IR factor contains more indigenous elements in Chinese culture, such as paying attention to reciprocity in the relationship, avoiding face-to-face conflict, maintaining superficial harmony, and saving face for everyone, which highlights the attitudes, beliefs, and behavioral patterns of how Chinese people "behave" in instrumental interpersonal relationships. In a joint factor analysis of the CPAI and the NEO PI-R, IR did not load on any of the NEO PI-R factors (Cheung et al., 2001). In another joint analysis of the CPAI-2 and the NEO-FFI, IR was again distinct (Cheung et al., 2008). That is to say, IR is juxtaposed with the five personality traits defined in the big five model, resulting in a "big six" personality structure. At the same time, Social Potency, Dependability, and Accommodation were intertwined with the big five personality traits in these joint factor analyses, showing more cultural-universal characteristics.

The four-factor structure of the CPAI and CPAI-2 has been replicated in several English-speaking groups, including Singapore Chinese adults and Caucasian American college students (Cheung et al., 2003), Chinese Americans and European Americans (Lin and Church, 2004), and a mixed Singapore sample including Chinese, Malays, and Indians (Cheung et al., 2006). Similarly, the big six personality structure has been found in English-speaking groups, including Hawaiian Students and Chinese Singaporeans through joint factor analysis (Cheung et al., 2001, 2003). These findings suggest that the IR factor may also be present in the personality structure of Westerners. To date, CPAI-2 has been translated into five languages other than English, including Japanese (Wada et al., 2004), Korean (see Cheung et al., 2013), Vietnamese (Dang et al., 2010), Dutch (Born and Jooren, 2009), and Romanian (Iliescu and Ion, 2009). Factor analysis of these translations showed that IR can still be established independently. These findings prompted researchers to consider the cross-cultural validity of the CPAI-2 and to rename it the Cross-cultural (Chinese) Personality Assessment Inventory.

In addition to the structural cross-cultural comparisons, comparisons of group means revealed significant differences across cultures and genders (Cheung et al., 2004; Lin and Church, 2004). One study reported cultural mean differences on the CPAI-2, with less acculturated Asian Americans scoring higher on the IR compared to more acculturated Asian American and European American participants (Lin and Church, 2004). Another study reported gender differences, with males scoring higher on most scales of the Social Potency factor and some

scales of the Dependability factor and females scoring higher on some scales of the Dependability factor, Accommodation factor, and Interpersonal Relatedness factor (Cheung et al., 2004). We can improve the comparison of group means on the CPAI measures by addressing the following two issues. Firstly, Domain-level gender differences of CPAI-2 remained unrevealed. Secondly, all these mean score comparisons were conducted without establishing measurement invariance (MI) across groups, which results in mean differences that cannot be directly explained (Cheung and Rensvold, 2002).

For more than two decades, a series of studies have been conducted with the CPAI-2, highlighting its value in predicting important aspects of people's lives, including adolescent life satisfaction (Ho et al., 2008; Xie et al., 2016), adolescent loneliness (Li et al., 2019), career exploration of university students (Fan et al., 2012), personal decision-making style (Gan et al., 2019), urban entrepreneurial dynamism (Obschonka et al., 2019), and so on. In these studies, indigenous personality traits, such as IR, demonstrated additional predictive power. More empirical studies are needed to examine the role of CPAI-2 in understanding and predicting human behavior cross cultures.

The 28 personality scales of CPAI-2 have a total of 298 items that takes about half an hour to finish, a time long enough to provoke impatience and eliminate the capacity of other variables, limiting the application of the CPAI-2. Thus, the present study aimed to develop two short forms for the CPAI-2: the 56-item CPAI and the 28-item CPAI. The former took two items from each of the 28 personality scales, with the aim of reducing the number of items and retaining a certain degree of hierarchical measurement suitable for both domain-level measurement and scale-level measurement. The latter removes one of the two items and saves more time, though it suffers from the loss of hierarchical measurement. That is, the former retains a certain degree of hierarchical measurement, while the latter is more time efficient and suitable for studies where time of assessment and respondent fatigue are the core questions. **Table 1** demonstrates the item numbers of each scale for the original CPAI-2, the 56-item CPAI and the 28-item CPAI.

When developing the 56-item CPAI and the 28-item CPAI, we tried to make both short forms retain the same hierarchical structure as the original CPAI-2 and maintain adequate reliability and validity. As for the structure, we wanted the short forms to reflect the four distinct domains, each with the same content bandwidth as the CPAI-2. The way we selected items ensured that the short forms would completely cover the content of the CPAI-2 and retain the original structure at the scale-level. To obtain adequate reliability and validity, we used a combination of empirical and rational criteria. Empirically, authors familiar with the CPAI-2 were responsible for item selection based on their conceptual judgment regarding the extent to which the content of the selected items represented the overall meaning of their underlying traits. Rationally, we tended to select or retain items with higher factor loadings, less cross-loading problems and items that contribute to higher alpha coefficients for domains. More importantly, we wanted to demonstrate that the short forms did perform well in terms of these psychometric qualities. In general, we had three goals in present study.

TABLE 1 | Item numbers of each of the 28 personality scales for the original CPAI-2, the 56-item CPAI and the 28-item CPAI, respectively.

Domains	Scales	Item Numbers		
		CPAI-2	56-CPAI	28-CPAI
SP	Novelty	10	2	1
	Diversity	10	2	1
	Divergent Thinking	10	2	1
	Leadership	10	2	1
	Logical vs. Affective Orientation	10	2	1
	Aesthetics	10	2	1
	Extraversion vs. Introversion	10	2	1
	Enterprise	10	2	1
De	Responsibility	10	2	1
	Emotionality	10	2	1
	Inferiority vs. Self-Acceptance	18	2	1
	Practical Mindedness	12	2	1
	Optimism vs. Pessimism	10	2	1
	Meticulousness	10	2	1
	Face	11	2	1
	Internal vs. External Locus of Control	10	2	1
	Family Orientation	10	2	1
Ac	Defensiveness (Ah-Q Mentality)	10	2	1
	Graciousness vs. Meanness	10	2	1
	Interpersonal Tolerance	10	2	1
	Self vs. Social Orientation	10	2	1
	Veraciousness vs. Slickness	10	2	1
IR	Traditionalism vs. Modernity	15	2	1
	Ren Qing (Relationship Orientation)	12	2	1
	Social Sensitivity	10	2	1
	Discipline	10	2	1
	Harmony	12	2	1
	Thrift vs. Extravagance	8	2	1
Total number of items		298	56	28

SP, Social Potency; De, Dependability; Ac, Accommodation; IR, Interpersonal Relatedness.

Firstly, as mentioned above, we selected items from the 28 personalities scales of the CPAI-2 for the two short forms based on some priori criteria. Secondly, we investigated the four-factor structure of the short forms and tested their measurement invariance across gender. Finally, we tested the criterion validity of the short forms by examining the relationship between the factors of the short forms and several important variables. **Figure 1** demonstrated the workflow of this study.

MATERIALS AND METHODS

Participants

The study analyzed data from 2 samples: one for item selection and construct validity and one for criterion validity. A

paper-pencil measurement was administered to 11,492 Chinese residents for item selection and construct validity. Of those, 355 submitted incomplete questionnaires. Thus, 11,137 Chinese residents (50.0% female, 49.1% male, 0.9% not reporting gender) provided complete data that were included for statistical analyses. Their median age was 40, and 96% were between 18 and 72 years old. They came from 7 provinces, including Fujian (10.4%), Henan (25.7%), Liaoning (10.4%), Qinghai (4.3%), Sichuan (20.8%), Shandong (18.8%), and Zhejiang (9.7%). To examine the criterion validity of the short forms, data collection was conducted online. 330 participants (69.4% female, 30.6% male) completed the questionnaire. Their age ranges from 18 and 59 years ($M = 26.11$, $SD = 7.22$). Of these, 61.2% were students, and 87.2% had an undergraduate or graduate degree. Note that there was no intersection between the two samples.

Measures

Questionnaire instruments include the CPAI-2, the Ten Item Personality Inventory (TIPI, Gosling et al., 2003), the Patient Health Questionnaire (PHQ-9, Kroenke and Spitzer, 2002), the Generalized Anxiety Disorder Screener (GAD-2, Kroenke et al., 2007), the General Health Questionnaire (GHQ-12, Goldberg and Williams, 1988), and the Subjective Well-Being Scale (Andrews and Withey, 1976).

CPAI-2

We used the traditional Chinese version of the CPAI-2 in this study. The original CPAI-2 uses a true-false rating scale, while the two short versions use a 5-point Likert scale. That is, respondents were asked to rate each statement depicting personal characteristics or typical behaviors describing their personality, from 1 (least) to 5 (most).

TIPI-10

The TIPI-10 is a self-rated questionnaire containing 10 items, each on a 7-point Likert scale (1 = disagree strongly, 7 = agree strongly). A study showed that TIPI-10 can used as a reliable and effective instrument to measure the Big Five Personality in a Chinese sample (Li, 2013).

Patient Health Questionnaire

The PHQ-9 was used to assess the severity of depressive symptoms over a two-week period. The scale includes nine items on a 4-point Likert scale (1 = not at all, 4 = nearly every day). The higher the total score, the more severe the depressive symptoms. A previous study indicated that PHQ-9 has good psychometric qualities in Chinese samples (Wang et al., 2014). Cronbach's α for the PHQ-9 in this study was 0.906.

Generalized Anxiety Disorder Screener

The GAD-2 consists of two core criteria for generalized anxiety disorder. The scale uses a 4-point Likert scale ranging from 1 (not at all) to 4 (nearly every day). The higher the total score, the more severe the generalized anxiety disorder. Cronbach's α in this study was 0.840.

General Health Questionnaire

The GHQ comprises 12 items with a 4-point response scale ranging from "rarely" to "almost always." The total score was used to indicate the severity of mental health problem. The higher the total score, the more serious the mental health problem. Cronbach's α was 0.898 for the GHQ in the present study. In addition, the GHQ consists of three sub-dimensions: social dysfunction, anxiety, and loss of confidence (Graetz,

FIGURE 1 | Workflow of this study.
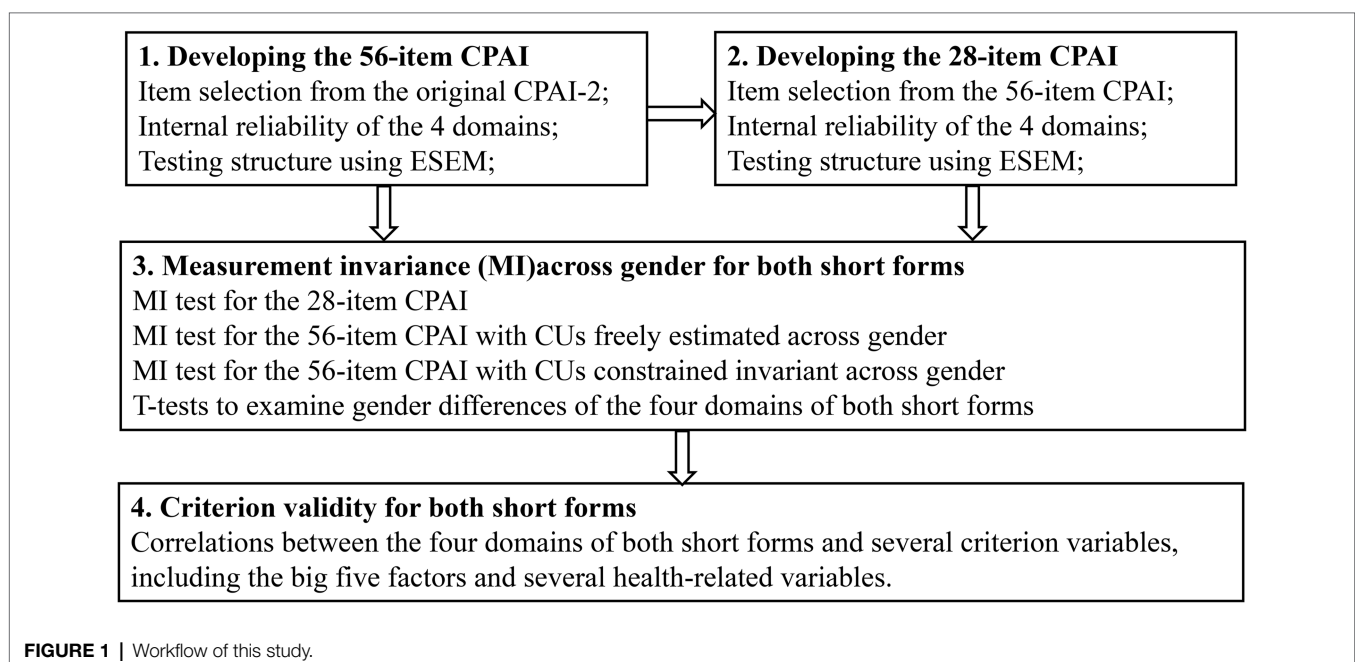
1991). Cronbach's α was 0.878, 0.786, and 0.856 for the three sub-dimensions, respectively.

Subjective Well-Being Scale

The scale has only one question and comprises seven faces, ranging from 1 (very happy) to 7 (very sad). Specifically, participants should determine which face is closest to their overall life experience and select the appropriate option. The happier the picture the participant chose, the higher their overall level of subjective well-being.

Data Analysis

The analyses were performed with Mplus 8.4 (Muthén and Muthén, 1998–2017) and SPSS20.0 software. Mplus 8.4 was used to test the structure and measurement invariance of the short forms, while SPSS20.0 was used to calculate the alpha coefficients, conduct t tests, and test criterion validity.

We mainly used Exploratory SEM (ESEM) rather than CFA to explore factor structure, correlations among factors and measurement invariance across gender for the two short forms. The CFA models require that cross-loadings of items be set to zero, a limitation that may lead to two problems (Asparouhov and Muthen, 2009; Marsh et al., 2014). Firstly, it is almost impossible for item-level CFAs to get an acceptable fit (e.g., CFI, TLI > 0.9; RMSEA < 0.05) for instruments that are well established in EFA research. Secondly, the factor correlations in CFA are likely to be positively biased, sometimes substantially so. Marsh et al. (2014) regarded ESEM as an overarching integration of the best aspects of CFA and EFA, since ESEM can perform almost all the functions of CFA and is immune to both problems. Previous studies on the BFI and other FFA measures have demonstrated that, compared with CFA models, ESEM models have a better fit, smaller factor correlations, and almost identical factor loadings (Marsh et al., 2010; Chiorri et al., 2016).

The analysis of ESEM used a robust maximum likelihood estimator with standard errors and fit tests that were robust concerning the non-normality of the observations (Muthén and Muthén, 1998–2017). As done by Marsh et al. (2010), we used an oblique GEOMIN rotation (the default in Mplus) in ESEM. Related material is available at the Open Science Framework https://mfr.osf.io/render?url=https%3A%2F%2Fosf.io%2Fg359z%2Fdownload.

Correlated Uniquenesses

Following Chiorri et al. (2016), we included ESEM models with and without *a priori* correlated uniquenesses (CUs; covariances between specific variance components associated with two different items of the same CPAI scale).

The model fit can be improved by freeing the correlations among error covariances (CUs) of some items, a strategy that is legitimate only in limited case that these items have further common variance beyond that explained by the specified latent factors (Marsh et al., 2010). The common variance beyond those caused by a common factor may result from a common method (e.g., Marsh et al., 1992), similar item wording (e.g., Chiorri et al., 2016) or "specific" factors that are independent

of the "general" factor (e.g., Marsh et al., 2010, 2013; Chiorri et al., 2016). Marsh et al. (2010) posited that items from the same facet of a specific Big Five factor have higher correlations than items from different facets of the same Big Five factor. They claimed that inflated correlations could be divided into those could be explained in terms of the common Big Five factor and those could track back to the same facet and suggested modeling the correlations due to facets as CUs by freeing the correlations among error covariances of each pair of items from the same facet, an approach that always leads to a considerable increase in model fit (Marsh et al., 2013; Chiorri et al., 2016).

The four deep domains of the CPAI-2 consist of 28 personality scales, of which 8 scales are Social Potency, 9 scales are Dependability, five scales are Accommodation, and six scales are Interpersonal Relatedness (see **Table 1**). We selected the same number of items from each scale to construct the short forms of the CPAI in an attempt to maintain the hierarchical structure of the original CPAI and to avoid the "bandwidth-fidelity dilemma" (Cronbach and Gleser, 1957). Thus, there are 28 pairs of items in the 56 item CPAI, and each pair comes from the same scale, in which case *a priori* set of 28 CUs should be included in the four-factor model of the 56-item short form to cope with correlation inflation due to shared scales. We also set another CU to attain an adequate model fit, a CU due to a wording effect rather than from the same scale. That is, we specified *a priori* set of 29 CUs in total.

Measurement Invariance Models

Marsh et al. (2014) recommended a 13-model taxonomy of invariance tests that can be conducted within an ESEM framework. According to the 13 models, we applied increasingly stringent equality constraints on the measurement parameters between male and female participants.

Four particularly noteworthy levels of invariance, from least to most strict, were configural, weak, strong, and strict invariance (Meredith, 1993). Configural invariance specifies the same number of factors with same items across groups and does not require any estimated parameters to be the same. It serves as a baseline for comparing other models that impose equality constraints on the parameters across groups. The ability of the configural invariance model to fit the data must be tested. The weak invariance model requires that factor loadings to be invariant across groups. Strong invariance model constrains both factor loading and intercepts (indicator means) to be equal across groups. If the strong invariance model is supported, the changes in the latent factor means can be reasonably interpreted as changes in the latent constructs. However, strong invariance is a necessary, but not sufficient, condition for testing manifest group mean differences. The differences in item reliability across groups will distort the observed mean differences in scores. The strict invariance model is sufficient because it adds a constraint of invariant residual variances (item uniquenesses) to strong invariance, indicating that item reliability is invariant.

The taxonomy of 13 models also includes invariance of the latent means and of the factor variance-covariance matrix. The former assumes at least strong invariance and sets the factor

means to zero in both groups, while the latter assumes at least weak invariance and adds constraints on invariant factor variances and covariances.

Goodness of Fit

Marsh et al. (2010) recommend the following fit indices independent of sample size: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the significance of parameter estimates. We also reported the robust chi-square test statistic, a fit index very sensitive to sample size. For the RMSEA, values less than 0.08 and 0.05 are considered as acceptable and optimal fits, respectively. For the CFI and TLI, values greater than 0.90 and 0.95 are considered as acceptable fits and optimal fits, respectively (Marsh et al., 2004).

We used the change in CFI (ΔCFI) and the change in RMSEA (ΔRMSEA) to compare the relative fit of two nested invariance models. ΔCFI less than 0.01 or/and ΔRMSEA less than 0.015 supports a more parsimonious model and provides evidence of invariance at the given level (Cheung and Rensvold, 2002; Chen, 2007). In addition, if TLI or RMSEA is as good as or better than the more complex model, the more parsimonious model is supported, which is a relatively conservative guideline (Marsh, 2007).

RESULTS

Developing the 56-Item CPAI

We created a 56-item CPAI by selecting two items from each of the 28 personality scales of CPAI-2. The item selection process has two stages. The first stage applied empirical criteria, while the second stage applied rational criteria. In the first stage, two authors independently selected two items from each of the 28 personality scales based on their own conceptual judgments regarding the extent to which the content of the items represents their underlying traits. If they selected different items from the same scale and could not come to an agreement, then all selected items were retained for screening at the next stage. In this stage, we got 68 items with 9 scales having more than 2 items because of disagreement, including Internal vs. External Locus of Control (I_E, 4 items), Responsibility (Res, 3 items), Self vs. Social Orientation (S_S, 3 items), Traditionalism vs. Modernity (T_M, 3 items), Ren Qing (Ren, 4 items), Social Sensitivity (Soc, 3 items), Discipline (Dis, 3 items), Harmony (Har, 4 items), and Thrift vs. Extravagance (T_E, 3 items).

In the second stage, we collected data of the 68 items on 5-point Likert scale and used domain-level alpha coefficient as criteria to reduce items. For Social Potency, items reduction was not necessary because none of the 8 scales had more than 2 items. For Dependability, 2 of the 9 scales had more than 2 items, that is, I_E and Res had 4 and 3 items, respectively. Then, there were 6 possible solutions for selecting two items from I_E and 3 from Res. We combined each of the 4 items selected from I_E and Res with items from other scales of Dependability and got 18 possible combinations (6*3) in total. The alpha coefficients of these combinations were from 0.821

to 0.831, with an average of 0.826. Finally, we chose the combination with the highest alpha coefficient as the final version of Dependability for the 56-item CPAI.

Using the same procedure, we got the final version of Accommodation and Interpersonal Relatedness. The alpha coefficients of the 3 combinations of Accommodation were from 0.676 to 0.768, with an average of 0.712. As for Interpersonal Relatedness, there were 1,458 combinations (3*4*3*3*3). The alpha coefficients for these combinations were from 0.644 to 0.724, with an average of 0.681. It is worth noting that the two authors later thought that an item in harmony scale was inappropriate in content, so only three items were left to select from. The combinations of items and their alpha coefficients are available on the Open Science Framework at https://mfr. osf.io/render?url=https%3A%2F%2Fosf. io%2F2pev3%2Fdownload.

Thus, we got the highest alpha coefficients of each domain and the final version of the 56-item CPAI. The alpha coefficients are 0.822 for Social Potency, 0.831 for Dependability, 0.768 for Accommodation, and 0.724 for Interpersonal Relatedness, with an average of 0.786. The item-total correlations of each item with the domain to which it belongs range from 0.271 to 0.649, with only one below 0.40 and an average of 0.522.

We also conducted Velicer's minimum average partial correlation procedure to determine the number of components of the 56 items. When the fourth component was extracted, the average squared partial correlation reached a minimum value of 0.0031, a result that supports a four-factor solution (Velicer, 1976).

Then, we conducted ESEM to test the four-factor model of the 56-item CPAI. These analyses included models with and without CUs. As shown in **Table 2**, only the ESEM model with CUs provides an adequate fit. **Table 3** demonstrates the standardized factor loadings, item-total correlations, and factor correlations. Factor loadings tend to be modest. Target loadings of the ESEM model range from 0.15 to 0.615, with six loadings below 0.30 and a median of 0.408. Cross-loadings in the ESEM model range from −0.323 to 0.366. Almost 80 percent of them (134 out of 168) are statistically different from zero. Five cross-loadings are higher than 0.30, and five items have cross-loading higher than the target loading. R-squares of items range from

TABLE 2 | Summary of Goodness of Fit Statistics for ESEM Models.

Model	χ^2	df	RMSEA (90%CI)	TLI	CFI
56-item CPAI	17101.38	1,322	0.033 (0.032; 0.033)	0.854	0.829
56 with CUs	9721.41	1,293	0.024 (0.024; 0.025)	0.907	0.922
28-item CPAI	2439.82	272	0.027 (0.026; 0.028)	0.921	0.943

N = 11,137; CFI, Comparative fit index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; CI, Confidence Interval; CUs, a priori correlated uniquenesses based on the scale design of the CPAI-2; 56 with CUs, 56-item CPAI with CUs; all χ^2 values are significant at p < 0.01.

TABLE 3 | Means, Item-Total correlations, Standardized Factor Loadings, R-squares, and Factor Correlations of the ESEM models with CUs.

items	Means	Item-Total	ESEM				
			SP	De	Ac	IR	R-square
413	3.669	0.468	**0.382**	−0.117	−0.021	0.183	0.218
159	2.881	0.442	**0.325**	0.161	−0.013	−0.096	0.134
82	3.357	0.611	**0.568**	−0.019	−0.034	−0.003	0.325
308	3.266	0.530	**0.487**	−0.081	−0.168	0.003	0.265
431	3.372	0.593	**0.565**	−0.146	−0.165	−0.013	0.354
243	3.579	0.506	**0.441**	0.112	0.162	0.089	0.234
325	2.996	0.586	**0.535**	0.007	−0.106	−0.110	0.299
373	3.216	0.616	**0.579**	−0.092	−0.119	−0.043	0.351
53	3.548	0.587	**0.544**	0.032	0.055	0.106	0.324
246	3.658	0.540	**0.488**	−0.044	0.048	0.211	0.322
196	2.880	0.474	**0.346**	0.087	−0.020	−0.022	0.125
315	3.379	0.536	**0.480**	0.096	0.083	0.059	0.246
55	2.692	0.471	**0.498**	0.261	0.025	−0.323	0.383
524	3.468	0.498	**0.421**	0.006	0.016	0.191	0.235
184	3.213	0.477	**0.410**	−0.058	−0.114	−0.001	0.181
135	3.614	0.476	**0.393**	−0.008	0.009	0.290	0.270
539	2.906	0.527	−0.129	**0.479**	−0.055	0.135	0.271
434	2.780	0.556	−0.125	**0.475**	−0.085	0.054	0.279
521	2.706	0.539	−0.003	**0.380**	−0.258	−0.037	0.296
28	3.075	0.448	0.051	**0.390**	0.049	0.051	0.139
17	3.243	0.428	−0.062	**0.368**	−0.084	0.229	0.195
216	3.351	0.271	0.185	**0.150**	−0.108	0.147	0.097
353	2.646	0.406	−0.031	**0.182**	−0.281	−0.034	0.160
170	2.782	0.549	0.013	**0.483**	−0.063	−0.057	0.272
331	2.537	0.547	0.037	**0.414**	−0.148	−0.105	0.267
351	2.978	0.524	−0.088	**0.486**	0.049	0.110	0.229
375	2.562	0.593	0.044	**0.615**	0.073	−0.105	0.372
183	2.966	0.471	−0.092	**0.397**	−0.075	0.123	0.196
5	2.784	0.516	0.081	**0.399**	−0.095	−0.050	0.210
117	2.637	0.578	0.098	**0.468**	−0.096	−0.143	0.307
269	2.090	0.508	0.005	**0.288**	−0.302	−0.202	0.315
11	2.555	0.577	0.004	**0.512**	−0.031	−0.130	0.310
388	2.853	0.589	−0.047	**0.588**	0.021	0.064	0.335
147	3.187	0.506	−0.029	**0.524**	0.047	0.185	0.270
274	3.234	0.549	0.029	−0.193	**0.406**	−0.084	0.258
419	3.212	0.565	0.013	−0.142	**0.388**	−0.040	0.210
34	3.638	0.538	−0.004	−0.278	**0.245**	0.102	0.216
371	3.533	0.640	0.007	−0.128	**0.554**	0.027	0.386
327	3.701	0.569	−0.075	−0.311	**0.234**	0.276	0.324
380	2.843	0.490	−0.119	−0.106	**0.321**	−0.141	0.162
217	3.029	0.492	0.021	−0.082	**0.418**	−0.233	0.230
321	3.255	0.564	0.057	−0.250	**0.345**	−0.045	0.248
489	3.746	0.649	−0.055	−0.303	**0.348**	0.219	0.381
144	3.512	0.634	0.042	−0.285	**0.339**	0.094	0.300
484	3.582	0.456	0.075	0.027	−0.136	**0.304**	0.112
99	4.079	0.546	0.171	−0.101	0.028	**0.450**	0.281
370	4.052	0.534	0.155	0.009	0.015	**0.439**	0.235
129	3.687	0.507	0.008	−0.071	−0.232	**0.374**	0.169
278	3.800	0.497	0.284	−0.069	0.033	**0.368**	0.262
286	3.744	0.454	0.174	0.141	0.113	**0.353**	0.187
236	3.538	0.484	0.096	−0.084	−0.199	**0.372**	0.178
364	3.422	0.493	−0.074	0.037	−0.227	**0.463**	0.237
215	3.538	0.466	0.366	0.053	0.024	**0.291**	0.244
445	3.523	0.502	0.016	−0.024	−0.205	**0.340**	0.138
394	3.452	0.526	0.004	−0.038	−0.298	**0.384**	0.201
158	4.042	0.549	0.170	0.057	0.138	**0.526**	0.357
Factor correlation							
	SP		1.0				
	De		−0.045*	1.0			
	Ac		−0.001	−0.396**	1.0		
	IR		0.128**	−0.127**	0.140**	1.0	

N = 11,137; Item-Total, Item-Total correlation SP, Social Potency; De, Dependability; Ac, Accommodation; IR, Interpersonal Relatedness; All item-total correlations are significant at p < 0.01. The number of each item in this table is its original numbers in CPAI-2. *p < 0.05; **p < 0.01.

0.097 to 0.386, with six below 0.160 and a median of 0.253. Factor correlations range from −0.396 to 0.140, with a median of −0.028.

Developing the 28-Item CPAI

We created a 28-item CPAI by dropping one of the two items selected from each of the 28 personality scales. The two criteria for deleting items were both based on the ESEM solution of the 56-item CPAI. That is, items with low factor loading or worse cross-loading problems would be dropped. Worse cross-loading problems included more cross-loadings on one item and the absolute values of cross-loading higher than or closer to that of the target loading. Thus, we got the 28-item CPAI.

For this even shorter version of CPAI-2, the alpha coefficients are 0.710 for Social Potency, 0.760 for Dependability, 0.609 for Accommodation, and 0.590 for Interpersonal Relatedness, with an average of 0.667. The item-total correlations of each item with the domain to which it belongs are from 0.509 to 0.671, with an average of 0.584 (See **Table 4**). The ratio of the mean alpha reliability is 0.849 for the 28-item CPAI compared

to the 56-item CPAI. In addition, we regarded the 28-item CPAI as a part of the 56-item CPAI and computed the part-whole correlations for each domain. The part-whole correlations are 0.939 for Social Potency, 0.940 for Dependability, 0.919 for Accommodation, and 0.900 for Interpersonal Relatedness, with an average of 0.925. The mean of the squared part-whole correlations is 0.855. These results suggest that the 28-item CPAI is about 15% less reliable than the 56-item CPAI.

As shown in **Table 2**, the fit of the ESEM model is acceptable. **Table 4** demonstrates the standardized factor loadings, item-total correlations, and factor correlations of the ESEM model. Factor loadings are modest. Specifically, the target loadings of the ESEM model range from 0.266 to 0.660, with only one loading less than 0.30 and a median of 0.446. The cross-loadings in the ESEM model range from −0.334 to 0.289. More than 80% of them (70 out of 84) are statistically different from zero. Only one cross-loading is higher than 0.30, and none of the items has a cross-loading higher than the target loading. Factor correlations range from −0.413 to 0.174 with a median of −0.051.

TABLE 4 | Means, Item-Total correlations, Standardized Factor Loadings, R-squares, and Factor Correlations of the ESEM model of the 28-item CPAI.

items	Means	Item-Total	ESEM				
			SP	De	Ac	IR	R-square
82	3.357	0.624	**0.539**	0.010	−0.003	0.024	0.293
308	3.266	0.583	**0.510**	−0.022	−0.100	0.003	0.272
431	3.372	0.642	**0.631**	−0.065	−0.070	−0.036	0.407
373	3.216	0.635	**0.610**	−0.020	−0.033	−0.032	0.372
196	2.880	0.509	**0.322**	0.140	0.034	0.039	0.115
315	3.379	0.557	**0.417**	0.103	0.084	0.111	0.198
524	3.468	0.538	**0.398**	0.051	0.055	0.222	0.228
184	3.213	0.526	**0.436**	−0.009	−0.051	0.016	0.195
434	2.780	0.588	−0.116	**0.447**	−0.135	0.060	0.281
521	2.706	0.560	0.009	**0.344**	−0.293	−0.031	0.295
170	2.782	0.595	0.020	**0.482**	−0.069	−0.051	0.276
331	2.537	0.588	0.056	**0.454**	−0.104	−0.081	0.276
351	2.978	0.556	−0.076	**0.493**	0.039	0.130	0.235
375	2.562	0.651	0.046	**0.660**	0.099	−0.063	0.404
183	2.966	0.511	−0.091	**0.396**	−0.069	0.138	0.193
117	2.637	0.591	0.076	**0.463**	−0.091	−0.086	0.279
388	2.853	0.622	−0.058	**0.580**	0.012	0.099	0.329
419	3.212	0.588	−0.018	−0.153	**0.365**	−0.034	0.197
34	3.638	0.560	−0.020	−0.264	**0.266**	0.102	0.227
371	3.533	0.671	−0.031	−0.101	**0.573**	0.050	0.400
217	3.029	0.570	0.002	−0.081	**0.420**	−0.219	0.221
144	3.512	0.630	0.017	−0.284	**0.337**	0.089	0.302
99	4.079	0.577	0.146	−0.114	0.006	**0.444**	0.269
129	3.687	0.587	0.001	−0.084	−0.268	**0.398**	0.194
278	3.800	0.545	0.289	−0.034	0.065	**0.381**	0.277
364	3.422	0.578	−0.070	0.031	−0.249	**0.472**	0.243
394	3.452	0.580	0.012	−0.072	−0.334	**0.394**	0.218
158	4.042	0.583	0.145	0.032	0.089	**0.516**	0.321
Factor correlation							
	SP		1.0				
	De		−0.092**	1.0			
	Ac		−0.010	−0.413**	1.0		
	IR		0.120**	−0.178**	0.174**	1.0	

N = 11,137; Item-Total, Item-Total SP, Social Potency; De, Dependability; Ac, Accommodation; IR, Interpersonal Relatedness; all item-total correlations are significant at p < 0.01; the number of each item in this table is its original numbers in CPAI-2. *p < 0.05; **p < 0.01.

Measurement Invariance Across Gender

We conducted multiple-group ESEM to test the measurement invariance of the 56-item CPAI and the 28-item CPAI across gender. We first tested the 13 models of the 28-item CPAI and labeled them with the letter A in **Table 5**. As for the 56-item CPAI, we tested two sets of the 13 models, one in which the CUs were allowed to vary for females and males and another in which the CUs were constrained to be invariant over responses by females and males. We labeled the former with the letter B and the latter with the letter C in **Table 5**. In general, we conducted three sets of measurement invariance tests: set A, set B and set C.

Configural Invariance

The goodness of fit statistics provides adequate support for the configural invariance models (Model 1A, Model 1B, and Model 1C), with all of the TLI and CFI exceeding 0.90 and all of the RMSEA below 0.05.

Weak Invariance

When factor loadings were constrained to be equal across gender, the TLIs and the RMSEAs are even better than those in Model 1, except for the RMSEA in Model 2C. None of the ΔCFIs exceeds 0.01, with ΔCFIs of 0.003 in model 2A and 0.002 in both models 2B and 2C. The ΔRMSEAs does not exceed 0.015 in model 2A, 2B, and 2C. The results support weak invariance among the three sets of the test across gender.

Strong Invariance

The strong invariance models constrain both factor loading and item intercepts to be equal across gender. The fit statistics do not reject invariant intercepts hypothesis, with the ΔCFIs below 0.01 and the ΔRMSEAs below 0.015 in model 3A, 3B, and 3C.

Strict Invariance

The strict invariance models require equal factor loadings, item intercepts, and uniquenesses across gender. When compared with models 5A, 5B, and 5C, the corresponding models 7A, 7B, and 7C do not produce substantial changes in TLI, CFI, and RMSEA. We also compared all the other various pairs of models (Model 3 vs. Model 2; Model 6 vs. Model 4; Model 9 vs. Model 8; Model 11 vs. Model 10; Model 13 vs. Model 12) to test the invariance of the uniquenesses and yielded the same results. These results provide good support for the strict measurement invariance for the three sets of the test.

CUs Invariance

We compared each Model B with corresponding Model C to examine whether the CU invariance across gender could be established. All ΔCFIs do not change except for the one (0.001) in the comparison between Model 12C and Model 12B. All ΔRMSEAs are below 0.015, and all TLI increase by 0.001, except for one of the comparison between Model 10C and Model 10B does not change. The results support invariance of CUs.

Factor Variance\Covariance Invariance

We compared several pairs of models, including Model 4 vs. Model 2, Model 6 vs. Model 3, Model 8 vs. Model 5, Model 9 vs. Model 7, and Model 12 vs. Model 10, and Model 13 vs. Model 11, with all ΔCFIs less than 0.002, all ΔRMSEAs less than 0.001 and all TLIs unchanged in all sets of the test. The results suggest that the factor variance\covariance is invariant between males and females.

Factor Mean Invariance

We tested factor mean invariance across gender by comparing four pairs of models: M10 vs. M5, M11 vs. M7, M12 vs. M8, and M13 vs. M9. What these four models (M10-M13) have in common is that they all have factor means constrained to zero for both male and female groups. The results show that all changes in model fit indices do not exceed the cut-points to reject the invariant factor means hypothesis. However, in the test of set A for the 28-item CPAI, the differences in fit indices only marginally support invariance. Changes in both CFI and TLI exceed 0.005, with ΔCFIs equaling to 0.006 and changes in TLI equaling to 0.007.

We could explain gender differences in terms of latent means with sufficient justification since there had been reasonable support for the strict invariance over gender. Thus, we examined models in which means were constrained to 0 for the male group and freely estimated for the female group. It was apparent that females yielded significantly higher scores on Dependability, Accommodation, and Interpersonal Relatedness and lower scores on Social Potency. **Table 6** presents a summary of the standardized gender differences based on the four models that provided estimates of these differences.

We also performed independent sample t tests to examine gender differences in the four factors of both short forms and found the same pattern as the multi-group ESEM results. Females scored higher than males on Dependability, Accommodation, and Interpersonal Relatedness, but lower on Social Potency. However, except for differences in social competence, the effect sizes for most gender differences are very small and of little practical significance. These results can explain why the factor mean invariance could be established in multi-group ESEM analyses. **Table 7** demonstrated a summary of the t test statistics.

Criterion Validity

We tested the correlations between the four domains of both short forms and several criterion variables, including the big five factors and several health-related variables. As shown in **Table 8**, the pattern of criterion associations is very similar across the two short forms. We calculated the correlations between the two columns of the criterion associations for each domain of the CPAI. We found correlations of 1.000 for Social Potency, 1.000 for Dependability, 0.999 for Accommodation, and 0.993 for Interpersonal Relatedness, suggesting that the 28-item CPAI is almost identical with the 56-item CPAI in terms of the relationship between the domains and the criterion variables.

The four domains of both short forms are significantly correlated with almost all big five factors. Specifically, Social

TABLE 5 | Summary of Goodness of Fit Statistics for All Gender Invariance Models.

Model	χ^2	df	TLI	CFI	NFParm	RMSEA (90%CI)
Model 1 − No invariance (Configural Invariance)						
Model 1A	2733.40	544	0.919	0.942	324	0.027 (0.026; 0.028)
Model 1B	11235.82	2,586	0.904	0.920	718	0.025 (0.024; 0.025)
Model 1C	11268.87	2,615	0.905	0.920	689	0.024 (0.024; 0.025)
Model 2: FL − Weak factorial/measurement IN (Nested with Model 1)						
Model 2A	2971.31	640	0.928	0.939	228	0.026 (0.025; 0.027)
Model 2B	11654.93	2,794	0.909	0.918	510	0.024 (0.024; 0.024)
Model 2C	11683.57	2,823	0.910	0.918	481	0.025 (0.025; 0.026)
Model 3: FL and Uniq (Nested with Model 1, Model 2)						
Model 3A	3062.77	668	0.929	0.937	200	0.025 (0.025; 0.026)
Model 3B	11826.18	2,850	0.910	0.917	454	0.024 (0.023; 0.024)
Model 3C	11855.29	2,879	0.911	0.917	425	0.024 (0.023; 0.024)
Model 4: FL + FVFC (Nested with Model 1, Model 2)						
Model 4A	3023.76	650	0.928	0.938	218	0.026 (0.025; 0.027)
Model 4B	11713.59	2,804	0.909	0.917	500	0.024 (0.024; 0.024)
Model 4C	11743.22	2,833	0.910	0.917	471	0.024 (0.023; 0.024)
Model 5: FL + Int − Strong factorial/measurement invariance (Nested with Model 1, Model 2)						
Model 5A	3182.84	664	0.925	0.934	204	0.026 (0.025; 0.027)
Model 5B	12116.13	2,846	0.907	0.914	458	0.024 (0.024; 0.025)
Model 5C	12144.10	2,875	0.908	0.914	429	0.024 (0.024; 0.025)
Model 6: FL + FVCV + Uniq (Nested with Model 1–4)						
Model 6A	3117.69	678	0.929	0.936	190	0.026 (0.025; 0.026)
Model 6B	11885.20	2,860	0.910	0.916	444	0.024 (0.023; 0.024)
Model 6C	11915.08	2,889	0.911	0.916	415	0.024 (0.023; 0.024)
Model 7: FL + Int + Uniq − strict factorial/measurement invariance (Nested with Model 1–3, 5)						
Model 7A	3276.13	692	0.926	0.932	176	0.026 (0.025; 0.027)
Model 7B	12289.85	2,902	0.908	0.913	402	0.024 (0.024; 0.025)
Model 7C	12317.95	2,931	0.909	0.913	373	0.024 (0.024; 0.025)
Model 8: FL + FVCV + Int (Nested with Model 1, 2,4, 5)						
Model 8A	3237.57	674	0.925	0.933	194	0.026 (0.025; 0.027)
Model 8B	12177.41	2,856	0.907	0.914	448	0.024 (0.024; 0.025)
Model 8C	12206.25	2,885	0.908	0.914	419	0.024 (0.024; 0.025)
Model 9: FL + FVCV + Int + Uniq (Nested with Model 1–8)						
Model 9A	3333.25	702	0.926	0.931	166	0.026 (0.025; 0.027)
Model 9B	12351.33	2,912	0.907	0.912	392	0.024 (0.024; 0.025)
Model 9C	12380.18	2,941	0.908	0.912	363	0.024 (0.024; 0.025)
Model 10: FL + Int + FMn − latent mean IN (Nested with Model 1, 2, 5)						
Model 10A	3438.79	668	0.918	0.928	200	0.027 (0.027; 0.028)
Model 10B	12363.30	2,850	0.905	0.912	454	0.025 (0.024; 0.025)
Model 10C	12391.12	2,879	0.905	0.912	425	0.024 (0.024; 0.025)
Model 11: FL + Int + FMn + Uniq − manifest mean IN (Nested with Model 1–3, 5, 7, 10)						
Model 11A	3533.39	696	0.919	0.926	172	0.027 (0.026; 0.028)
Model 11B	12537.34	2,906	0.905	0.911	398	0.024 (0.024; 0.025)
Model 11C	12565.11	2,935	0.906	0.911	369	0.024 (0.024; 0.025)
Model 12: FL + FVCV + Int + FMn (Nested with Model 1, 2, 4–6, 8, 10)						
Model 12A	3492.10	678	0.918	0.926	190	0.027 (0.027; 0.028)
Model 12B	12422.95	2,860	0.905	0.911	444	0.025 (0.024; 0.025)
Model 12C	12451.73	2,889	0.905	0.911	415	0.024 (0.024; 0.025)
Model 13: FL + FVCV + Int + FMn + Uniq − complete factorial IN (Nested with Model 1–12)						
Model 13A	3589.33	706	0.919	0.925	162	0.027 (0.026; 0.028)
Model 13B	12597.43	2,916	0.905	0.910	388	0.025 (0.024; 0.025)
Model 13C	12625.87	2,945	0.906	0.910	359	0.024 (0.024; 0.025)

Women n = 5,565; Men n = 5,464; χ2 = chi-square statistic; df, degrees of freedom; CFI, Comparative fit index; TLI, Tucker-Lewis Index; NFParm, number of free parameters; RMSEA, Root Mean Square Error of Approximation; CI, Confidence Interval; CUs, a priori correlated uniquenesses based on previous works; FL, factor loadings; Uniq, item uniquenesses (error variance); FVCV, factor variances-covariances; Int, item intercepts; FMn, factor means. All χ2 values are significant at p < 0.01.

TABLE 6 | Summary of gender differences on latent mean factors.

Models	56-item CPAI (set B)				28-item CPAI (set A)			
	SP	De	Ac	IR	SP	De	Ac	IR
Model 5	−0.195	0.056	0.219	0.258	−0.219	0.090	0.190	0.300
Model 7	−0.194	0.056	0.218	0.258	−0.218	0.090	0.190	0.302
Model 8	−0.188	0.102	0.174	0.235	−0.222	0.123	0.215	0.198
Model 9	−0.188	0.097	0.178	0.230	−0.222	0.123	0.215	0.198

Women n = 5,565; Men n = 5,464; SP, Social Potency; De, Dependability; Ac, Accommodation; IR, Interpersonal Relatedness; all difference values are significant at p < 0.01.

TABLE 7 | Summary of the *t* test statistics for gender differences of the four factors of both short forms.

Factors		56-item CPAI				28-item CPAI			
		means	SD	t	Cohen's d	means	SD	t	Cohen's d
SP	Male	3.35	0.58	8.268	0.17	3.32	0.64	8.809	0.15
	Female	3.25	0.60			3.22	0.66		
De	Male	2.79	0.64	−3.886	0.06	2.73	0.74	−3.359	0.07
	Female	2.83	0.61			2.78	0.71		
Ac	Male	3.34	0.67	−5.872	0.11	3.36	0.74	−4.077	0.07
	Female	3.41	0.66			3.41	0.72		
IR	Male	3.68	0.54	−5.613	0.09	3.71	0.61	−7.446	0.13
	Female	3.73	0.52			3.79	0.59		

Women n = 5,565; Men n = 5,464; SP, Social Potency; De, Dependability; Ac, Accommodation; IR, Interpersonal Relatedness; SD, Standardized Deviation; all t values are significant at p < 0.01.

TABLE 8 | Correlations between the four factors of the two short forms with other variables.

	28-item CPAI				56-item CPAI			
	SP	De	Ac	IR	SP	De	Ac	IR
Extraversion	0.506**	0.299**	0.207**	0.029	0.519**	0.312**	0.243**	0.095
Agreeableness	0.081	0.472**	0.435**	0.334**	0.079	0.476**	0.467**	0.311**
Conscientiousness	0.344**	0.585**	0.337**	0.428**	0.341**	0.583**	0.379**	0.432**
Emotional Stability	0.345**	0.680**	0.439**	0.290**	0.345**	0.670**	0.469**	0.291**
Openness	0.662**	0.292**	0.128*	0.109*	0.668**	0.306**	0.164*	0.138*
PHQ	−0.312**	−0.555**	−0.294**	−0.068	−0.319**	−0.555**	−0.365**	−0.074
GAD	−0.246**	−0.565**	−0.327**	−0.132*	−0.255**	−0.554**	−0.399**	−0.136*
GHQ	−0.454**	−0.607**	−0.374**	−0.214**	−0.457**	−0.599**	−0.435**	−0.237**
Social dysfunction	−0.528**	−0.540**	−0.315**	−0.297**	−0.532**	−0.522**	−0.370**	−0.326**
Anxiety	−0.223**	−0.507**	−0.349**	−0.043	−0.225**	−0.506**	−0.403**	−0.048
Loss of confidence	−0.307**	−0.468**	−0.266**	−0.131*	−0.307**	−0.478**	−0.311**	−0.150**
SWB	0.363**	0.390**	0.270**	0.168**	0.384**	0.381**	0.299**	0.209**

N = 330. SP, Social Potency, De, Dependability, Ac, Accommodation, IR, Interpersonal Relatedness, PHQ, Patient Health Questionnaire, GAD, Generalized Anxiety Disorder, GHQ, General Health Questionnaire. SWB, Subjective Well-Being. *p < 0.05; **p < 0.01.

Potency has stronger correlations with Extraversion ($r = 0.506$) and Openness ($r = 0.662$) than with other big five factors. Dependability has stronger correlations with Conscientiousness ($r = 0.585$) and Emotional Stability ($r = 0.680$). Accommodation has stronger correlations with Agreeableness ($r = 0.435$) and Emotional Stability ($r = 0.439$). IR has relatively weak correlations with the big five factors, comparing with the other three domains. Social Potency does not correlate with Agreeableness and IR does not correlate with Extraversion.

As for health-related variables, the four domains are significantly correlated with PHQ (ranging from −0.294 to −0.555), GAD (ranging from −0.246 to −0.565), GHQ (ranging from −0.374 to −0.607), social dysfunction (ranging from −0.315 to −0.540), anxiety (ranging from −0.223 to −0.507), loss of confidence (ranging from −0.266 to −0.478), and subjective well-being (ranging from 0.270 to 0.390). Among them, Dependability has relatively strong correlations with PHQ, GAD, GHQ, Social dysfunction and Anxiety, Social Potency

has relatively strong correlation with Social dysfunction, and IR is not correlated with PHQ and anxiety.

DISCUSSION

The CPAI-2 is a promising instrument in the fields of personality psychology and cross-cultural psychology. However, shortages of short forms may slow down its progress in these fields. In the present study, we developed two short forms with sound psychometric qualities for the CPAI-2: the 56-item CPAI and the 28-item CPAI. Then, we examined the extent to which these short forms retain the structure of the CPAI-2 and their measurement invariance across gender. It turns out that they both share the same four-factor structure of the CPAI-2, and the four factors appear to be distinct from each other. Both short forms demonstrate strict invariance across gender. Further tests show that men scored higher than women on social competence. In addition, both short forms have adequate reliabilities and validities.

In the present study, we provided alpha coefficients for each domain of the two short forms and examined the relationship between CPAI domains and several criterion variables. Among the four domains, Accommodation and Interpersonal Relatedness are the two domains with relatively low internal consistency in both short forms. In the 56-item CPAI, the alpha coefficients of the four domains are all higher than 0.7, indicating adequate internal consistency (Nunnally and Bernstein, 1994). When reducing the number of items by half to construct the 28-item CPAI, the alpha coefficients decreased in all four domains, with lower internal consistency in two of them, dropping below 0.70. That is to say, in the 28-item CPAI, Accommodation and Interpersonal Relatedness seems to be weak in internal consistency, especially Interpersonal Relatedness.

The way we constructed the short forms prioritizes high bandwidth over high internal consistency. We selected the same number of items from each of the 28 CPAI-2 scales so that each domain of the short forms would cover all of its aspects in the original CPAI-2, a strategy that resulted in a relatively high level of item content heterogeneity in each domain. Item content heterogeneity refers to whether the items in a scale cover many different aspects of one trait or focus on only a few (McCrae et al., 2011). The high item content heterogeneity can lead to low internal consistency. For example, Interpersonal Relatedness consists of six diverse aspects. In the 56-item CPAI, there are two items per aspect, whereas in the 28-item CPAI, there is only one item per aspect. Thus, the former is less heterogeneous because it has a peer that reflects the same aspect in each item. Interpersonal Relatedness is weaker than other domains in terms of internal consistency, probably also because the aspects that make it up are more heterogeneous in terms of content.

We placed more emphasis on validity than on internal consistency reliability. Low internal consistency caused by item content heterogeneity may not lead to low validity (McCrae et al., 2011). In terms of validity, the 28-item CPAI does not appear to be worse than the 56-item CPAI according to the correlation pattern between the four domains and those criterion variables. Specifically, the four domains of both short forms are positively correlated with subjective well-being and negatively correlated with variables indicating poor mental health, and Dependability seemed to be the most potent protector of health among them.

In addition, domains of short forms are widely related to the big five personality traits. The way they correlated with the big five traits is quite similar to the way the scales of CPAI domains are entangled with the facets of the big five factors in previous joint factor analyses (Cheung et al., 2001, 2008). For example, Scales of Dependability mainly combined with facets of Neuroticism (Emotional Stability) and Conscientiousness in previous joint factor analyses of CPAI measures and big five measures. Then, in the present study, the Dependability of both short forms was apparently more strongly correlated with Emotional Stability and Conscientiousness. The short forms are in excellent consistency with the original CPAI measures regarding their relationship with the Big Five personality factors.

In addition, the correlation pattern of CPAI domains and the big five factors provides evidence of convergent and discriminant validity from a multi-trait-multi-method perspective. The big five and CPAI measures are developed with different approaches, the former uses an etic approach, while the latter uses a combined etic-emic approach. However, the personality traits they measured overlap. Dependability overlaps with Emotional Stability and Conscientiousness, Social potency overlaps with Openness and Extraversion, and Accommodation overlaps with agreeableness. These overlaps are reflected in previous joint factor analyses and are again demonstrated in these correlations in present study. The correlations between one CPAI domain and the big five factors overlapping with it are much higher than those between the domain and other CPAI domains.

The short forms do offer substantial savings in assessment time compared to the full CPAI-2. According to Soto and John (2017a), the 60-item BFI-2 takes 4 to 10 min to complete, and the 30-item BFI-2-S takes 3 to 5 min. The 56-item CPAI and the 28-item CPAI have about the same number of items as BFI-2 and BFI-2-S, respectively. Thus, we can infer from their estimates of the time required to complete the 56-item CPAI (4 to 10 min) and the 28-item CPAI (3 to 5 min). When using the short form of the CPAI-2, the time would shrink from half an hour to less than 10 min, a decrease that would allow more time for other variables or substantially reduce the likelihood of fatigue and impatience. This is why short forms are preferred over the full version, especially when they have comparable reliability and validity.

However, the efficiency gains in short forms often come at the cost of reliability and validity (Soto and John, 2017a), meaning that short forms need larger samples to maintain the same statistic power as the full CPAI-2. The cost of short forms also includes weakening or even losing hierarchies.

The full CPAI-2 is appropriate for both domain-level and scale-level personality assessment, a hierarchical assessment that combines the benefits of high bandwidth with high fidelity (Soto and John, 2017b). The 56-item CPAI retains to some extent the capability to assess personality hierarchically and is only appropriate for scale-level assessment in very large samples. The 28-item CPAI, however, lacks the capacity to assess scale-level personality traits.

Thus, it is easy to choose between the CPAI-2 and the 56-item CPAI, but not between the 56-item CPAI and the 28-item CPAI. Compared to the CPAI-2, the 56-item CPAI allows a time advantage of more than 20 min, but with a slight attenuation in psychometric qualities and the capacity of hierarchical measurement. It seems to be worth it. However, it would not be worthwhile to replace the 56-item CPAI with the 28-item CPAI to save less than 7 min at the cost of weakened reliability and loss of hierarchical measurement ability. As advised by Soto and John (2017a), the 28-item CPAI is suitable for studies in which assessment time and respondent fatigue are core concerns, and even small gains in efficiency are critical.

We conducted multi-group ESEM analyses to test the measurement invariance of the two short forms in a comprehensive taxonomy of invariance models with appropriate tests of full measurement and structural invariance. The results support configural invariance across gender and invariance of factor loadings, item intercepts and uniquenesses, correlated uniquenesses, factor variances and covariances, and factor means for both short forms. At the level of measurement invariance, strict gender invariance has been established which implies that the two short instruments are comparable between men and women in the structural level, including factor variance and covariance, and factor mean.

The invariance of the factor covariance indicates that the correlation pattern among the four factors is the same between males and females. Thus, we can expect the short forms will have the same discriminant and convergent validity when applied to different gender groups. Factor mean invariance across gender indicates that there is no gender difference in the four factors. However, the results of the t test show significant gender differences with small effect sizes. These two results are not really contradictory because most of the effect sizes of gender differences are too small to be of any practical significance, except for the gender differences in social competence. Men scored higher than women on social competence, with a small but not negligible effect size, a result that is consistent with the findings on scale-level gender differences on the personality traits of the CPAI-2 (Cheung et al., 2004). Cheung et al. (2004) also found that males scored higher than females on some scales of dependability, while females scored higher than males on other scales of dependability. Such scale-level differences offset each other on domain-level, explaining why gender difference is trivial and negligible on dependability.

Previous studies on the structure of the CPAI used traditional EFA approaches that could only provide a crude comparison across groups (Cheung et al., 2003; Lin and Church, 2004). Lin and Church (2004) conducted the CFA to test the structure of CPAI scales and NEO-FFI facets and found the CFA model did not fit the data well. Thus, we believe that the best option currently available for performing measurement invariance analysis for CPAI instruments is the ESEM models. We have now provided a basis for cross-sex comparisons of the short forms of CPAI through the ESEM models. In the future, we will use these models for research that compare personality traits of CPAI across different cultures.

CONCLUSION

The work reported here provides two short forms for CPAI-2. Both of them are time efficient, gender invariant, and have adequate validity. One has 56 items and the other 28 items. The former retains a certain degree of the capacity of hierarchical measurement, and the latter is more time-saving. Henceforth, we have the flexibility to choose different versions of CPAI depending on the study. In addition, the present study provides new evidence for the advantages of ESEM and reveals its potential applicability in future studies on CPAI.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Ethics guidelines of the Ethics Committee of Institute of Psychology, Chinese Academy of Sciences. The study protocol was approved by the institutional review board: Ethics Committee of Institute of Psychology, Chinese Academy of Sciences (reference number: H20020).

AUTHOR CONTRIBUTIONS

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REFERENCES

Andrews, F. M., and Withey, S. B. (1976). *Social Indicators of Well-Being: The Development and Measurement of Perceptual Indicators*. New York: Plenum.

Asparouhov, T., and Muthen, B. (2009). Exploratory structural equation modeling. *Struct. Equ. Model.* 16, 397–438. doi: 10.1080/10705510903008204

Born, M., and Jooren, J. (2009). How Does the Cross-Cultural Personality Assessment Inventory (CPAI-2) Fare in The Netherlands. In *11th European Congress of Psychology*; 7–10 July 2009. Oslo, Norway.

Chen, F. F. (2007). Sensitivity of goodness of fit indices to lack of measurement invariance. *Struct. Equ. Model.* 14, 464–504. doi: 10.1080/10705510701301834

Cheung, S. F., Cheung, F. M., and Fan, W. (2013). "From Chinese to cross-cultural personality inventory: A combined emic-etic approach to the study of personality in culture," in *Advances in Culture and Psychology: Volume 3*. eds. M. J. Gelfand, C. Chiu and Y. Hong (US: Oxford University Press)

Cheung, S. F., Cheung, F. M., Howard, R., and Lim, Y. H. (2006). Personality across the ethnic divide in Singapore: are "Chinese traits" uniquely Chinese? *Personal. Individ. Differ.* 41, 467–477. doi: 10.1016/j.paid.2005.12.023

Cheung, F. M., Cheung, S. F., Leung, K., Ward, C., and Leong, F. (2003). The English version of the Chinese personality assessment inventory. *J. Cross-Cult. Psychol.* 34, 433–452. doi: 10.1177/0022022103034004004

Cheung, F. M., Cheung, S. F., and Zhang, J. X. (2004). What is "Chinese" personality? Subgroup differences in the Chinese personality assessment inventory (CPAI-2). *Acta Psychol. Sin.* 36, 491–499.

Cheung, F. M., Cheung, S. F., Zhang, J., Leung, K., Leong, F., and Huiyeh, K. (2008). Relevance of openness as a personality dimension in Chinese culture: aspects of its cultural relevance. *J. Cross-Cult. Psychol.* 39, 81–108. doi: 10.1177/0022022107311968

Cheung, F. M., Fan, W., Cheung, S. F., and Leung, K. (2008). Standardization of the cross cultural [Chinese] personality assessment inventory for adolescents in Hong Kong: A combined emic-etic approach to personality assessment. *Acta Psychol. Sin.* 40, 839–852. doi: 10.3724/SP.J.1041.2008.01639

Cheung, F. M., Leung, K., Fan, R. M., Song, W. Z., Zhang, J. X., and Zhang, J. P. (1996). Development of the Chinese personality assessment inventory. *J. Cross-Cult. Psychol.* 27, 181–199. doi: 10.1177/0022022196272003

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z., et al. (2001). Indigenous Chinese personality constructs: is the five-factor model complete? *J. Cross-Cult. Psychol.* 32, 407–433. doi: 10.1177/0022022101032004003

Cheung, G. W., and Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct. Equ. Model. Multidiscip. J.* 9, 233–255. doi: 10.1207/S15328007SEM0902_5

Cheung, F. M., van de Vijver, F. J., and Leong, F. T. (2011). Toward a new approach to the study of personality in culture. *Am. Psychol.* 66, 593–603. doi: 10.1037/a0022389

Chiorri, C., Marsh, H. W., Ubbiali, A., and Donati, D. (2016). Testing the factor structure and measurement invariance across gender of the big five inventory through exploratory structural equation modeling. *J. Pers. Assess.* 98, 88–99. doi: 10.1080/00223891.2015.1035381

Church, A. T. (2001). Personality measurement in cross-cultural perspective. *J. Pers.* 69, 979–1006. doi: 10.1111/1467-6494.696172

Costa, P. T., and McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual.* Odessa, FL: Psychological Assessment Resources.

Cronbach, L. J., and Gleser, G. C. (1957). *Psychological Tests and Personnel Decisions*. Urbana: University of Illinois.

Dale, R. M., Bryant, K. A., Finnegan, N., Cromer, K., and Anand, A. (2020). The NEO-FFI domain of openness to experience moderates ketamine response in treatment resistant depression. *J. Affect. Disord.* 260, 323–328. doi: 10.1016/j.jad.2019.09.010

Dang, M., Weiss, B., Tran, N., and To, H. T. (2010). Vietnamese version of the CPAI-Adolescent. *Paper presented at the 7th International Test Commission Conference*; July 19–21, 2010. Hong Kong.

Dong, Y., Fan, W., Cheung, F. M., and Li, M. (2021). Development of a short form of the CPAI-A (form B) with Rasch analyses. *J. Appl. Meas.* 21, 515–532.

Donnellan, M. B., Oswald, F. L., Baird, B. M., and Lucas, R. E. (2006). The mini-IPIP scales: tiny-yet-effective measures of the big five factors of personality. *Psychol. Assess.* 18, 192–203. doi: 10.1037/1040-3590.18.2.192

Fan, W., Cheung, F. M., Leong, F. T., and Cheung, S. F. (2012). Personality traits, vocational interests, and career exploration: A cross-cultural comparison between American and Hong Kong students. *J. Career Assess.* 20, 105–119. doi: 10.1177/1069072711417167

Gan, Y., Zheng, L., He, X., and Cheung, F. M. (2019). Interpersonal relatedness and temporal discounting. *J. Soc. Pers. Relat.* 36, 1695–1714. doi: 10.1177/0265407518770907

Goldberg, D. P., and Williams, P. (1988). *A User's Guide to the General Health Questionnaire*. Windsor, United Kingdom: NFER-Nelson.

Gosling, S. D., Rentfrow, P. J., and Swann, W. B. Jr. (2003). A very brief measure of the big-five personality domains. *J. Res. Pers.* 37, 504–528. doi: 10.1016/S0092-6566(03)00046-1

Graetz, B. (1991). Multidimensional properties of the general health questionnaire. *Soc. Psychiatry Psychiatr. Epidemiol.* 26, 132–138. doi: 10.1007/BF00782952

Ho, M. Y., Cheung, F. M., and Cheung, S. F. (2008). Personality and life events as predictors of adolescents' life satisfaction: do life events mediate the link between personality and life satisfaction? *Soc. Indic. Res.* 89, 457–471. doi: 10.1007/s11205-008-9243-6

Iliescu, D., and Ion, A. (2009). Psychometric Performance of the CPAI-2 as a Big Five Measure in the Romanian Context. In *11th European Congress of Psychology*; 7–10 July 2009. Oslo, Norway.

John, O. P., Naumann, L. P., and Soto, C. J. (2008). "Paradigm shift to the integrative big-five taxonomy: history, measurement, and conceptual issues," in *Handbook of Personality: Theory and Research*. eds. O. P. John, R. W. Robins and L. A. Pervin (New York, NY: Guilford Press), 114–158.

Kroenke, K., and Spitzer, R. L. (2002). The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr. Ann.* 32, 509–515. doi: 10.3928/0048-5713-20020901-06

Kroenke, K., Spitzer, R. L., Williams, J. B., Monahan, P. O., and Löwe, B. (2007). Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Ann. Intern. Med.* 146, 317–325. doi: 10.7326/0003-4819-146-5-200703060-00004

Li, J. D. (2013). Psychometric properties of ten-item personality inventory in China. *Chin. J. Health Psychol.* 21, 1688–1692. doi: 10.13342/j.cnki.cjhp.2013.11.008

Li, M., Fan, W., Chen, X., and Cheung, F. M. (2019). Independent and interdependent personalities at individual and group levels: predicting loneliness in Chinese adolescents. *Personal. Individ. Differ.* 147, 85–90. doi: 10.1016/j.paid.2019.04.031

Lin, E. J. L., and Church, A. T. (2004). Are indigenous Chinese personality dimensions culture-specific? An investigation of the Chinese personality assessment inventory in Chinese American and European American samples. *J. Cross-Cult. Psychol.* 35, 586–605. doi: 10.1177/0022022104268390

Marsh, H. W. (2007). "Application of confirmatory factor analysis and structural equation modeling in sport/exercise psychology," in *Handbook of Sport Psychology*. eds. G. Tenenbaum and R. C. Eklund. *3rd Edn.* (Hoboken, NJ: Wiley), 774–798.

Marsh, H. W., Byrne, B. M., and Craven, R. (1992). Overcoming problems in confirmatory factor analyses of MTMM data: the correlated uniqueness model and factorial invariance. *Multivar. Behav. Res.* 27, 489–507. doi: 10.1207/s15327906mbr2704_1

Marsh, H. W., Hau, K. T., and Wen, Z. (2004). In search of golden rules: comment on hypothesis testing approaches to setting cutoff values for fit indices and dangers in overgeneralising Hu and Bentler's (1999) findings. *Struct. Equ. Model.* 11, 320–341. doi: 10.1207/s15328007sem1103_2

Marsh, H. W., Lüdtke, O., Muthén, B., Asparouhov, T., Morin, A. J. S., Trautwein, U., et al. (2010). A new look at the big-five factor structure through exploratory structural equation modeling. *Psychol. Assess.* 22, 471–491. doi: 10.1037/a0019227

Marsh, H. W., Morin, A. J., Parker, P. D., and Kaur, G. (2014). Exploratory structural equation modeling: An integration of the best features of exploratory and confirmatory factor analysis. *Annu. Rev. Clin. Psychol.* 10, 85–110. doi: 10.1146/annurev-clinpsy-032813-153700

Marsh, H. W., Nagengast, B., and Morin, A. (2013). Measurement invariance of big-five factors over the life span: ESEM tests of gender, age, plasticity, maturity, and la dolce vita effects. *Dev. Psychol.* 49, 1194–1218. doi: 10.1037/a0026913

McCrae, R. R., Kurtz, J. E., Yamagata, S., and Terracciano, A. (2011). Internal consistency, retest reliability, and their implications for personality scale validity. *Personal. Soc. Psychol. Rev.* 15, 28–50. doi: 10.1177/1088868310366253

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika* 58, 525–543. doi: 10.1007/BF02294825

Muthén, L. K., and Muthén, B. O. (1998–2017). *Mplus User's Guide. 8th Edn.* Los Angeles, CA: Muthén and Muthén.

Nunnally, J. C., and Bernstein, I. (1994). *Psychometric Theory. 3rd Edn.* New York, NY: McGraw-Hill.

Obschonka, M., Zhou, M., Zhou, Y., Zhang, J., and Silbereisen, R. K. (2019). "Confucian" traits, entrepreneurial personality, and entrepreneurship in China: a regional analysis. *Small Bus. Econ.* 53, 961–979. doi: 10.1007/s11187-018-0103-8

Perry, L. M., Hoerger, M., Molix, L. A., and Duberstein, P. R. (2020). A validation study of the mini-IPIP five-factor personality scale in adults with cancer. *J. Pers. Assess.* 102, 153–163. doi: 10.1080/00223891.2019.1644341

Rammstedt, B., and John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the big five inventory in English and German. *J. Res. Pers.* 41, 203–212. doi: 10.1016/j.jrp.2006.02.001

Schmidt, F. L., Le, H., and Ilies, R. (2003). Beyond alpha: An empirical examination of the effects of different sources of measurement error on reliability estimates for measures of individual differences constructs. *Psychol. Methods* 8, 206–224. doi: 10.1037/1082-989X.8.2.206

Shchebetenko, S., Kalugin, A. Y., Mishkevich, A. M., Soto, C. J., and John, O. P. (2020). Measurement invariance and sex and age differences of the big five inventory–2: evidence from the Russian version. *Assessment* 27, 472–486. doi: 10.1177/1073191119860901

Soto, C. J., and John, O. P. (2017a). Short and extra-short forms of the big five inventory–2: The BFI-2-S and BFI-2-XS. *J. Res. Pers.* 68, 69–81. doi: 10.1016/j.jrp.2017.02.004

Soto, C. J., and John, O. P. (2017b). The next big five inventory (BFI-2): developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *J. Pers. Soc. Psychol.* 113, 117–143. doi: 10.1037/pspp0000096

Velicer, W. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika* 41, 321–327. doi: 10.1007/BF02293557

Wada, S., Cheung, F. M., and Cheung, S. E. (2004). Development of Japanese CPAI-2: Comparisons between Tow Asian Neighbors. *Paper presented at the 112th APA Convention*; July 28 to August 30. Honolulu, Hawaii.

Wang, W., Bian, Q., Zhao, Y., Li, X., Wang, W., Du, J., et al. (2014). Reliability and validity of the Chinese version of the patient health questionnaire (PHQ-9) in the general population. *Gen. Hosp. Psychiatry* 36, 539–544. doi: 10.1016/j.genhosppsych.2014.05.021

Wang, J., Fan, W., Cheung, F. M., Wang, Q., and Li, M. (2019). Personality and Chinese adolescents' career exploration: The mediation effects of self-efficacy and perceived parental support. *J. Pac. Rim Psychol.* 13, e28–e29. doi: 10.1017/prp.2019.16

Xie, Q., Fan, W., Wong, P., and Cheung, F. M. (2016). Personality and parenting style as predictors of life satisfaction among Chinese secondary students. *Asia Pac. Educ. Res.* 25, 423–432. doi: 10.1007/s40299-015-0271-0

West Meets East in a New Two-Polarities Model of Personality: Combining Self-Relatedness Structure With Independent-Interdependent Functions

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Self and relatedness are the two most essential dimensions of personality, as indicated in many personality theories, and have been supported by numerous empirical studies conducted in the western (individualistic) and eastern (collectivist) contexts. However, because of a confusion or failure to distinguish the structure and function of personality, popular theories (e.g., the Big Five model) do not make logic distinctions between these two basic personality dimensions. In terms of the cultural-relevant feature, both self and relatedness and their specific aspects may be variously highlighted in different cultural settings. On the basis of a re-examination of several crucial two-dimension (namely, self and relatedness) personality theories derived from the east and west, we reconstruct a new two polarities personality model to include not only self and relatedness but also the independent and interdependent functions in terms of some popular personality theories from western and eastern cultures. Theoretically and empirically, self and relatedness should be the basic structures of personality, whereas independence and interdependence should be the basic functions of personality. Self and relatedness have independent and interdependent functions; however, due to the cultural relevance of personality, the functions should be variously emphasized in different contexts. Several possible future research directions are discussed.

Keywords: personality, self, relatedness, structure, function, west, east

INTRODUCTION

As mainstream of personality psychology (e.g., Eysenck, 1970; McCrae and Costa, 1989; Ashton et al., 2009), most western-derived models have been strongly concerned with intrapsychic dimensions and the lives of people as individuals—such as their occupation, marriage status, family, and age. On the other hand, a systematic analysis of personality with sufficient attention

to interpersonal dimensions is seriously lacking (Freedman et al., 1951; Leary, 1957; Wiggins, 1979; Yang, 2006; Blatt, 2008; Cheung and Ho, 2018).

With societies becoming more multicultural and more individuals crossing multicultural identity boundaries, personality psychology must "move beyond the critiques of imperialism and nationalism to a level of international cooperation with greater cultural sensitivities" (Cheung et al., 2011, p. 600). In recent decades, some researchers have attempted to describe personality from a comprehensive perspective in a global context. Particularly, in light of Hofstede's (2001) cultural framework with western (individualistic) or eastern (collectivistic) orientation, both self and relatedness, as two most essential dimensions of personality, have been highlighted in those personality models derived from both western (individualistic) and eastern (collectivistic) cultures (e.g., Cheung et al., 1996; Yang, 2006; Blatt, 2008). Due to the differences between eastern and western cultures these binary personality theories derived from the east or the west showed some unique characteristics of self and relatedness, which have led to certain differences in understanding personality by scholars from east and west.

Particularly, because of greater emphasis on the individualistic and independent nature of western culture, a few interdependent-related characteristics (e.g., agreeableness and parts of sub-dimensions of extraversion–warmth and gregariousness) have been included in some popular models (e.g., McCrae and Costa, 1989; Graziano and Tobin, 2009), but relatedness-relevant personality dimensions have not been logically or structurally (e.g., Big five model and Erikson's model) in or have often been slightly overlooked in those mainstream theories and assessments of western personality (e.g., Cheung et al., 2003). Furthermore, it is unclear whether the "self" (or some related terms such as autonomy, agency, introjection, and individual orientation) and "relatedness" (or some other related terms such as communion, sociotropy, anaclitic, and social orientation) have equivalent meanings in models derived from eastern and western settings or some different aspects of "self" and "relatedness" have been variously emphasized in different backgrounds.

Is it possible that self or relatedness possess cultural-specific representation or different functions for individuals in different cultural contexts? Should or can both self and relatedness be further deconstructed under the construct of personality? Accordingly, we may need a new construction for the dualistic theoretical framework that can cover "self and relatedness" and at the same time accommodate the differences of functions in personality between the east and the west (i.e., "independent" and "interdependent" personality functions).

Based on the review of those important two-dimension models derived from west and east, we will argue that there are no fundamental differences in structure (both self and relatedness) and functions (both independent and interdependent) between eastern and western personality. The core difference may lie in the degrees of emphasis on different structure content in each culture, which is culturally represented by specific personality function expression. Therefore, a new two-polarities model that criss-crosses structural and functional aspects of personality is proposed. We reconstruct the dualistic personality model that includes not only self and relatedness but also independent and interdependent functions. We advance a new two polarities model comprising four sub-dimensions of personality: independent self, interdependent self, intrapersonal relatedness and interpersonal relatedness. We deconstruct the existing typical personality models by eastern and western personality psychologists in light of our new two-polarities model (see **Table 1** for a diagrammatical representation). We expect our work to increase the understanding of personality structure and function from an enlarged perspective that incorporates both eastern and western cultures.

TRADITIONAL BI-DIMENSIONAL MODELS OF PERSONALITY

Western Models

Traditionally, two typical personality dimensions, self and relatedness, have been central in personality theories across various psychology domains, ranging from cross-cultural psychology to social psychology and psychoanalysis (Blatt, 2008; Luyten and Blatt, 2013). Developed on the basis of the perspectives of different disciplines or methodologies, the various personality theories refer to the two dimensions as surrender and autonomy (Angyal, 1951), communion and agency (Bakan, 1966; also see Pincus, 2005), sociotropy and autonomy (Beck, 1999), togetherness and individuality (Bowen, 1966), attachment and separation (Bowlby, 1969), individuation and attachment (Franz and White, 1991), affiliation (or intimacy) and achievement (or power; McAdams, 1985), mutualistic and individualistic urges (Slavin and Kriegman, 1992), individual and group identities or self and social identities (Tajfel, 1978; Turner et al., 1987), and relatedness and autonomy or competence (Ryan and Deci, 2000).

As indicated by authors such as Mikulincer and Shaver (2007) and Pincus (2005), the dialectic interaction between issues of relatedness and self in personality and personality development has been emphasized in these bi-dimensional models of personality. According to these models in western personality psychology, personality structure has a clear binary framework (for reviews, also see Luyten and Blatt, 2013). Several pivotal two-polarities models derived from western backgrounds are outlined below.

Interpersonal Models

In addition to primarily focusing on intrapersonal dimensions in western mainstream personality psychology, some personality scholars (e.g., Freedman et al., 1951; Leary, 1957; Wiggins, 1979; Kiesler, 1996; Pincus, 2005) have highlighted interpersonal attributes and suggested that two orthogonal dimensions underlie interpersonal traits, attitudes, and behavior in both normal and disrupted personality development: agency (or social dominance) and communion (or nurturance or affiliation). Conceptually, agency is clearly related to the self-definition (autonomy) dimension, whereas communion is congruent with the relatedness/sociotropic dimension. The interpersonal models assume that normal personality development involves a balance

TABLE 1 | Personality structure under the framework of self and relatedness with the function of independence and interdependence.

Structure / Function	Self	Relatedness
Independence	Independent self: Autonomy (Angyal, 1951; Erikson, 1968; Ryan and Deci, 2000), agency (Bakan, 1966; Pincus, 2005); achievement (McAdams, 1985; McClelland, 1985), industry (Erikson, 1968), introjective (Blatt, 2008), neuroticism (McCrae and Costa, 1989), openness (McCrae and Costa, 1989), extroversion (referring to the sub-dimensions of assertiveness, activity, excitement seeking, and positive emotions; McCrae and Costa, 1989)	Intrapersonal relatedness: Agreeableness (McCrae and Costa, 1989), extroversion (referring to the sub-dimensions of warmth and gregariousness; McCrae and Costa, 1989), trust (vs. mistrust) (Erikson, 1968), discipline, graciousness, thrift, traditionalism, defensiveness, and veraciousness (Cheung et al., 2013)
Interdependence	Interdepedent self: Conscientiousness (McCrae and Costa, 1989), need of power (Winter, 1973), initiative (Erikson, 1968), Face (Cheung et al., 2013; Zhai, 2013), *Lian* (Zhai, 2013)	Interpersonal relatedness: Affiliation (McAdams, 1985; McClelland, 1985), anaclitic (Blatt, 2008), cooperation (Freedman et al., 1951; Noam and Fischer, 1996), communication (Bakan, 1966), intimacy (Erikson, 1968; McAdams, 1985; McClelland, 1985), sociotropy (Clark and Beck, 1999); Surrender (Angyal, 1951), *Renqing,* social sensitivity, interpersonal tolerance, and harmony (Cheung et al., 2013)

Only some typical personality dimensions in common personality models are exampled in this table.

between agency and affiliation (Laforge et al., 1954; Wiggins, 2003; Pincus, 2005). The two-factor model can be arranged in a circumplex model comprising four quadrants (Freedman et al., 1951; Leary, 1957), and this model is empirically supported in the literature of western personality. For example, studies have demonstrated that anaclitic or sociotropic individuals are located in the friendly-submissive quadrant, evidencing high levels of dependency and low levels of dominance, whereas introjective or autonomous individuals exhibit the opposite pattern, being located in the hostile-domineering quadrant (e.g., Pincus, 2005; Ravitz et al., 2008).

Blatt's Two-Polarities Model

Blatt and colleagues (Blatt and Blass, 1996; Blatt, 2008; Luyten and Blatt, 2011, 2013) have argued that personality develops through a complex dialectic transaction between two fundamental psychological developmental dimensions: interpersonal relatedness—the development of increasingly mature, intimate, mutually satisfying, and reciprocal interpersonal relationships— and self-definition—the development of an increasingly differentiated, integrated, realistic, and essentially positive sense of self or identity. This model further emphasizes the importance of interpersonal relationships on the basis of focusing on the self-construction of personality. Blatt (2008) argued that interpersonal relatedness and self-definition, two fundamental developmental processes, evolve through a life-long dialectic transaction such that progress in relatedness (anaclitic) or self-definition (introjective) development facilitates progress in the other. The two main lines of development and the two personality dimensions are independent but also promote each other. For example, meaningful and satisfying relationships may contribute to self-construction, and a defined self may lead, in turn, to more mature levels of interpersonal relatedness (Luyten and Blatt, 2011, 2013).

Beck's Cognitive Behavioral Model of Personality

Like in the aforementioned work in the western field of personality, Beck (1983, 1999) defined two central dimensions for deconstructing personality and emphasized the interpersonal

aspect of personality as well as the intrapersonal aspect. Beck's model highlights a favorable balance between autonomy and sociotropy as the hallmark of adaptive personality functioning. According to Beck (1983, p. 273), sociotropy (or social dependency) reflects "the person's investment in positive interchange with other people...including passive-receptive wishes (acceptance, intimacy, understanding, support, guidance)." Sociotropic individuals care particularly about other people's attitude toward them, and they often try to please others and maintain their attachments (Robins and Block, 1988). By contrast, autonomy (or individuality) reflects "the person's investment in preserving and increasing his independence, mobility, and personal rights; freedom of choice, action, and expression; protection of his domain...and attaining meaningful goals" (Beck, 1983, p. 272). Autonomous, achievement-oriented individuals are mainly concerned about the possibility of personal success and often try to maximize their control over the environment to reduce their probability of failure.

The distinction between the anaclitic/sociotropic/relatedness and introjective/autonomous/self-definition personality dimensions has been widely validated in both clinical and non-clinical samples (Clark and Beck, 1999; Matsumoto, 1999; Zuroff et al., 2004; Blatt, 2008). These models have also been conceptually and empirically linked to contemporary interpersonal approaches (Freedman et al., 1951; Wiggins, 1991, 2003; Pincus, 2005; Ravitz et al., 2008), attachment theory (Sibley, 2007), and self-determination theory (Shahar et al., 2006). Empirical investigations have indicated consistent differences in current and early life experiences (Blatt, 2008), and basic character and relational style (Zuroff et al., 2004) associated with these two dimensions. In addition, the three two-dimension models overlap to a certain extent.

Recently, Luyten and Blatt (2013) broadly reviewed empirical evidence supporting the two-dimension model and concerning the neurobiological and evolutionary foundations (e.g., Beebe et al., 2007; Simeon et al., 2011). Luyten and Blatt (2013) also reported the effects of developmental factors, gender, and sociocultural issues on the development of interpersonal relatedness and self-definition (e.g., Fraley and Roberts, 2005;

DiBartolo and Rendón, 2012). The two polarities model provides theoretical and empirical utility concerning normal and disrupted personality and its development, which is largely influenced by evolutionary, biological, and sociocultural factors and their interactions.

Although different theoretical labels are used in these various theories, there is remarkable theoretical and empirical overlap. Moreover, emerging evidence indicates that these theories, which have been developed within differing theoretical approaches, assess aspects of the two fundamental dimensions (relatedness and self) at different levels of abstraction, indicating that the extant two-dimensional models of personality organization and development can be hierarchically organized (Sibley, 2007; Sibley and Overall, 2007; Luyten and Blatt, 2013). However, the dualistic structure of personality has historically been slightly overlooked in the mainstream of personality psychology.

Eastern Models

In their experiences of personality research and applications, some east scholars (e.g., F. M. Cheung, K. Yang, and their colleagues) found that western-based mainstream personality inventories (e.g., the Chinese Minnesota Multiphasic Personality Inventory; Cheung et al., 1992) could not provide a reliable and valid assessment of Chinese individuals' personality. Therefore, in response the challenges to Chinese personality in theory and application, eastern psychologists highlighted the dimension of relatedness as a supplement to western individualistic models (e.g., Cheung et al., 1996; Yang, 2006).

Two individual- and relational-oriented models are briefly reviewed in this section. The first is a four-factor model of personality assessed using the Cross-Cultural (Chinese) Personality Inventory (CPAI) developed by Cheung et al. (1996; 2003; 2013). The other is a four-dimension model of personality proposed by Yang (2006). These two models developed from eastern backgrounds largely reflect a binary framework for understanding personality traits with individual and relational orientations across cultures.

Cheung's Binary Personality Model Measured Using the Cross-Cultural (Chinese) Personality Inventory

Since the early 1990s, they developed various CPAI measurements, including the adult version (CPAI), the revised version (CPAI-2), and the adolescent version (CPAI-A) (Cheung et al., 2008b, 2013; Fan et al., 2008) with a combined emic–etic approach (Cheung et al., 2011). In the personality model assessed using the CPAI inventories, a Chinese indigenous personality dimension, interpersonal relatedness, is measured. This dimension evaluates the characteristics associated with the relationships between people (with society, family, and relatives) in the personality structure. Interpersonal relatedness reflects "a strong orientation toward instrumental relationships; emphasis on occupying one's proper place and engaging in appropriate action; avoidance of internal, external, and interpersonal conflict; and adherence to norms and traditions" (Cheung et al., 2001).

Interpersonal relatedness encompasses not only the connotations of an individual's intrinsic characteristics related to interpersonal communication and the subjective attitude toward relationships with people (related sub-dimensions such as discipline, graciousness, traditionalism, thrift), but also the external behavior shown in daily interpersonal communication (related sub-dimensions including *renqing,* social sensitivity, interpersonal tolerance, and harmony). Specifically, for example, graciousness measures how kind and broad-minded people are in their dealings with others. One item of graciousness is "When someone offends me, I will always bear that in mind (reversed)." *Renqing* measures the individual's adherence to cultural norms regarding reciprocal interactions such as courtesy rituals, exchanging resources, maintaining and utilizing useful ties, and nepotism. For example, one item of *renqing* is "If a friend or relative was hospitalized, I would definitely go to visit him/her."

The rest three factors in the CPAI model assessed using the CPAI measurements are largely correlated with Big Five factors, which mainly reflect an individual or intrapersonal orientation (Cheung et al., 2001, 2003, 2008a). For example, the social potency/expansiveness factor in the CPAI-2 and CPAI-A evaluates the personality traits of individuals pursuing change, innovation, self-development, and the realization of individual values, which are largely related to openness and extraversion in the Big Five. The core meaning of emotional stability in the CPAI-A lies in the emotional stability and adjustment of self-cognition and attitude; emotional stability is partially related to neuroticism within the Big Five. The core meaning of dependability in the CPAI-2 and CPAI-A is evaluation of reliability, seriousness, and responsibility, and dependability is strongly related to sense of responsibility and neuroticism within the Big Five. In addition, accommodation in the CPAI-2 mainly assesses an individual's attitude toward society or others and may reflect intrapersonal relatedness or social cognition—how a person relates to society or others.

Subsequent cross-cultural research has suggested that the CPAI personality framework is relevant across cultures and that the constructs derived from an eastern context—interpersonal relatedness–related personality constructs (e.g., *renqing*, harmony, social sensitivity, family orientation, and traditionalism)—are not restricted to the Chinese context and can be validated in some western cultures (Cheung et al., 2001, 2003, 2006; Lin and Church, 2004; Born and Jooren, 2009; Iliescu, 2009; Fan et al., 2011, 2012). For example, Lin and Church (2004) discovered that the interpersonal relatedness factor was well supported in both Chinese American and European American samples; moreover, the scores of European Americans on family orientation, which is highly valued in traditional Chinese culture, were significantly higher than those of Chinese Americans. Born and Jooren (2009) surveyed Dutch university students and Iliescu (2009) surveyed a Romanian sample, and found that the CPAI-2's four-factor structure was largely supported.

Therefore, the personality model assessed by the CPAI (including the updated version CPAI-2 and the CPAI-A) largely reveals two types of personality factor. One type is largely related to or overlaps with some factors in the Big Five model, which was originally derived from western cultures and mainly reflects the intrapsychic dimensions of personality traits highlighted in those cultures. The other type is interpersonal relatedness as defined by

Cheung and her colleagues; for this type, a group of interpsychic dimensions of personality traits highlighted in Chinese and most eastern cultures is assessed.

Yang's Binary Personality Model in Terms of a Four-Level Personality Framework

Yang (2006) also developed a four-level conceptual scheme for classifying personality traits under a dual high-order personality structure composed of individual-oriented personality attributes and social-oriented personality attributes, which comprise relational-oriented, group-oriented, and other-oriented attributes. Therefore, Yang actually proposed a binary model for understanding personality on the basis of both dispositional and cultural psychological approaches (Church, 2000).

According to Yang (1995, 2006), a person's aptitudes, temperament, needs, cognitions, affect, and behaviors, which are relatively enduring characteristics, together form the person's personality, which results from a particular ecological, social, cultural, and historical milieu. Culture and personality attributes (even aptitudes and temperament) are assumed to be more or less bidirectionally determined and mutually constituted (Markus and Kitayama, 1998). In a specific living environment, a person's interactions with their personal self (similar to the construct of the independent self proposed by Markus and Kitayama, 1991) construct individual-oriented attributes such as autonomy, independence, agency, and competence in both eastern and western contexts. An individual's interactions with another person may help form relationship-oriented attributes such as harmony and *renqing* (Cheung et al., 1996, 2013). A person's interactions with their family and other groups may yield group-oriented attributes such as family orientation (Fan et al., 2014) and leadership. Finally, an individual's interactions with real or imagined non-specific unidentified others as the generalized audience in the social environment may form other-oriented attributes such as face (i.e., *mianzi* in Chinese, Zhai, 2013) and defensiveness (Cheung et al., 1996, 2013).

These four levels of personality traits are composed of a person's personality structure for people of all cultures, but different dimensions are given differing importance depending on the cultural background of individualism or collectivism. In fact, personality attributes within individualist and collectivist societies may have deep social and cultural explanations. In eastern societies (e.g., China and Japan), people are inclined to comply with social roles, norms, obligations, customs, and practices, and the relational-oriented self acts as the major anchoring and stabilizing center for consistent and coherent personality functioning in everyday life. In western societies (e.g., the United States), people are inclined to assert the self and appreciate their differences from others. The individual-oriented self acts as the major anchoring and stabilizing center for consistent and coherent personality functioning in everyday life, whereas sociocultural factors may be readily changed to suit the person's needs.

In eastern societies, relationship-oriented, group-oriented, and other-oriented attributes, which have stronger connections with people's daily life than in western societies, are especially prevalent. However, even people in social-oriented societies (e.g., China) may have certain individual-oriented characteristics in some circumstances (Markus and Kitayama, 1991). For example, when people attend a banquet, they sometimes dress informally and even to stand out. This may reflect a certain individualistic orientation. In western societies, individual-oriented attributes, which have stronger connections with daily life than in eastern societies, are especially prevalent. However, this does not mean that people in individual-oriented societies do not exhibit social-oriented characteristics in some circumstances (e.g., in religious groups and some small towns and rural communities; Bellah et al., 1985; Markus and Kitayama, 1991). For example, in western societies, when people attend a banquet, they often dress formally, which may reflect a certain collectivist orientation.

Therefore, the four levels of personality traits define a dualistic framework of personality comprising aspects of self-construal in personality and aspects of a broader understanding of relatedness–construal in personality in terms of macro and micro societies. Therefore, both Cheung and Yang have separately defined a bi-dimensional structure of personality on the basis of their eastern cultural backgrounds; some details still need to be further verified in theory and practice, however.

Ways for Western Models to Meet Eastern Models

Based on the above reviews, we conclude that both western and eastern personality theorists noted that both self and relatedness are important and foundational factors of personality across east and west. This may be the reason that there are dualistic models parallel to western ones emerging in eastern culture. However, these scholars from the west and the east may have great differences in understanding this dualistic structure, and at the same time, there is a lot of space for modification in their models. In the next section, we first propose a new two-polarities model, and then deconstruct those existing dualistic personality models derived from west or east and reconstruct the structure and function of self and relatedness from a cross-cultural perspective.

A NEW TWO POLARITIES MODEL OF PERSONALITY

As noted earlier, efforts to use a dichotomy to analyze personality have never stopped. For example, The idioms "round outside and square inside" or "sageliness within and kingliness outside" in Confucian philosophy refer to how to be a person and do things in the world (Cheung et al., 2008b; Zhou et al., 2021); they also may reflect one explanation for personality with a dialectical thinking pattern. The "inner square" or "sageliness" means that a person should behave according to certain principles and maintain their independence and integrity. This may be similar to the self in the two-polarities model of personality. The "outer round" or "kingliness" means that a person should also live in harmony with their surroundings by using certain interpersonal strategies or approaches. This may be similar to relatedness in the two-polarities model of personality. Similarly, Blatt and Blass (1996) have tried to reanalyze Erikson's (1968) eight-stage linear

developmental line, adding an additional stage—cooperation versus alienation, with the framework of self and relatedness.

This is also true for the widely recognized Big Five personality model. For example, on the basis of a series of studies supporting the Big Five factors, Digman (1997) deconstructed the Big Five model into a two-dimension higher-order factor structure; the two dimensions were labeled α (comprising agreeableness, conscientiousness, and emotional stability) and β (comprising extraversion and openness). However, because this two-factor model was mainly derived from empirical results but not theory-based, its implications in theory and practice are limited (e.g., Ashton et al., 2009). One possible reason may be that both α and β factors consist of aspects of both relatedness and self, which theoretically and practically reflect different personality structures, or functions (McCrae and Costa, 1989). Freedman et al. (1951) and Leary (1957) have also argued that a total personality consists of both structures and mechanisms.

Our review also indicates that even if both self and relatedness are largely defined as the two central contents of personality, the corresponding bi-dimensional models do not provide a logical, systematic, or consistent explanation of the two superordinate dimensions. One possible reason is that the structure (e.g., traits) and functions of those models have not been fully explained. The other may be that both self and relatedness may reflect various functions in a specific cultural setting.

Considering Both Structure and Function of Personality

In this article, the structure of personality refers to the dualistic framework of self and relatedness; the function can be understood in terms of the utilities of the structure of personality (namely self and relatedness) in realizing the mechanism to make an individual dependent or independent (e.g., Freedman et al., 1951; Leary, 1957). Various scholarly contributions have discussed the interplay of these two polarities.

Loevinger (1976), for instance, pointed out the main function of self is to help the individual to integrate one's life experience and adapt into one's environment. From a cross-cultural perspective, Hashimoto and Yamagishi (2016) compared the adaptive roles of self-construal with independence and interdependence between US and Japan participants. Although there are some differences in the dimension of interdependence between US and Japan participants, the framework of a duality of independence and interdependence was empirically supported (Hashimoto and Yamagishi, 2016). This adaptation actually includes one's autonomy and attachment (e.g., Mahler et al., 1975; also see the Erikson's (1968) psychological development) or agency and communion (Bakan, 1966).

In traditional models of personality, structure and functions are often both considered; however, except for a few models (e.g., Freud's and Eysenck's frameworks), they are not constructed under any specific rationale. For example, the Big Five model has often been considered a typical trait theory of personality comprising five key personality traits; however, those traits may need to be further distinguished in terms of their different functions. For example, agreeableness and extraversion define the plane of interpersonal behavior (McCrae and Costa, 1989), but they also reflect extremely different functions in the dimension of interpersonal personality. As argued by Digman (1997) on the basis of Eysenck's (1970) viewpoint, extraversion involves not only an interest in social interaction but also active, zestful, and venturesome activities in life and interpersonal relations; extraversion mainly achieves a function for construct an independent self (referring to the sub-dimensions of assertiveness, activity, excitement seeking, and positive emotions; McCrae and Costa, 1989). However, agreeableness describes individual differences as being likeable, pleasant, and harmonious in relations with others, and also reflects some characteristics such as kindness, warmth, and considerateness (Graziano and Tobin, 2009).

As another example, although Cheung and colleagues proposed interpersonal relatedness as an indigenous-Chinese personality factor, this factor is complex and must be deconstructed because different subordinate factors reflect either independent or interdependent functions of personality. Specifically, although both discipline and *renqing* are related to a person's interpersonal environment, discipline indicates how independent a person is from others, and reflects a function of relatedness to make an individual more independent by one's inner attitude toward interpersonal communication; whereas *renqing* defines how interdependent a person is with others, and mainly reflects a function of relatedness to make an individual more interdependent by one's extra behaviors with others.

Theoretically, personality has two basic functions related to the internal and external environments. The first is to maintain independence (Loevinger, 1987), achieve ego functional autonomy (Allport, 1961), and then construct self-identity (Erikson, 1968; Pals, 2001). This independence or autonomy helps a person meet their needs for achievement and power (Murry, 1938; Maslow, 1970). The second is to connect a person with their social environment (e.g., Baumeister and Leary, 1995) by assuming social roles such as father, brother, friend, colleague, or leader and to then meet their needs for affiliation and intimacy (Murry, 1938; Maslow, 1970). Accordingly, as we indicated previously, self and relatedness are two central components because most personality scholars across eastern and western cultural contexts have proposed them (e.g., Wiggins, 1979; Cheung et al., 1996; Beck, 1999; Yang, 2006; Blatt, 2008). Therefore, the functions of personality, namely, independence and interdependence, should be achieved through two core factors of structure, namely self and relatedness. Furthermore, the development of personality is the process of integration of self with relatedness through the integration of or balance between the functions of independence and interdependence (Erikson, 1968; Caspi and Roberts, 2001).

Criss-Crossing Self vs. Relatedness and Independence vs. Interdependence

A person must maintain their independence and autonomy, and they must also maintain necessary and appropriate relationships with others—that is, have interdependence. The two major elements of personality, self and relatedness, are the carriers that

achieve these two functions: independence and interdependence. Adaptability requires the management of the dynamics of self and others. Of course, the realization of functions is different due to differences in the social and cultural environment of the individual. Therefore, we propose a new two-polarities model of personality with a functional perspective. The most common personality dimensions (or traits) in the dualistic framework proposed in this article are briefly summarized in **Table 1**.

Corresponding to the two basic dimensions—self and relatedness—there are two types of self—the independent self and interdependent self—and two types of relatedness—intrapersonal relatedness and interpersonal relatedness. These four sub-dimensions commonly perform the basic functions of personality, independence and dependence, where personality is defined as individuals' differences in behavior or inner process (e.g., Carver and Scheier, 2016).

In this section, we further delve into the two-polarities model we propose and further deconstruct the framework of self and relatedness drawing attention to aspects of existing works of eastern and western personality psychologists. In so doing, our aim is to demonstrate the rationality of the new two-polarities model we propose and show how this model is useful to promote an understanding of personality from a cross-cultural perspective.

Underexplored Aspects of the Independent and Interdependent Self

Independent self distinguishes and separates a person from others by autonomy and identity coherence. This self is derived from a belief in the wholeness and uniqueness of each person's configuration of internal attributes (Waterman, 1981; Sampson, 1988; Murray, 1993; Choi and Kim, 2003). The essential aspect of this view involves a conception of the self as an autonomous and independent person (Markus and Kitayama, 1991). The independent self may exhibit certain ego-defense mechanisms (e.g., depression, rigidity, and impulsiveness) to maintain the individual's identity (Freedman et al., 1951).

Interdependent self reflects the basic function of maintaining a person's autonomy or identity by considering the person part of an encompassing social relationship. Social environments, especially other people, serve as a mirror-like reflection to show a person's uniqueness. This interdependent self has the function of establishing the personality self through association between the person and their social environment. Markus and Kitayama (1991), for example, argued that an individual's behavior is determined by, contingent on, and, to a large extent, organized by what they perceive to be the thoughts, feelings, and actions of others in their relationships or social context. The interdependent self may employ certain interaction mechanisms to maintain identity (Freedman et al., 1951).

As shown in **Table 1**, some personality traits defined in previous models can indicate the characteristics of the independent self—for example, neuroticism and openness in the Big Five model (McCrae and Costa, 2008) and novelty, diversity, enterprise, sensation seeking, and life goals in the CPAI model (Fan et al., 2011; Cheung et al., 2013). Some personality traits defined in previous models may indicate the characteristics of the interdependent self—for example, domination (Freedman et al., 1951), face (Zhai, 2013; also in the CPAI model), lian (Zhai, 2013), and conscientiousness in the Big Five model (McCrae and Costa, 2008).

Particularly, in terms of Church's (2000) viewpoint regarding the possibility of integration of trait psychology and cultural psychology, some authors have largely distinguished two types of self in light of the framework of individualist and collectivist cultures. For example, after reviewing the relevant empirical literature about the self in western and eastern contexts, Markus and Kitayama (1991) proposed two types of self-construal, the independent self and interdependent self, in terms of individualist versus collectivist culture. Generally, individuals in an individualist society, which can be represented by the United States, are more likely to embody the independent self because their social environment requires them to embody self-independence. Western cultures emphasize the inherent separateness of distinct people, who must be independent from others and realize and express their unique attributes (Miller, 1988; Markus and Kitayama, 1991). However, eastern cultures, which can be represented by China, emphasize the fundamental connectedness between human beings; thus, individuals in a collectivist society are more interdependent because their environment requires them to maintain interdependence among individuals (Hsu, 1985; Miller, 1988) and to see themselves as part of an encompassing social relationship.

Yang (2004) argued that the Chinese self is expressed in terms of social orientation and individual orientation. In Yang's (2004) model, the dimension of individual orientation is similar to the construct of the independent self, whereas social orientation is largely similar to the construct of the interdependent self in Markus' framework. In fact, some other authors have defined two types of self in terms of the cultural differences between east and west in theoretical or empirical studies (e.g., Gao, 1996; Wang and Li, 2003; Mo, 2012). For example, after conducting an experiment, Mo (2012) reported that in addition to having the independent self in the western cultural sense, Chinese people often include family members or close relatives in their self-construct. In a certain sense, this is a manifestation of the independent self and interdependent self in the personality structure.

Derived from a Chinese setting, face has often been defined as a proper reputation and image in social interactions (Cheung et al., 1996). Accordingly, face reflects the interpersonal self to a certain extent. On the basis of an in-depth interpretation of the concept of face, Zhai (2013) introduced the concept of lian from the Chinese language. Lian further clarifies the interdependent self, showing more details of its function of self establishment in social environment. According to Zhai (2013), lian refers to the mind and behavior that an individual expresses after impression management to cater to an image recognized by a certain social circle, whereas face is the sequential position of an image (namely, lian) already formed in the minds of people in the social circle or others. The work conducted by Zhai (2013) may indicate that making a deconstructive analysis for interpersonal self is necessary when emphasizing the interpersonal relevance of the personal self in a Chinese context.

In addition, from the broader perspective of social psychology, private versus collective or public selves have been proposed in some other theories, such as the socioanalytic development of personality (Hogan, 1982), self-cognition (Triandis, 1989) collective/group/social identity (Schlenker, 1985; Turner et al., 1987; Brewer and Gardner, 1996), and self-verification (Swann, 1984). Private-self cognition reflects an assessment of the self by the self and includes cognitions involving personal traits, states, and behaviors (Fenigstein et al., 1975; Ybarra and Trafimow, 1998). Similarly, Schlenker (1986) argued that the private self has been afforded prestigious status and is usually regarded as having both structure, containing the organized and relatively stable content of personal experiences, and an active process that guides and regulates thoughts, feelings, and actions. The private self is the core of a person's inner being and reflects basic, enduring, distinctive, and genuine attributes. Self-reflection and self-identify are the main functions through which the private self acquires, crystallizes, or conveys accurate information on the self. This may be an intrapsychic process of defining automatic and independent individual identity.

By contrast, the collective or public self, which is the self as it is projected in a person's social life, reflects a process of self-disclosure and self-presentation (Schlenker, 1986) aiming to connect the person with their environment through assessment of the self by a specific reference group or collective. The collective self reflects the self-cognitions based on some collective (Triandis, 1989) because social norms and predilections embed us deeply in a matrix of real and imagined other people who influence our ideas and behaviors (Schlenker, 1986). Therefore, the collective self may reflect the interdependent content of the self.

Furthermore, according to the two-location theory proposed by Trafimow et al. (1991), the private self and the collective self are independent of each other, and the retrieval of a specific type of self-cognition depends on, for example, the individual's specific cultural setting. People from an individualistic culture may retrieve more private-self cognitions and fewer collective-self cognitions than those from a collectivist culture. However, the private and collective selves could be considered complementary facets of self-identity. They are intertwined and equally significant. As argued by Schlenker (1986), considerable interplay exists between these two selves. The two selves reflect a reciprocal relationship between people' private self-image and their public projections of self. Self-image influences public behavior, which in turn can modify self-image. Accordingly, both the private self and the collective self are pivotal components of the personality self.

Therefore, in sum, although the independent self-construal versus interdependent self-construal, individual-oriented versus social-oriented self, and private self versus collective self are derived from different theoretical perspectives, they all indicate a dualistic interpretation of personality. The self may not be a one-dimensional construction; it should include the construction of the independent self and that of the interdependent self. Both types of selves are embedded in people's personality across west and east. It is just that individuals are immersed respectively in individualism or collectivism, which leads to ones' different representation hierarchy in terms of the two selves.

Underexplored Aspects of Intrapersonal Relatedness and Interpersonal Relatedness

Intrapersonal relatedness reflects how an individual thinks about their social world—their social cognition. This type of relatedness indicates how a person relates his/her self to the social environment. Intrapersonal relatedness reflects the relevance of personality by assessing those characteristics expressing how a person associates themselves with their circumstances. As reported in **Table 1**, some personality traits defined in previously proposed models may indicate the characteristics of intrapersonal relatedness—for example, agreeableness (McCrae and Costa, 2008), and graciousness, defensiveness, self versus social orientation, veraciousness versus slickness, and discipline in the CPAI models (Fan et al., 2011; Cheung et al., 2013).

Interpersonal relatedness defines how a person relates to the social world through behavior or performance, such as social presentation and social transformation (namely, persona). The interpersonal relatedness reflects the relevance of personality by assessing those characteristics expressing how a person associates themselves with circumstances through external behavior and performance. Similarly, some personality traits defined in previously proposed models may indicate characteristics of interpersonal relatedness (also see **Table 1**) —for example, cooperation (Freedman et al., 1951), extraversion (McCrae and Costa, 2008), and *renqing,* harmony, and interpersonal tolerance in the CPAI models (Fan et al., 2011; Cheung et al., 2013).

In addition, as a second key dimension in the literature on personality (e.g., Wiggins, 1979; McCrae and Costa, 1989), the relatedness construct needs to be explained clearly. Several similar terms have been used in the research on personality, such as relatedness, interpersonal relatedness, and interpersonal personality. The set of terms may have been employed with varying meaning or some overlaps by personality scholars from western and eastern contexts. Two types of relatedness could also be understood in terms of Church's (2000) viewpoint regarding the possibility of integration of trait psychology and cultural psychology with the framework of individualist and collectivist cultures.

When Blatt and his colleagues proposed their two-polarities personality model, they did not always clearly distinguish relatedness from interpersonal relatedness (e.g., Luyten and Blatt, 2013). However, interpersonal relatedness may not be the whole content of the meaning of relatedness (Fan et al., 2008). Although interpersonal relatedness has been addressed in the models proposed by Blatt (2008) and Cheung et al. (1996, 2001, 2008b), the publications by Blatt and Cheung have never cited one another. Accordingly, the interpersonal relatedness construct may have widely different meanings in their corresponding models, or some overlaps may exist between the interpersonal relatedness considered by Blatt and by Cheung as well as their colleagues. Whether there are two types of interpersonal relatedness must be determined.

According to Blatt (2008) and Luyten and Blatt (2013), interpersonal relatedness refers to reciprocal, meaningful, and personally satisfying interpersonal relationships. Clearly, the interpersonal relatedness defined by Blatt and colleagues mainly

reflects one type of external (objective) interpersonal behavior or the corresponding pattern in which a person's individual differences are expressed through communicated behaviors. This may well represent some western personality psychologists' understanding of interpersonal relatedness.

As we reviewed previously, the definition of "interpersonal relatedness" by Cheung and her colleagues may consist of two types of relatedness. Furthermore, we empirically examined the data from use of the CPAI-A in a Hong Kong standardization study (Cheung et al., 2008b), mainland China standardization studies (Xie et al., 2016; Dong et al., 2020), and recent investigation conducted in Shanghai, China (Li et al., 2019) as well as the data from use of the CPAI-2 in the original standardization study (Cheung et al., 2008a) and recent data obtained from Chinese college students (Zhou et al., 2021). These data reveal a binary structure of relatedness. One type of interpersonal relatedness is similar to that defined by Blatt and colleagues and mainly manifests as objective or external relatedness; this is measured by *renqing*, harmony, interpersonal tolerance, and social sensitivity subscales. This type of interpersonal relatedness reflects an individual's persona, social presentation, or social transaction—how the person relates to the social world through actual behavior, expression, or presentation. Therefore, this type of relatedness can be defined as interpersonal relatedness and is similar to the public level of interpersonal personality (Freedman et al., 1951; Leary, 1957), and is assessed by considering the person's behavior or performance.

Intrapersonal relatedness reflects an individual's subjective attitude toward relationships with people and intrinsic characteristics related to interpersonal communication. Intrapersonal relatedness is similar to the private level of interpersonal personality (e.g., Freedman et al., 1951; Leary, 1957), and can be assessed through the subject's descriptions, dreams, values, or other projective outcomes. The concept corresponds to intrapersonal relatedness in the CPAI including graciousness, discipline, thrift, and traditionalism. Intrapersonal relatedness reflects an individual's social cognition (i.e., how they think about their social world), which is mainly conducted in the mind, hence being termed intrapersonal relatedness.

For another example, although Blatt and Blass (1996) reanalyzed Erikson (1968, 1982) eight-stage linear developmental line together with an additional stage of cooperation versus alienation, trust–mistrust, and cooperation–alienation and intimacy–isolation must not reflect the same type of relatedness. Specifically, trust–mistrust reflects a person's attitude or cognition regarding the social world (i.e., social cognition), whereas cooperation–alienation and intimacy–isolation reflects how they relate to their social world through specific behaviors and expressions (i.e., persona, social presentation, and social transaction).

CONCLUSION AND FUTURE DIRECTIONS

Adopting a cross-cultural perspective across the west and east to understand people's differences through a concise structure has always been the goal of personality psychologists (e.g., Yang, 2006; Blatt, 2008; Heine and Buchtel, 2009). In this article, we rethink previous work on a broad binary model of self and relatedness and reconstruct the two-polarities personality model comprising relatedness and self. Self and relatedness are the fundamental psychological structure and developmental processes involved in development of the capacity to establish and maintain an integrated personality (Sullivan, 1953; Wiggins, 1979; McCrae and Costa, 1989; Blatt, 2008). The two-dimension model has been theoretically and empirically supported in both western and eastern cultural settings. However, many popular theories (e.g., the Big Five model and Erikson's model) do not properly distinguish the two basic personality dimensions, although a few attempts have been made (e.g., Digman, 1997; Blatt, 2008). Furthermore, self and relatedness have sometimes been defined differently in different models, particularly those constructed from western versus eastern perspectives.

We argue that the fundamental reason for the aforementioned problems lies in a confusion or failure to distinguish the structure and function of personality; self and relatedness may have various meanings, and different aspects of these dimensions may be highlighted in different cultural settings. Accordingly, we reconstruct the dualistic personality model that includes not only self and relatedness but also independent and interdependent functions. Four sub-dimensions of personality in the dualistic model of self-relatedness are proposed: independent self, interdependent self, intrapersonal relatedness and interpersonal relatedness. Specifically, this integrated model with re-constructed both self and relatedness would advance the field of personality research.

For example, the integrated model is a more complete model of personality unlike other models that emphasize only one dimension. Whether in the western or eastern context, the outcome of our behavior always depends on our overall personality. The only difference is which part plays a greater predictive role. The integrated two-polarities model may have incremental validity above and beyond one dimensional models in predicting individuals' learning or work performances, and mental health in a specific cultural setting. Additionally, the more complete model should function better when used in cross-cultural studies since some cultures are individualistic and other cultures are collectivistic.

In addition, even within a single country, there are cultural subgroups (e.g., racial ethnic minorities in the United States), this more complete model may provide greater cross-cultural/cross-ethnic validity. For example, because the differences between an anaclitic/sociotropic depression and an introjective/autonomous depression are congruent with predictions made by the traditional two-polarities personality model of self and relatedness (e.g., Luyten and Blatt, 2013), our new-proposed two-polarities model, which further subdivides self and relationships, may help people to understand, predict and even cope with depression more accurately in different cultural backgrounds.

However, we only preliminarily reconstruct the self-relatedness personality framework, and some important issues remain to be investigated in future works. First, the validity of the theory and practice of the dualistic model proposed in

this article must be examined. Although we provide a brief summary of personality dimensions and traits by discussing the major models of personality (e.g., the Big Five model, Erikson's personality development stages and tasks, and the CPAI models), some other key models of personality [e.g., Murry's (1938) or Maslow's (1970) need model, and Freud's (1962) personality structure and development model] must be further reconstructed in the framework of self-relatedness. Second, more strong theoretical and empirical evidence is required to support the proposed self-relatedness dualistic model. Some other authors (e.g., Digman, 1997; Blatt, 2008; Luyten and Blatt, 2013) have favorably reviewed relevant works. However, our proposed model is congruent with a broad range of theoretical formulations regarding personality development, personality structure, personality functions, personality assessment, and even the neurophysiological mechanism and biological genetic basis of personality.

Third, if a model is useful for understanding personality and the validation of the model in predicting people's behavior or performance, it largely depends on reliable and validated measurement and assessment practices of the personality construct under the corresponding framework. Accordingly, how to operationalize the constructs such as independent/interdependent self and intrapersonal/interpersonal relatedness in this model and develop corresponding reliable and effective evaluation tools are also important issues that we need to solve in the future. These assessment tools can not only clearly reflect the basic meaning of those key constructs that we proposed, but also avoid different cultural prejudices and achieve cross-cultural invariance. Some specific issues should be well solved in practice. Furthermore, for dealing with those measurement-related issues, some other questions have also been answered theoretically and practically. For example, theoretically, peoples within both western and eastern cultures show greater collectivist or individualist tendencies, respectively. From a functionalist perspective, what does it mean to have a greater interdependent self and interpersonal relatedness in a more individualistic culture? Or what does it mean to have a greater independent self and intrapersonal relatedness in a more collectivistic culture? In the framework of self-relatedness personality with the functions of independence and interdependence, will the

cultural aggregate norms of personality have any reflection in a specific cultural setting or ideology? And how to implement these ideas or assumptions should be well examined in the future work.

Fourth, the association between eastern versus western culture and the self-relatedness personality model should be further explored. Although we have attempted to combine personality dimensions derived from different cultural settings in the dualistic model, considerable working space remains in this domain. For example, Zhai (2013) defined the construct *lian* in terms of the popular term face on the basis of empirical evidence, but our model regards both *lian* and face as part of the interpersonal self. Clearly, as reported by Yang (2006), some personality attributes may be relatively fixed in each type of culture (e.g., harmony in Chinese culture and openness in American culture) whereas others may be relatively malleable (e.g., extroversion in Chinese culture) though opposite patterns of relative fixedness and malleability. Specifically, the self and relevant traits or functions may be more powerful, pervasive, and influential among western people, whereas relatedness and relevant traits may be more powerful, pervasive, and influential among eastern people.

All in all, we believe that the proposed two polarities model will advance the integration perspective of studying personality across western and eastern cultures. At the same time, we also hope that this two polarities model can help scholars account for differences in personality between eastern and western cultures in the context of globalization and glocalization by comprehensively considering the structure and function of personality for people in a specific social context.

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All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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REFERENCES

Allport, G. W. (1961). *Pattern and Growth in Personality*. New York, NYSSolt, Reinhart & Winston.

Angyal, A. (1951). *Neurosis and Treatment: A Holistic Theory*. Hoboken, NJ: Wiley.

Ashton, M. C., Lee, K., Goldberg, L. R., and de Vries, R. E. (2009). Higher order factors of personality: do they exist? *Pers. Soc. Psychol. Rev.* 13, 79–91. doi: 10.1177/1088868309338467

Bakan, D. (1966). *The Duality of Human Existence*. Chicago, IL: Rand McNally.

Baumeister, R. F., and Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychol. Bull.* 117, 497–529.

Beck, A. T. (1983). "Cognitive therapy of depression: new perspectives," in *Treatment of Depression: Old Controversies and New Approaches*, eds P. J. Clayton and J. E. Barrett (New York, NY: Raven Press), 265–290.

Beck, A. T. (1999). "Cognitive aspects of personality disorders and their relation to syndromal disorders: a psychoevolutionary approach," in *Personality and Psychopathology*, ed. C. R. Cloninger (Washington, DC: American Psychiatric Press), 411–429.

Beebe, B., Jaffe, J., Buck, K., Chen, H., Cohen, P., Blatt, S., et al. (2007). Six-week postpartum maternal self-criticism and dependency and 4-month mother–infant self- and interactive contingencies. *Dev. Psychol.* 43, 1360–1376. doi: 10.1037/0012-1649.43.6.1360

Bellah, R. N., Madsen, R., Sullivan, W. M., Swidler, A., and Tipton, S. M. (1985). *Habits of the Heart: Individualism and commitment in American Life*. Berkeley, CA: University of California Press.

Blatt, S. J. (2008). *Polarities of Experience: Relatedness and Self-Definition in Personality Development, Psychopathology, and the Therapeutic Process*. Washington, DC: American Psychological Association.

Blatt, S. J., and Blass, R. B. (1996). "Relatedness and self-definition: a dialectic model of personality development," in *Development and Vulnerabilities in Close Relationships*, eds G. G. Noam and K. W. Fischer (Mahwah, NJ: Lawrence Erlbaum Associates), 309–338.

Born, M., and Jooren, J. (2009). "How does the cross-cultural personality assessment inventory (CPAI-2) fare in The Netherlands?," in *Paper Presented at the 11th European Congress of Psychology*, Oslo.

Bowen, M. (1966). The use of family theory in clinical practice. *Compr. Psychiatry* 7, 345–374. doi: 10.1016/s0010-440x(66)80065-2

Bowlby, J. (1969). *Attachment and Loss: Attachment*, Vol. I. New York, NY: Basic Books.

Brewer, M. B., and Gardner, W. (1996). Who is this "we"? Levels of collective identity and self representations. *J. Pers. Soc. Psychol.* 71, 83–93.

Carver, C. S., and Scheier, M. F. (2016). *Perspectives on Personality*, 8th Edn. London: Pearson.

Caspi, A., and Roberts, B. W. (2001). Personality development across the life course: the argument for change and continuity. *Psychol. Inq.* 12, 49–66. doi: 10.1207/s15327965pli1202_01

Cheung, F. M., Cheung, S. F., and Fan, W. (2013). "From Chinese to cross-cultural personality inventory: a combined emic-etic approach to the study of personality in culture," in *Advances in Culture and Psychology*, Vol. 3, eds M. J. Gelfand, C. Chiu, and Y. Hong (Oxford: Oxford University Press), 117–180.

Cheung, F. M., Cheung, S. F., Leung, K., Ward, C., and Leong, F. (2003). The english version of the Chinese personality assessment inventory (CPAI). *J. Cross Cult. Psychol.* 34, 433–452.

Cheung, F. M., Fan, W., Cheung, S. F., and Leung, K. (2008b). Standardization of the cross-cultural [Chinese] personality assessment inventory for adolescents in Hong Kong: a combined emic-etic approach to personality assessment. *Acta Psychol. Sin.* 40, 839–852.

Cheung, F. M., Cheung, S. F., Zhang, J., Leung, K., Leong, F., and Huiyeh, K. (2008a). Relevance of openness as a personality dimension in Chinese culture: aspects of its cultural relevance. *J. Cross Cult. Psychol.* 39, 81–108. doi: 10.1177/0022022107311968

Cheung, F. M., and Ho, Y. W. (2018). "Culturally relevant personality assessment," in *Diversity in Harmony – Insights from Psychology: Proceedings of the 31st International Congress of Psychology*, eds S. Kazuo, K. Sonoko, S. Takao, and M. Tetsuro (Hoboken, NJ: John Wiley & Sons, Ltd), 211–229. doi: 10.1002/9781119362081.ch11

Cheung, F. M., Leung, K., Fan, R. M., Song, W. Z., Zhang, J. X., and Zhang, J. P. (1996). Development of the Chinese personality assessment inventory. *J. Cross Cult. Psychol.* 27, 181–199.

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z., et al. (2001). Indigenous Chinese personality constructs: is the five-factor model complete? *J. Cross Cult. Psychol.* 32, 407–433.

Cheung, F. M., van de Vijver, F. J., and Leong, F. T. (2011). Toward a new approach to the study of personality in culture. *Am. Psychol.* 66, 593–603. doi: 10.1037/a0022389

Cheung, F. M., Zhao, J. C., and Wu, C. Y. (1992). Chinese MMPI profiles among neurotic patients. *Psychol. Assess.* 4, 214–218. doi: 10.1037/1040-3590.4.2.214

Cheung, S. F., Cheung, F. M., Howard, R., and Lim, Y. H. (2006). Personality across ethnic divide in Singapore: are "Chinese traits" uniquely Chinese? *Pers. Individ. Differ.* 41, 467–477. doi: 10.1016/j.paid.2005.12.023

Choi, S. C., and Kim, K. (2003). A conceptual exploration of the Korean self in comparison with the Western self. *Contribut. Psychol.* 42, 29–42.

Church, A. T. (2000). "Culture and personality: toward an integrated cultural trait psychology," in *Paper Presented at the 25th International Congress of the International Association for Cross-Cultural Psychology*, Pultusk.

Clark, D. A., and Beck, A. T. (1999). *Scientific Foundations of Cognitive Theory and Therapy of Depression*. Hoboken, NJ: Wiley.

DiBartolo, P. M., and Rendón, M. J. (2012). A critical examination of the construct of perfectionism and its relationship to mental health in Asian and African Americans using a cross-cultural framework. *Clin. Psychol. Rev.* 32, 139–152. doi: 10.1016/j.cpr.2011.09.007

Digman, J. M. (1997). Higher-order factors of the big five. *J. Perso. Soc. Psychol.* 73, 1246–1256.

Dong, Y., Fan, W., and Cheung, F. M. (2020). Development of a Short Form of the CPAI-A (Form B) with Rasch Analyses. *J. Appl. Meas.* 21, 515–532.

Erikson, E. H. (1968). *Identity: Youth and Crisis*. New York, NY: Norton.

Erikson, E. H. (1982). *The Life Cycle Completed*. New York, NY: Norton.

Eysenck, H. J. (1970). *The Structure of Human Personality*, 3rd. Edn. London: Methuen.

Fan, W., Cheung, F. M., Cheung, S. F., and Leung, K. (2008). Gender difference of personality traits among Hong Kong secondary school students and their developmental analyses. *Acta Psychol. Sin.* 40, 1002–1012. doi: 10.3724/sp.j.1041.2008.01002

Fan, W., Cheung, F. M., Leong, F. T. L., and Cheung, S. F. (2012). Personality traits, vocational interests, and career exploration: a cross-cultural comparison between american and Hong Kong Students. *J. Career Assess.* 20, 105–119. doi: 10.1177/1069072711417167

Fan, W., Cheung, F. M., Leong, F. T. L., and Cheung, S. F. (2014). Contributions of family factors to career readiness: a cross- cultural comparison. *Career Dev. Q.* 62, 194–209. doi: 10.1002/j.2161-0045.2014.00079.x

Fan, W., Cheung, M. C., Zhang, J. X., and Shu, F. C. (2011). A combined emic-etic approach to personality: CPAI and cross-cultural applications. *Acta Psychol. Sin.* 43, 1418–1429.

Fenigstein, A., Scheier, M. F., and Buss, A. H. (1975). Public and private self-consciousness: assessment and theory. *J. Consult. Clin. Psychol.* 43, 522–527.

Fraley, R. C., and Roberts, B. W. (2005). Patterns of continuity: a dynamic model for conceptualizing the stability of individual differences in psychological constructs across the life course. *Psychol. Rev.* 112, 60–74. doi: 10.1037/0033-295X.112.1.60

Franz, C. E., and White, K. M. (1991). Individuation and attachment in personality development: extending Erikson's theory. *J. Pers.* 53, 224–256. doi: 10.1111/j.1467-6494.1985.tb00365.x

Freedman, M. B., Leary, T. F., Ossorio, A. G., and Goffey, H. S. (1951). The interpersonal dimension of personality 1. *J. Pers.* 20, 143–161. doi: 10.1111/j.1467-6494.1951.tb01518.x

Freud, S. (1962). *The Ego and the Id*. New York, NY: Norton. (Oeiginally published, 1923).

Gao, G. (1996). "Self and other: a Chinese perspective on interpersonal relationships," in *Communication in Personal Relationships Across Cultures*, eds W. B. Gudykunst, S. Ting-Toomey, and T. Nishida (Thousand Oaks, CA: Sage Publications, Inc), 81–101.

Graziano, W. G., and Tobin, R. M. (2009). "Agreeableness," in *Handbook of Individual Differences in Social Behavior*, eds M. R. Leary and R. H. Hoyle (New York, NY: The Guilford Press), 46–61.

Hashimoto, H., and Yamagishi, T. (2016). Duality of independence and interdependence: an adaptationist perspective. *Asian J. Soc. Psychol.* 19, 286–297. doi: 10.1111/ajsp.12145

Heine, S. J., and Buchtel, E. E. (2009). Personality: the universal and the culturally specific. *Annu. Rev. Psychol.* 60, 369–394. doi: 10.1146/annurev.psych.60.110707.163655

Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations*. Thousand Oaks, CA: Sage.

Hogan, R. (1982). "A socioanalytic theory of personality," in *Nebraska Symposium on Motivation: Vol. 30. Personality-Current Theory and Research*, eds R. A. Dienstbier and M. M. Page (Lincoln: University of Nebraska Press), 55–89.

Hsu, F. L. K. (1985). "The self in cross-cultural perspective," in *Culture and Self*, eds A. J. Marsella, G. De Vos, and F. L. K. Hsu (London: Tavistock), 24–55. doi: 10.1080/00220973.1991.11072239

Iliescu, D. (2009). "Psychometric performance of the CPAI-2 as a big five measure in the romanian context," in *Paper Presented at the 11th European Congress of Psychology*, Oslo.

Kiesler, D. J. (1996). *Contemporary Interpersonal Theory and Research: Personality, Psychopathology, and Psychotherapy*. Hoboken, NJ: Wiley.

Laforge, R., Leary, T. F., Naboisek, H., Coffey, H. S., and Freedman, M. B. (1954). The interpersonal dimension of personality: II. An objective study of repression. *J. Pers.* 23, 129–153. doi: 10.1111/j.1467-6494.1954.tb01144.x

Leary, T. (1957). *The Interpersonal Diagnosis of Personality*. New York, NY: Ronald Press.

Li, M., Fan, W., Chen, X., and Cheung, F. M. (2019). Independent and interdependent personalities at individual and group levels: predicting

loneliness in Chinese adolescents. *Pers. Individ. Differ.* 147, 85–90. doi: 10.1016/j.paid.2019.04.031

Lin, E. J., and Church, A. T. (2004). Are indigenous Chinese personality dimensions culture-specific? An investigation of the Chinese personality assessment inventory in Chinese American and European American samples. *J. Cross Cult. Psychol.* 35, 586–605. doi: 10.1177/0022022104268390

Loevinger, J. (1976). *Ego Development: Conceptions and Theories.* Hoboken, NJ: Jossey-Bass.

Loevinger, J. (1987). *Paradigms of Personality.* New York, NY: WH Freeman.

Luyten, P., and Blatt, S. J. (2011). Integrating theory-driven and empirically-derived models of personality development and psychopathology: a proposal for DSM V. *Cli. Psychol. Rev.* 31, 52–68. doi: 10.1016/j.cpr.2010.09.003

Luyten, P., and Blatt, S. J. (2013). Interpersonal relatedness and self-definition in normal and disrupted personality development: retrospect and prospect. *Am. Psychol.* 68, 172–183. doi: 10.1037/a0032243

Mahler, M. S., Pine, F., and Bergman, A. (1975). *The Psychological Birth of the Human Infant. Symbiosis and Individuation.* New York, NY: Basic Books.

Markus, H. R., and Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychol. Rev.* 98, 224–253.

Markus, H. R., and Kitayama, S. (1998). The cultural psychology of personality. *J. Cross Cult. Psychol.* 29, 63–87.

Maslow, A. H. (1970). *Motivation and Personality.* Manhattan, NY: Harper and Row.

Matsumoto, D. (1999). Culture and self: an empirical assessment of Markus and Kitayama's theory of independent and interdependent self-construals. *Asian J. Soc. Psychol.* 2, 289–310.

McAdams, D. P. (1985). *Power, Intimacy, and the Life Story: Personological Inquiries Into Identity.* Minneapolis, MN: Dorsey.

McClelland, D. C. (1985). How motives, skills, and values determine what people do. *Am. Psychol.* 40, 812–825. doi: 10.1037/0003-066X.40.7.812

McCrae, R. R., and Costa, P. T. Jr. (2008). "The five-factor theory of personality," in *Handbook of Personality: Theory and Research,* eds O. P. John, R. W. Robins, and L. A. Pervin (New York, NY: The Guilford Press), 159–181.

McCrae, R. R., and Costa, P. T. (1989). The structure of interpersonal traits: wiggins's circumplex and the five-factor model. *J. Pers. Soc. Psychol.* 56, 586–595. doi: 10.1037/0022-3514.56.4.586

Mikulincer, M., and Shaver, P. R. (2007). *Attachment in Adulthood: Structure, Dynamics, and Change.* New York, NY: Guilford Press.

Miller, J. G. (1988). "Bridging the content-structure dichotomy: culture and the self," in *The Cross-Cultural Challenge to Social Psychology,* ed. M. H. Bond (Thousand Oaks, CA: Sage), 266–281.

Mo, L. (2012). "Three waves of the development of empirical research methods in psychology," in *The Presentation at Psychological Forum.* (Shanghai: Shanghai Normal University).

Murray, D. W. (1993). What is the Western concept of the self? On forgetting David Hume. *Ethos* 21, 3–23. doi: 10.1525/eth.1993.21.1.02a00010

Murry, J. M. (1938). The future of the intelligence. *Sewanee Rev.* 46, 441–447.

Noam, G. G., and Fischer, K. W. (1996). *Development and Vulnerability in Close Relationships.* Mahwah, NJ: Erlbaum.

Pals, J. L. (2001). Identity: a contextualized mechanism of personality continuity and change. *Psychol. Inq.* 12, 88–91.

Pincus, A. L. (2005). "A contemporary integrative interpersonal theory of personality disorders," in *Major Theories of Personality Disorder,* 2nd Edn, eds M. F. Lenzenweger and J. F. Clarkin (New York, NY: Guilford Press.), 282–331.

Ravitz, P., Maunder, R., and McBride, C. (2008). Attachment, contemporary interpersonal theory and IPT: an integration of theoretical, clinical, and empirical perspectives. *J. Contemp. Psychother.* 38, 11–21. doi: 10.1007/s10879-007-9064-y

Robins, C. J., and Block, P. (1988). Personal vulnerability, life events, and depressive symptoms: a test of a specific interactional model. *J. Personal. Soc. Psychol.* 54, 847–852. doi: 10.1037/0022-3514.54.5.847

Ryan, R. M., and Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 55, 68–78. doi: 10.1037/0003-066X.55.1.68

Sampson, E. E. (1988). The debate on individualism: indigenous psychologies of the individual and their role in personal and societal functioning. *Am. Psychol.* 43, 15–22.

Schlenker, B. R. (1985). "Identity and self-identification," in *The Self and Social Life,* ed. B. R. Schlenker (York, NY: McGraw Hill).

Schlenker, B. R. (1986). "Self-identification: toward an integration of the private and public self," in *Public Self and Private Self,* ed. R. F. Baumeister (Berlin: Springer), 21–62. doi: 10.1007/978-1-4613-9564-5_2

Shahar, G., Kalnitzki, E., Shulman, S., and Blatt, S. J. (2006). Personality, motivation, and the construction of goals during the transition to adulthood. *Pers. Individ. Differ.* 40, 53–63. doi: 10.1016/j.paid.2005.06.016

Sibley, C. (2007). The association between working models of attachment and personality: toward an integrative framework operationalizing global relational models. *J. Res. Pers.* 41, 90–109. doi: 10.1016/j.jrp.2006.03.002

Sibley, C., and Overall, N. (2007). The boundaries between attachment and personality: associations across three levels of the attachment network. *J. Res. Pers.* 41, 960–967. doi: 10.1016/j.jrp.2006.10.002

Simeon, D., Bartz, J., Hamilton, H., Crystal, S., Braun, A., Ketay, S., et al. (2011). Oxytocin administration attenuates stress reactivity in borderline personality disorder: a pilot study. *Psychoneuroendocrinology* 36, 1418–1421. doi: 10.1016/j.psyneuen.2011.03.013

Slavin, M. O., and Kriegman, D. H. (1992). *The Adaptive Design of the Human Psyche: Psychoanalysis, Evolutionary Biology, and The Therapeutic Process.* York, NY: Guilford Press.

Sullivan, H. S. (1953). *The Interpersonal Theory of Psychiatry.* New York, NY: Norton.

Swann, W. B. Jr. (1984). "Self-veification: bringig social reality into harmony with the self," in *Psychological Perspectives on the Self,* Vol. 2, eds J. Suls and A. G. Greenwald (Mahwah, NJ: Erlbaum).

Tajfel, H. (1978). "Social categorization, social identity, and social comparison," in *Differentiation Between Social Groups: Studies in the Social Psychology of Intergroup Relations,* ed. H. Tajfel (London: Academic Press).

Trafimow, D., Triandis, H. C., and Goto, S. G. (1991). Some tests of the distinction between the private self and the collective self. *J. Pers. Soc. Psychol.* 60, 649–655. doi: 10.1037/0022-3514.60.5.649

Triandis, H. C. (1989). The self and social behavior n differing cultureal contexts. *Psychol. Rev.* 96, 506–520. doi: 10.1037/0033-295x.96.3.506

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., and Wetherell, M. S. (1987). *Rediscovering the Social Group: A Self-Categorization Theory.* Hoboken, NJ: Basil Blackwell.

Wang, Q., and Li, J. (2003). Chinese children's self-concepts in the domains of learning and social relations. *Psychol. Sch.* 40, 85–101. doi: 10.1002/pits.10071

Waterman, A. S. (1981). Individualism and interdependence. *Am. Psychol.* 36, 762–773. doi: 10.1037/0003-066x.36.7.762

Wiggins, J. S. (1979). A psychological taxonomy of trait-descriptive terms: the interpersonal domain. *J. Pers. Soc.Psychol.* 37, 395–412.

Wiggins, J. S. (1991). "Agency and communion as conceptual coordinates for the understanding and measurement of interpersonal behavior," in *Thinking Clearly About Psychology, Vol. 2: Personality and Psychopathology,* eds W. M. Grove and D. Cicchetti (Minneapolis, MN: University of Minnesota Press), 89–113.

Wiggins, J. S. (ed.) (2003). *Paradigms of Personality Assessment.* New York, NY: Guilford Press.

Winter, D. G. (1973). *The Power Motive.* New York, NY: Free Press.

Xie, Q., Fan, W., Wong, P., and Cheung, F. M. (2016). Personality and parenting style as predictors of life satisfaction among Chinese secondary students. *Asia-Pacific Educ. Res.* 25, 423–432.

Yang, K. S. (1995). "Chinese social orientation: an integrative analysis," in *Chinese Societies and Mental Health,* eds W. S. Tseng, T. Y. Lin, and Y. K. Yeh (Oxford: Oxford University Press), 19–39.

Yang, K. S. (2004). "Toward a theory of the Chinese self: conceptual analysis in terms of social orientation and individual orientation," in *Proceedings of the Conference on Chinese Self Process, Concept, and Evaluation,* eds K. S. Yang and K. Y. Hsu (Jiaoxi: Fu Guang College of Humanities and Social Sciences).

Yang, K. S. (2006). "Indigenous personality research," in *Indigenous and Cultural Psychology. International and Cultural Psychology,* eds U. Kim, K. S. Yang, and K. K. Hwang (Boston, MA: Springer), doi: 10.1007/0-387-28662-4_13

Ybarra, O., and Trafimow, D. (1998). How priming the private self or collective self affects the relative weights of attitudes and subjective norms. *Pers. Soc. Psychol. Bull.* 24, 362–370.

Zhai, X. W. (2013). *Face, Favor and Reproduction of Power*. Beijing: Peking University Press.

Zhou, M. J., Li, F. G., Mu, W. Q., Fan, W., Zhang, J. X., Cheung, F. M., et al. (2021). Round outside and square inside: the latent profile structure and adaptability of Chinese interpersonal relatedness. *Acta Psychol. Sin.* 53, 1–16.

Zuroff, D. C., Mongrain, M., and Santor, D. A. (2004). Conceptualizing and measuring personality vulnerability to depression: commentary on Coyne and Whiffen (1995). *Psychol. Bull.* 130, 453–472. doi: 10.1037/0033-2909.130. 3.489

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