

Dimensional assessment of personality disorders in young people: A closer look on personality functioning in younger ages, different cultures, and various clinical settings

Edited by

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Dimensional assessment of personality disorders in young people: A closer look on personality functioning in younger ages, different cultures, and various clinical settings

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Editorial: Dimensional assessment of personality disorders in young people: A closer look on personality functioning in younger ages, different cultures, and various clinical settings

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Editorial on the Research Topic

Dimensional assessment of personality disorders in young people:
A closer look on personality functioning in younger ages, different
cultures, and various clinical settings

Introduction

From a developmental perspective, adolescence is a critical period to intervene in order to alter developmental trajectories (1). This is especially true for mental problems, as adolescence is the period in life where psychiatric disorders contribute the most to morbidity in comparison to somatic diseases. Personality disorders (PD) in general and Borderline personality disorder (BPD) in particular are among the most severe mental health problems, as they are associated with poor psychosocial functioning, poor physical health, increased psychiatric comorbidity, and enormous societal costs (2). The Global Alliance for Prevention and Early Intervention for Borderline Personality Disorder (2) was founded to promote early detection and early intervention for BPD in young people as there is still reluctance to use this diagnosis in adolescents even if there is sufficient knowledge that BPD can be diagnosed in young people reliably and validly

(2, 3). The next decade will reveal if the major changes in ICD-11 with the application of a life-span perspective on all mental disorders will lead to a substantial change in classification routines. Currently, as a consequence of not being diagnosed correctly, adolescents suffering from BPD are deprived of effective empirically based treatments (4), which increases the risk of an impaired life-course, since we know that untreated BPD symptoms in late childhood are predictive of a poor outcome in all areas of life (5) which increases the risk of chronic disability.

Early detection requires assessment tools with appropriate psychometric properties that are designed to capture the core elements of personality pathology according to the new classification systems. The alternative model of Personality Disorders (AMPD) in the DSM-5 (6) introduced a dimensional approach to assess an overall measure of PD severity (Criterion A). Four dimensions of personality functioning are supposed to describe the core impairments of PD: Identity, Self-Direction, Empathy, and Intimacy. In ICD-11 (7), the basic definition of PD is mostly similar to the DSM-5 AMPD, with impairments of self- and interpersonal functioning as core criteria of PD. The clinician is also allowed to assign one or more trait domain specifiers that contribute to the individual expression of personality disturbances (i.e., *Negative Affectivity*, *Detachment*, *Dissociality*, *Disinhibition*, *Anankastia*). Finally, with the aim of facilitating the identification of individuals who may respond to established treatments, a *Borderline Pattern specifier* has been included, which is essentially based on the DSM-5 Borderline PD diagnostic criteria.

The Operationalised Psychodynamic Diagnosis (8) provides a similar model to assess the severity of a patients' structural impairment, using four dimensions of personality structure: Control, Identity, Interpersonality, and Attachment.

In order to investigate the potential of these dimensional models to detect emerging personality disorders in children, adolescents and young adults, and to promote early detection and early intervention (in line with the GAP agenda), we established an international working group of child and adolescent psychiatrists and psychologists who are interested to develop reliable and valid assessment tools specifically adapted for younger ages and various cultural contexts.

The present Research Topic "Dimensional Assessment of Personality Disorders in Young People: A Closer Look on Personality Functioning in Younger Ages, Different cultures, and Various Clinical Settings" is a collection of articles that represent the work of research groups who promote the early detection of personality pathology in young people aged 12 to 26. The eleven articles of authors from eight different nations cover a broad range of aspects that are essential for the early assessment of personality functioning and pathology.

Conceptual aspects of BPD in adolescence

Disturbed identity development has been identified as an important feature of maladaptive personality functioning as represented in DSM-5 and ICD-11. In their contribution, [Sharp et al.](#) demonstrated the course of maladaptive personality functioning in the domain identity during adolescence in a large community sample of 2,381 adolescents. Results of this study suggest a normative increase in maladaptive identity development after age 12 (although not touching clinically relevant levels), which remained consistent until age 17 when it dropped back to levels observed in 12-year-olds. Important for the understanding of the development of impaired personality functioning (9) is the result that maladaptive identity development was significantly associated with mean-level increases in borderline personality features, and that, with increasing age, these constructs become more closely associated.

The significance of impaired identity in Borderline personality disorder is also in the focus of the work of [Rivnyák et al.](#) In a sample of 169 adolescents from the general population they used network analysis to test the importance of identity diffusion in the organization of borderline personality features. The main result was that in this network the shortest paths from one specific borderline feature to another specific borderline feature went through identity diffusion. This result emphasizes the central role of identity diffusion as a core symptom of Borderline Personality disorder beyond affect dysregulation.

[Barkauskiene et al.](#) broadened the perspective by focussing on the full scope of personality functioning (criterion A) and also on maladaptive personality traits (criterion B). In a mixed sample of 568 adolescents from the community, clinical settings and youth forensic care, the authors explored the associations of Criterion A (assessed with the LoPF-Q 12–18 questionnaire Lithuanian version) and B (assessed with the PID-5-BF) and their contribution in predicting borderline personality features in young people. The strongly interrelated criterion A and B were both significant predictors of borderline personality features in adolescents. However, there was an incremental value of criterion A (all four domains of personality functioning identity, self-direction, empathy, intimacy) over both criterion B and general psychopathology to capture the core features of borderline personality in young people.

Assessment of identity and personality functioning in adolescence

If impaired identity and personality functioning play such a crucial role in the understanding of (adolescent) Borderline pathology, the reliable and valid assessment

of those constructs is of high clinical relevance. Four papers of the present Research Topic focus on aspects of reliability and validity in the assessment of identity and personality functioning.

Rivnyák et al. evaluated the factor structure, complex relation, and validity of two measures assessing identity processes and identity statuses in a Hungarian adolescent sample: the Dimensions for Identity Development Scale (DIDS) and the Utrecht-Management of Identity Commitments Scale (U-MICS). Results particularly support the use of the construct Commitment which is part of both inventories, showing negative correlations with internalizing and externalizing problems and positive correlations with adaptive cognitive emotion regulation strategies and self-esteem.

Sarrar and Goth investigated the assessment of personality functioning from a psychodynamic perspective. They introduced an age-adapted version DSQ-22-A (Defense Style Questionnaire) for adolescent self-report and investigated its relation to the structure questionnaire of the Operationalized Psychodynamic Diagnosis in childhood and adolescence [OPD-CA2-SQ; (10)] and to aspects of psychopathology in a combined clinical and school sample of 396 adolescents. Results suggested the particular validity of the scale Maladaptive Defenses, consisting of the defense mechanisms autistic fantasy, affect isolation, projection, somatization, and splitting. However, fundamental changes concerning some basic operationalizations of the defense mechanisms and the 2-item-method were suggested for international discussion.

Two papers focus on the psychometric properties of the questionnaire AIDA [Assessment of Identity Development in Adolescence; (11, 12)], that, up to now, has been translated to 26 languages worldwide.

González Flores et al. adapted the AIDA for a Panamanian population. The AIDA Panama showed excellent internal consistency, the total scale Identity Diffusion showed high covariations with psychopathology (SDQ) and immature defenses (DSQ). Bifactorial CFA support the existence of a general factor and the unidimensionality of the questionnaire. This corresponds to Sharp et al. who demonstrated that the AIDA items appear to be best represented by a single latent factor with a good fit in a CFA.

Plakolm Erlač et al. used sophisticated methods to study both the implicit and explicit self-concept of identity diffusion in a sample of adolescent patients with BPD by using an implicit association task (IAT) and the Slovenian version of AIDA. Self-report based AIDA scores to denote impaired identity functioning were significantly correlated with the implicit measure of identity diffusion. However, when looking at the predictive ability of implicit and explicit measures, only explicit identity diffusion (according to the AIDA scores) was significantly associated with borderline features.

Impairment in personality functioning in different populations

Currently, the impact of gender identity on psychological wellbeing is one of the most controversial issues in many scientific areas including child and adolescent psychiatry. In ICD-11, gender dysphoria was taken out of the spectrum of psychiatric diagnoses to demonstrate that struggling with gender orientation is not equivalent to having mental problems. In clinical settings however, it is of major importance to differentiate gender dysphoric adolescents with no signs of mental illness from those individuals with comorbid gender dysphoria and personality disorders. In a Finnish sample using the AIDA questionnaire, Karvonen et al. compared the identity integration of 215 adolescents with features of gender dysphoria, 400 adolescents from general population and 77 adolescent psychiatric outpatients. Results of the study were clear in the direction of higher levels of identity diffusion in adolescent psychiatric outpatients compared to adolescents with features of gender dysphoria whose scores were similar to adolescents from the general population.

In a German study, Zettl et al. focused on a largely understudied group by examining identity development and maladaptive personality traits in 120 young adult refugees from 22 countries compared to 281 adults with first- or second-generation migration background. The personality functioning domain identity was assessed with a short version of AIDA in culturally adapted versions (English, Persian, Arabic, Turkish, Croatian, French, and German), and the Personality Inventory for DSM-5 – Brief Form (PID-5-BF) was used to assess criterion B. Compared to migrants, refugees reported significantly higher levels of identity diffusion, negative affectivity, detachment, antagonism, and disinhibition, demonstrating the burden of displacement on personality development.

Trajectories of personality functioning across the life-span

Finally, two articles of the Research Topic are focused on personality and impaired personality functioning across the life-span. As part of the Preschool Child Development Trajectory Study, Paulus et al. examined the predictive value of temperament measured in preschool age (mean age 4.2 years) for psychopathology later in childhood (mean age 9.2 years). Preschool temperament contributed differently to the development of externalizing and internalizing problems in middle childhood. High levels of frustration and anger in the preschool age were strong predictors of impaired mental health at age nine.

In a longitudinal design, d'Huart et al. studied both prevalence and 10-year stability of personality disorders from

adolescence (mean age 15.8 years) to young adulthood (mean age 25.9 years) in a high-risk sample of 115 individuals with a history of residential child welfare and juvenile-justice placements in Switzerland. Prevalence of personality disorders was 20.0% at baseline and 30.4% at follow-up. The mean-level stability of any personality disorder was only moderate, and the mean-level stability of specific personality disorders was even low. These results support the overwhelming evidence of numerous studies that the stability of personality disorder diagnoses, which has been seen as the core of the disorder for a long time, is far lower than expected. This insight has penetrated the concept of personality disorders in the upcoming ICD-11.

Future direction

We hope that the eleven articles of this Research Topic shed light upon the relevance of assessing impaired personality functioning in general and identity diffusion more specifically. As Sharp (9) has outlined, criterion A, i.e., impairment in personality functioning, seems to be the core of personality dysfunction in adolescence that can lead to long-lasting disability if not treated properly. With our work, we want to foster the aims of the Global Alliance for Prevention and Early Intervention for Borderline Personality Disorder (GAP) in the fight for a better support of young people with early emerging personality disorders, and we strongly agree with GAP that this should be a major public health priority. With our newly developed test versions LoPF-Q Parent 6–18, LoPF-Q Therapist 6–18, OPD-CA2-SQ Parent 6–18 and PID5BF+ CA IRF we will start to investigate the possibility of an even earlier detection of (beginning) personality difficulties and disorders in parent

report for children from 6 years up in a longitudinal setting. From 2023 on, our EARLY study is starting with project partners from 12 countries.

Author contributions

KS wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the final version.

Conflict of interest

Authors KG, MB, and KS are of assessment instruments that are used in the research of some of the articles in this collection (KG and KS: AIDA and OPD-CA2-SQ; KG, MB, and KS: LoPF-Q 12-18).

The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Identity Diffusion as the Organizing Principle of Borderline Personality Traits in Adolescents—A Non-clinical Study

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Growing evidence shows that diagnosing and treating borderline personality disorder (BPD) is of high relevance for affected youths. Although identity crisis is part of the normative developmental process, identity diffusion is a potential candidate for being an appropriate concept in further developing screening tools and interventions for BPD treatment in adolescence. We hypothesized that severity of borderline traits (as indicated by the strength of their associations with identity diffusion) would be negatively associated with non-clinical adolescents' endorsement of borderline features' presence. We also hypothesized that identity diffusion had a central role in the network of borderline personality traits and could be conceived of as a latent organizing principle of borderline personality disorder. In our study, 169 non-clinical adolescents (81 girls and 88 boys; $M_{\text{age}} = 15.38$; $SD_{\text{age}} = 1.52$) filled out self-report measures of borderline personality features and identity diffusion. According to our results, having strong feelings and interpersonal sensitivity were the two most endorsed borderline personality features. Borderline personality features were positively correlated with identity diffusion. The more severe a borderline personality feature was, the less relevant it was for non-clinical adolescents. According to a network analysis, identity diffusion was the most central and least redundant element of the network of borderline personality traits. Results are discussed from a clinical point of view, further encouraging professionals to use identity diffusion screening tools to detect BPD in adolescence.

Keywords: identity diffusion, borderline personality disorder, adolescence, network analysis, AIDA

INTRODUCTION

This paper presents a study that investigated the role of identity diffusion in the organization of borderline personality features in adolescents. The dimensional approach to personality disorders in DSM-5 (1) allows us to make cautious inferences for clinical issues from non-clinical samples as the one in our study. We start by introducing concepts related to normative and pathological identity development in adolescence.

Identity Development in Adolescence

Both parents and clinicians face adolescence as a challenge. In today's society the developmental stage of adolescence has been prolonged or even to some degree blurred with what we call emerging adulthood (2). Nevertheless, this stage of life—from 10 to 24 years of age for adolescence (3) and from 18 to 25–30 years of age for emerging adulthood (2)—remains one with significant transformations ranging from biological to psychological and social. Although most of adolescents and their families report a trouble-free transition from childhood to adulthood, this period has been frequently described as one of “storm and stress” (4, 5). As part of the normative developmental processes, heightened emotionality—especially in relation to social cues—is a hallmark for adolescent transformation [for a psychopathology related summary see (6)]. Turbulences are also caused by a normative maladaptive shift in emotion regulation including rumination and aggression (7). Thus, normative changes in adolescence might seem to be similar to borderline traits (for a detailed elaboration of this issue see section Borderline personality disorder in adolescence).

The potential turbulences of this developmental stage are not surprising, given the several profound tasks that have to be solved in order to achieve psychologically balanced adult functioning; no matter whether at the end of adolescence or emerging adulthood [for a list of tasks see (8)]. These tasks can be summarized under the identity achievement vs. role confusion psychosocial developmental stage of Erikson (9, 10). Erikson [(11), p. 94] defines ego identity as “the accrued confidence that one's ability to maintain inner sameness and continuity... is matched by the sameness and continuity of one's meaning for others.” Relying on this definition and a review of social-cognitive and psychopathology oriented psychodynamic accounts of identity, Goth et al. (12) suggest two meaningful components of identity development: continuity and coherence. Both components are represented in three domains of psychosocial functioning: intrapersonal, interpersonal, and the level of mental representations.

On the one hand, continuity is the vital experience of subjective self-sameness with an inner stable timeline. Continuity is reflected in the three different domains of psychosocial functioning as goals, talents, commitments, roles, and relationships, and an ability to trust and rely on emotions. On the other hand, coherence is reflected as consistency in self-representations, autonomous psychological functioning with sufficient ego strength, and differentiated mental representations of self and others. By definition, coherence can be considered as the relatively contradiction-free and reflected content of self-representations.

For Erikson (9, 13), it was pivotal to make a distinction between normative identity crisis and identity diffusion. The source of normative identity crisis is development itself. By adolescence, childhood introjections and identifications lose their adaptive function, thereby forcing adolescents to revise them and integrate them into their ego identity at a more abstract level. Thus, identity crisis is a universal component of adolescent psychosocial development. Contrastingly, identity diffusion is

the failure to solve the crisis successfully and falling short of achieving a continuous and coherent identity. For Kernberg (14, 15), identity diffusion results from the adolescent's inability to solve the ambivalence of newly achieved independence and attachment to parents and to integrate mental representations of self and others.

Borderline Personality Disorder in Adolescence

Borderline personality disorder (BPD) is a severe psychiatric disorder with chronic suicidality, unstable interpersonal relationships, and intense and fluctuating emotions (1). Being a very heterogeneous construct, there are 256 unique combinations of the nine diagnostic criteria for BPD. Moreover, factor analytic studies found multiple underlying latent factors explaining BPD criteria. Becker et al. (16) found four factors in a sample of adolescent inpatients. The four factor were (1) “suicidal threats or gestures” and “emptiness or boredom,” (2) “affective instability,” “uncontrolled anger,” and “identity disturbance,” (3) “unstable relationships” and “abandonment fears,” and (4) “impulsiveness” and “identity disturbance.” In a community-based sample, Chabrol et al. (17) found six factors: (1) dissociative/psychotic symptoms, (2) substance use, (3) interpersonal instability, (4) affectivity/identity disturbances, (5) narcissistic features, and (6) impulsivity. In a French-speaking international sample of adolescents diagnosed with BPD, Speranza et al. (18) found two factors accounting for 66.8% of variance in the nine criteria. The two factors were (1) internally oriented and (2) externally oriented criteria, composed of avoidance of abandonment, identity disturbance, chronic feeling of emptiness, and stress-related paranoid ideation for internally oriented criteria and unstable relationships, impulsivity, suicidal or self-mutilating behaviors, and inappropriate anger for externally oriented criteria. From these results we can conclude that albeit there is a single label for this disorder in taxonomy, BPD is a very heterogeneous construct.

Growing evidence shows that BPD is a valid, reliable, and clinically meaningful construct in adolescence (19, 20). The importance of emphasizing and promoting the BPD diagnosis for adolescents is twofold. First, BPD is highly prevalent (every fifth patient in the clinical setting is diagnosed with BPD) and highly dysfunctional (high comorbidity, increased risk for incarceration) mental disorder (21). Second, interventions in adolescence are or should be of high priority because of the malleability and flexibility of this developmental period (22). Successful interventions—even in case of subsyndromal BPD features—can serve as indicated prevention for adult BPD (22).

At the same time, professionals are still hesitant in many settings around the world to diagnose BPD in adolescents (23). The four main reasons for avoiding BPD diagnosis are: (1) invalidity of BPD diagnosis for adolescence, (2) the ongoing process of personality development, (3) difficulty to distinguish normative processes from BPD symptoms, and (4) strong stigmatization [Griffiths (24), Laurensen et al. (25); for a general review on personality pathology in adolescence

see (26)]. The first three of the above mentioned counter-arguments can be rejected based on empirical evidence. As for the validity of BPD diagnosis, prevalence and temporal stability of the diagnosis are very similar in adolescents and adult (27–29). Although personality development is an ongoing process and maturation during adolescence is evident [e.g., (30)], there is also substantial evidence for the stability in adolescence in personality traits (31). The difficulty to make a distinction between normative processes and BPD symptoms can be rejected using a dimensional approach to personality traits and personality disorder symptoms (32). Accordingly, we don't need qualitatively different traits to be present for sine morbo and personality disordered adolescents, a difference in frequency or intensity would suffice. Because stigmatization is highly dependent upon health care professionals' knowledge about BPD (33), progress in the three before mentioned domains could also decrease BPD-related stigmatization.

Borderline Personality Disorder and Identity Diffusion

Identity—a key process in normative adolescent development—plays an important role in the development and organization of BPD symptoms [e.g., (34, 35)]. The Alternative Model for Personality Disorders (Section III of DSM-5) (1) sees identity disturbance as a central construct in diagnosing personality disorders in general, and especially BPD. Moreover, impairments of identity affect other domains related to personality pathology. Identity diffusion interferes with pursuing goals (self-directedness), understanding others' perspectives (empathy), and establishing close relationships (intimacy) (34). Richtein et al. (35) showed in both clinical and non-clinical samples that together with affective instability, identity diffusion played a central role in the network of BPD symptoms. In a recent review, Kaufman and Meddaoui (36) called for a deeper empirical understanding of identity pathology. Identity diffusion could play a central role in building a unifying theory of BPD, because it is associated with constructs that form the core of BPD in different etiological models [impaired mentalizing (37); distorted object relations (14, 15); invalidating environment (38); emotion dysregulation (39)]. Moreover, Wilkinson-Ryan and Westen (40) found that identity diffusion—especially painful incoherence—successfully distinguished patients with BPD from patients with other personality disorders and from individuals with no diagnosis.

Aims of the Study, Hypothesis

Based on the above presented theoretical background, the aim of the study was twofold. First, we wanted to further evidence that borderline personality features are not to be confused with signs of normative adolescent identity crisis. We hypothesized that severity of borderline traits [as indicated by the strengths of their correlations with identity diffusion—a sign of developmental breakdown (41)] is negatively associated with non-clinical adolescents' endorsement of borderline features' presence. Second, we wanted to test the relevance of identity diffusion in organizing borderline personality features. We hypothesized that identity diffusion had a central role in

the network of borderline personality traits and could be conceived of as a latent organizing principle of borderline personality disorder.

METHOD

Sample and Procedure

Our participants were students from secondary schools in Pécs (South-Western Hungary). After parental informed consent 169 adolescents (81 girls and 88 boys) filled out the questionnaire package in paper–pencil format in groups of 20–30. Participants' age was between 12 and 18 with a mean age of 15.38 (SD = 1.52). The study was approved by the Hungarian United Ethical Review Committee for Research in Psychology (Ref. No.: 2017-110).

Measures

Identity diffusion was measured by Assessment of Identity Development in Adolescence [AIDA; Goth et al. (12); Rivnyák et al. (42) for the Hungarian version]. AIDA is a self-report measure of identity development to differentiate between normative adolescent identity crisis from the clinically relevant state of identity diffusion. The measure consists of 58 items that are evaluated on 5-point Likert-scales based on whether they describe the participant or not. Although AIDA measures different aspects of identity diffusion, we only used the total score in this study. Higher scores refer to more diffuse identity. AIDA proved to be a unidimensional measure of identity diffusion with high internal reliability (Cronbach's $\alpha = 0.94$).

Borderline personality traits were measured with Borderline Personality Features Scale for Children-11 [BPFSC-11; (43)]. The scale was translated from English into Hungarian using the parallel back-translation procedure (44). The scale consists of 11 items tapping into the main characteristics of borderline personality disorder in the domains of emotional instability, emotional problems, and impaired interpersonal relations. Participants rate their agreement with the statements on 5-point Likert-scales. Higher scores refer to more prominent presence of borderline traits. A Cronbach's α value of 0.79 showed adequate internal reliability of BPFSC-11.

Statistical Analyses

To describe the variables means and standard deviations were computed. Skewness and kurtosis values were used to describe distribution. Internal reliability of the scales was indicated by Cronbach's α values. Pearson's correlations were used to test the association between variables. The above mentioned statistical analyses were run on IBM SPSS Statistics 22.

To investigate the network of the variables, we used network analysis with JASP 0.9.1.0. To achieve stable and easily interpretable networks, EBICglasso estimation was used. Based on Bayesian parameters and using the Graphical Least Absolute Shrinkage and Selection Operator (GLASSO), this estimation filters out weak correlations and false positive associations resulting from partial correlational analyses.

Networks can be described by several parameters (45–47). Node-related parameters can refer to the centrality of the node (i.e., variable) in the network. Betweenness refers to how many

times a node is part of the shortest path between any pair of nodes. Closeness describes how many edges are needed to reach other nodes. Degree refers to how many and how strong edges depart from a node. Higher values refer to the more central role of the node in the network.

Local clustering coefficients quantify how close a node's neighbors are to being a complete graph. Thus, nodes with high local clustering coefficients are redundant in the network. Therefore, lower local clustering coefficients refer to the unique information attributed to a node (i.e., variable). There are several different methods to calculate local clustering coefficients. Costantini et al. (45) suggest to use the coefficient elaborated by Zhang and Horvath [2005 in Costantini et al. (45)] in the case of adaptive LASSO estimations. All centrality and local clustering coefficients reported in this study are standardized values. This means that the value zero refers to a mean value and values 1.0 and -1.0 refer to one standard deviation above and below mean, respectively.

RESULTS

First, the descriptive characteristics of measured variables are presented. According to the kurtosis and skewness values (Table 1), all reported variables were considered to represent normal distributions (48).

The associations between scales and single items were tested with Pearson's correlations. According to the results (Table 1), identity diffusion was strongly and positively related to borderline personality features in general. Identity diffusion also showed positive correlations with all specific borderline traits (i.e., items of BPFSC-11), except for item 3 (feelings are very strong). The strength of significant correlations ranged from moderate to strong. Identity diffusion was most strongly correlated with item 4 (something important missing about me) and item 9 (people will leave and not come back).

Next, we tested the association between the relative severity of specific borderline personality features and their relative relevance for non-clinical adolescents. To do so, we tested the linear correlation between the mean scores of BPFSC-11 items (as an indicator of the relative relevance of borderline features for non-clinical adolescents) and the strength of their correlations with identity diffusion (as an indicator of the relative severity of specific borderline features). We did this as an analog to computing similarity scores for measuring profile agreement (49). Although the correlation was not significant [$r_{11} = -0.422$; $p = 0.196$] because of the low sample size, there is a moderate negative correlation between relative severity (as indicated by each BPFSC-11 item's correlation with identity diffusion) and relative relevance (as indicated by the mean score

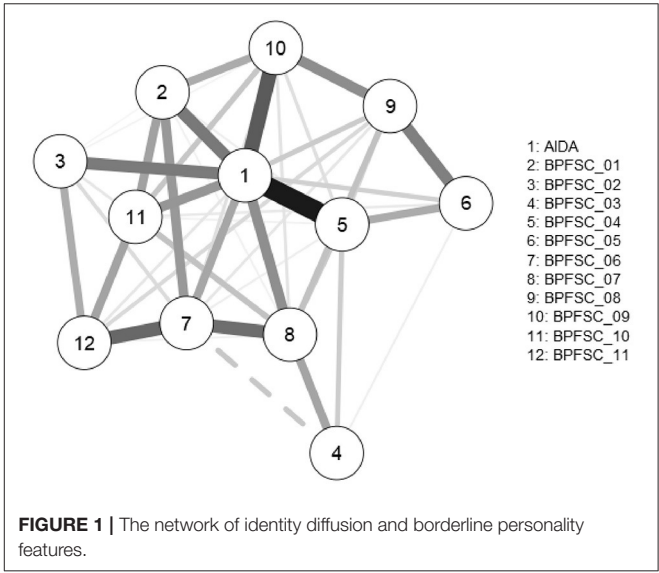


TABLE 1 | Descriptive statistics for measured variables.

	Correlation (r) with identity diffusion (AIDA total)	M	SD	Skewness	Kurtosis
Identity diffusion (AIDA total)	n/a	72.61	32.84	0.329	−0.329
Borderline personality traits (BPFSC-11 total)	0.831*	25.40	7.39	0.364	−0.148
BPFSC-11 item 1 (feel very lonely)	0.584*	1.88	0.97	0.904	0.460
BPFSC-11 item 2 (let people know how much they've hurt me)	0.475*	2.94	1.30	0.045	−1.091
BPFSC-11 item 3 (feelings are very strong)	0.144	3.66	1.22	−0.563	−0.667
BPFSC-11 item 4 (something important missing about me)	0.649*	2.36	1.27	0.528	−0.866
BPFSC-11 item 5 (careless with things)	0.344*	1.96	1.02	0.882	0.084
BPFSC-11 item 6 (people have let me down)	0.535*	1.78	1.01	1.298	1.160
BPFSC-11 item 7 (go back and forth between feelings)	0.566*	2.37	1.35	0.594	−0.876
BPFSC-11 item 8 (do things without thinking)	0.428*	1.88	1.10	1.255	0.923
BPFSC-11 item 9 (people will leave and not come back)	0.601*	2.43	1.37	0.533	−1.005
BPFSC-11 item 10 (feel about myself change a lot)	0.518*	2.37	1.27	0.437	−0.952
BPFSC-11 item 11 (really mean to each other with friends)	0.348*	1.76	1.01	1.463	1.735

Correlations between identity diffusion and BPFSC-11 (scalewise and itemwise). * $p < 0.001$.

TABLE 2 | Characteristic parameters of the network's nodes; centrality and local clustering coefficients (all coefficients are standardized values).

	Centrality		Local clustering	
	Betweenness	Closeness	Degree	Zhang coefficient
Identity diffusion (AIDA total)	2.871	2.187	2.629	−1.413
BPFSC-11 item 1 (feel very lonely)	−0.639	0.251	−0.189	1.548
BPFSC-11 item 2 (let people know how much they've hurt me)	−0.639	−0.151	−0.882	0.947
BPFSC-11 item 3 (feelings are very strong)	−0.639	−1.491	−1.261	0.926
BPFSC-11 item 4 (something important missing about me)	0.271	0.809	0.180	0.247
BPFSC-11 item 5 (careless with things)	−0.639	−1.262	−0.898	0.332
BPFSC-11 item 6 (people have let me down)	0.271	0.215	0.681	−1.034
BPFSC-11 item 7 (go back and forth between feelings)	0.531	0.632	0.378	−0.277
BPFSC-11 item 8 (do things without thinking)	−0.379	−0.728	−0.171	−0.827
BPFSC-11 item 9 (people will leave and not come back)	0.011	0.436	0.094	0.968
BPFSC-11 item 10 (feel about myself change a lot)	−0.639	−0.232	−0.139	−0.037
BPFSC-11 item 11 (really mean to each other with friends)	−0.379	−0.665	−0.423	−1.381

AIDA, Assessment of Identity Development in Adolescence; BPFSC-11, Borderline Personality Features Scale for Children-11.

of each BPFSC-11 item) of borderline personality traits. This means that non-clinical adolescents reported less agreement with borderline features as borderline features' association with identity diffusion increased.

To test the relative importance of identity diffusion in the organization of borderline personality features, we used network analysis. Both visual inspection of the network (**Figure 1**; see **Table 1** for item content) and centrality and local clustering coefficients (**Table 2**) support the central role of the identity diffusion score in the network. All centrality parameters are the highest for identity diffusion score, while the local clustering coefficient is the lowest for AIDA Total. This means that most of the shortest paths going from a specific borderline trait to another specific borderline trait go through identity diffusion (betweenness), identity diffusion exerts the highest number of direct effects on specific borderline traits (closeness), and identity diffusion has the strongest effect on specific borderline traits (degree). Identity diffusion also has the less redundant (i.e., the most unique) information in the network (local clustering coefficient).

DISCUSSION

With regard to the first aim of the study (i.e., to investigate the salience of specific borderline personality features in non-clinical adolescents in the conceptual framework of normative adolescent crisis), non-clinical adolescents reported less agreement with more severe borderline personality features (as indicated by the strength of their correlations with identity diffusion). Accordingly, professional concerns about confusing normative identity crisis with borderline personality features [e.g., (50, 51)] might be exaggerated. As adolescents' agreement with BPFSC-11 items increased, single items' strength of correlation with identity diffusion decreased. Thus, our results echo the conclusion of the developers of AIDA (12) and many who make a clear distinction between normative adolescent identity crisis and

identity diffusion that is a risk factor for developing borderline personality disorder and personality disorders in general (52, 53).

With regard to the second aim of our study, results of the network analysis supported the hypothesis that identity diffusion could be a latent variable accounting for the interconnectedness of specific borderline personality traits. Although previous factor analytic studies revealed the multi-faceted nature of borderline personality in adolescents (16–18) and Paris (54) even argued that each feature of borderline personality disorder reflects different diatheses, our results showed that identity diffusion—as measured by AIDA (12)—played a central role in the network of borderline personality features in non-clinical adolescents. We suggest that the heterogeneous nature of borderline personality disorder (55) can become less perplexing if the diverse symptoms are conceptualized as stemming from a single source, namely identity diffusion. Nevertheless, we do not question the multiply determined nature of identity diffusion with etiological contributions from genetics to culture (56). In this sense, although distal etiological factor might be diverse, identity diffusion can be hypothesized as a single proximal etiological factor (57).

LIMITATIONS AND CONCLUSIONS

Although our results are clear and extend previous research in a meaningful way, some limitations of our study should be mentioned. First, the sample size of our study is limited. In order to achieve even stronger conclusions, the sample size should be increased further. Second, although results are compelling, we should be very cautious in extrapolating our conclusions to clinical samples. Therefore, the study should be repeated with a clinical sample.

Our study is among the first to show the central role of identity diffusion as an organizing principle of borderline personality features with network analyses. From a methodological point of view, we join a group of colleagues (45–47) in advocating

network analysis as a promising new method in the field of clinical and personality psychology. If clinical studies could replicate our results in the future, they proved identity diffusion to be a potentially useful intervention target in the treatment of adolescents with borderline personality disorder. This would further promote the importance and use of identity diffusion screening tools like AIDA (12).

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 Hungarian United Ethical Review Committee for

Research in Psychology (Ref. No.: 2017-110). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

AR: study design, data collection, and writing the first draft. MP: writing and revising the first draft. BP: revising the first draft. AL: statistical analysis, writing, and revising the first draft. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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An Evaluation of Age-Group Latent Mean Differences in Maladaptive Identity in Adolescence

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Little is known about the differences between age groups in maladaptive personality function as denoted in Criterion A of the Alternative Model for Personality Disorder (AMPD) in the DSM-5, which is the entry criterion for diagnosing personality disorder in the upcoming ICD-11. The current study aimed to address this gap by evaluating latent mean age group differences in maladaptive identity, which is one aspect that has been identified as an important feature of maladaptive, general personality function as represented in the DSM-5 and ICD-11. We were also interested whether mean differences would track with mean differences in borderline personality disorder (BPD) features given prior data suggesting that general personality function overlap with the construct of BPD. A community sample of $N = 2,381$ adolescents, representing a mix of different socio-economic and educational backgrounds, ages 12-18 ($M = 14.92$, $SD = 1.94$; 46% male) completed a measure of maladaptive identity. A subset ($n = 1,165$) completed a measure of borderline personality features. Latent variable modeling was used to evaluate latent mean differences across seven age bands. Results suggested a normative increase in maladaptive identity after age 12, which remained consistent until age 17 when it dropped back to levels observed in 12-year-olds. Maladaptive identity was significantly associated with mean-level increases in borderline personality features, with these constructs becoming more closely associated with increasing age.

Keywords: level of personality function, AMPD Criterion A, personality disorder, adolescence, maladaptive identity

INTRODUCTION

The publication of the Alternative Model for Personality Disorders [AMPD; (1)] introduces maladaptive self- and inter-personal functioning (Criterion A) as a unidimensional severity continuum common (general) and core to all personality pathology. Criterion A is referred to as the Level of Personality Functioning (LPF) and includes disturbances in identity and self-direction (self-function) and intimacy and empathy (interpersonal function). Once a clinician has determined a client's LPF, she/he then determines the client's level of maladaptive personality trait function (Criterion B) across five trait domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism), which encompass 25 trait facets. Similarly, the 11th revision of the International Classification of Diseases [ICD-11; (2)] adopted a dimensional approach to the classification of personality disorders with its entry criterion defined as impaired self- and inter-personal functioning, followed by evaluation of five trait qualifiers (3, 4).

Interest in the developmental aspects of personality disorder has increased over the last two decades, motivated by research showing that personality disorder onsets in adolescence; therefore, early identification and intervention in adolescence may prevent significant suffering and cost for individuals and families (5–7). While a robust literature exists supporting both the traditional DSM-5 section II conceptualization of borderline personality disorder in adolescence, and that of DSM-5 Section III Criterion B/ICD-11 maladaptive traits in children and adolescents, much less research has been conducted on the entry criteria of both the AMPD and the ICD-11 formulations (maladaptive self- and inter-personal function) in adolescents (8). Hence, little is known about the mean differences between age groups in the common features of maladaptive personality function. Knowing whether to expect increases or decreases in maladaptive self and interpersonal function as young people develop through adolescence would help set expectations so that deviations from typical patterns can be identified (and treated, if necessary). Research on age mean differences in borderline traits as well Criterion B maladaptive trait function has typically shown higher means of maladaptive personality traits in mid- and late-adolescence compared to pre- or early-adolescence and young adulthood [e.g., (9, 10)]. As yet, it is not known whether mean differences among different age groups in maladaptive self and interpersonal function would follow a similar pattern.

Against this background, the current study aimed, first, to evaluate latent mean age differences across adolescence in one aspect of general personality function, namely maladaptive self and identity function. In both the AMPD and the ICD-11 formulations, maladaptive self and identity function forms a key component of the entry criterion of personality disorder. In the AMPD, for example, severe manifestations for disturbances in self and identity function include problems in experiencing oneself as unique with a sense of agency or autonomy, boundary problems, an incoherent self-image, fragile self-esteem, poor self-regulation, difficulties in establishing or achieving personal goals, and compromised ability to reflect on and understand own mental processes. Similarly, the ICD-11 operationalizes identity disturbance through stability and coherence of one's sense of identity, ability to maintain an overall positive and stable sense of self-worth, accuracy of one's view of one's characteristics, strengths, limitations and the capacity for self-direction (ability to plan, choose, and implement appropriate goals). Self and identity function is therefore increasingly recognized as a central dimension of personality pathology in both adults and adolescents (11, 12).

Our central hypothesis was that children in mid-adolescence would show higher levels of maladaptive self and identity function compared to early and late adolescents. This is based, firstly, on the Erikson's (13) theory of identity crisis in mid-adolescence; and the findings consistent with this theory from studies of adaptive self- and identity-development showing that as adolescents age into young adulthood, they progress through an identity formation process from an identity based on identifications (foreclosure status), through an exploration (moratorium) process, to a new configuration, based on the sum of its identificatory elements (achievement) (14, 15).

Therefore, mid-adolescence tends to be associated with a period of increased identity diffusion associated with exploration until adolescents reach a more consolidated sense of self toward the end of adolescence and early adulthood. Second, there is strong correlation between Criterion A and B traits [see (16) for a review of this literature]. If Criterion B maladaptive traits have higher means in mid adolescence than early and late adolescence as discussed earlier, it follows that maladaptive Criterion A function may also evidence the same pattern given high correlations between Criterion A and B.

To evaluate our hypotheses, we used latent variable modeling to evaluate age invariance in a large community-based sample of adolescents across seven age bands. Latent variable modeling (as opposed to mean difference scores in observed scores) offers a robust approach to evaluating age-group differences (17), because it models latent means that take into account measurement error that may bias estimates of the relations among the underlying constructs [e.g., (18)], thereby allowing for inference of valid comparisons across groups or over time (19).

As a second aim, we investigated associations between maladaptive identity and borderline features across different age groups to answer the question whether maladaptive identity tracks with adolescent personality pathology, as defined in Section II of the DSM-5. This is an important question for two reasons. The first relates to the suggested notion that borderline features, as traditionally defined in Section II of the DSM-5, reflects the general, shared features of personality pathology in the same way that Criterion A does (16, 20, 21). Demonstrating similar age mean differences in the two constructs simultaneously would offer further support that these two constructs are inextricably linked. Second, demonstrating associations of latent age mean differences between maladaptive identity and borderline features would further validate the relevance of maladaptive identity for personality pathology. Given well-established cross-sectional findings showing identity disturbance to be associated with borderline personality disorder features in adults and adolescents (22), combined with evidence of increases in both maladaptive traits and borderline features in mid-to-late adolescence discussed earlier, we expected that higher levels of maladaptive identity associated with mid-adolescence would track with borderline personality disorder features.

METHODS

Participants

A sample of $N = 2,381$ adolescents were recruited from the community in Germany and Switzerland at 11 schools, representing a mix of different socio-economic and educational backgrounds, aged 12–18 ($M = 14.92$, $SD = 1.94$; 46% male). The schools were selected to be representative and included junior high schools, middle schools, high schools, and vocational schools from urban and rural areas. There were roughly equal numbers of adolescents in each age group, which are detailed in **Table 2**. Data collection took place at the schools in a group-setting by classes or grades during one school hour. The adolescents were asked to fill out the questionnaires without talking, supervised by an undergraduate research assistant who

was available to answer questions. Prior to the assessment, the study was explained to the students and parents gave a written informed consent for study participation. A subset ($n = 1,165$) completed a measure of borderline personality features (BPFSC-11).

Measures

The Assessment of Identity Development in Adolescents [AIDA; (23)] assesses impairments in self and identity functioning, we use the AIDA, a measure specifically developed to capture maladaptive self and identity function in adolescents, purported to be a core dimension of personality pathology according to DSM-5 Section III (1, 13, 24), OPD-CA2 and the upcoming ICD-11 (2). The AIDA is a 58-item self-report measure for adolescents aged 12–18 years with five-option answering format (0 = no to 4 = yes). All items add up to the total scale Identity Diffusion; high scores suggest a high level of impairment. Similar to measures of AMPD informed maladaptive self- and identity-function, the AIDA therefore probes both adaptive or typical self- and identity-function (e.g., individuals can score 0 on all or most items) and maladaptive identity function. It therefore deviates from prior measures of maladaptive identity function in psychopathology research, which typically focus only on extreme ends of the severity continuum, as well as prior measures of adaptive identity functioning that do not provide adequate coverage of maladaptive identity function (25).

The construction of the AIDA was top-down and focused on clinical validity by integrating those aspects of self and identity development from different schools of thought that had empirically shown to be clinically valid in the description of relevant impairments; i.e., that had the potential to significantly discriminate healthy persons from personality disordered persons (25). Thus, to provide adequate coverage of the full construct of identity pathology, six different relevant aspects of impairments were combined to build the full AIDA-model and ordered into the two primary scales “Continuity” and “Coherence” that are also used in the OPD-CA2. For each aspect, item formulations had been developed that are short, unambiguous, clearly representing a variation from “healthy-to-impaired,” and easy to understand. For example for the area “Continuity,” aspect “identity-consolidating perspectives” the item: “I could list a few things that I can do very well.” (reverse scoring) or for the aspect “identity-consolidating roles” the item: “I feel like I am a valuable member of my family.” (reverse scoring). Likewise for the area “Consistency,” aspect “identity-integrating consistency in self-concepts” the item: “I often feel lost, as if I had no clear inner self.” Or for the aspect “identity-integrating cognitive self-experience” the item: “I am confused about what kind of person I really am.”

All items underwent empirical beta and pilot and validation tests before being integrated into the questionnaire. In order to be transparent concerning the roots and the full scope of the concept and in order to enable the investigation of possible distinct relations of the domain constructs (e.g., concerning relations to external variables, therapeutic focus or prognostic outcomes) the domain constructs may be used as subscales and scales in terms of narrative descriptive units. Subscales are not supposed to be statistically independent scales but on the contrary, they are

supposed to represent the clinical complex, but joint factor “Self and Identity pathology” together. Exploratory factor analysis supported a one-factor solution supporting a joint factor (23). However, scale reliabilities were good with Cronbach's alpha 0.94 on total, 0.87 and 0.92 on primary and 0.69 to 0.84 also on the subscale level and support the possibility of using the subscales as descriptive units.

Most important, the AIDA has shown excellent clinical utility. The AIDA total score of Identity Diffusion differed at a highly significant level and with a relevant effect size of $d = 2.6$ standard deviations between the general population (Mean 64.9, SD 27.6) and patients diagnosed with BPD according the SCID-2 (Mean 137.6, SD 25.1). The difference with patients with other PD types reached an effect size of $d = 2.0$, and patients without any PD (patients with internalizing or externalizing disorders) of $d = 0.9$. This speaks to the high relevance of the construct assessed by the AIDA to describe impairments associated with especially BPD but also other PD pathology (25, 26).

The AIDA was initially constructed in the German language. The development of versions in other languages includes culture-adapted translation by experts in the field of child and adolescent psychology, back-translation process and discussion with the original authors and empirical pilot and main tests in school and clinical samples to ensure basic psychometric qualities. Several translated versions had shown excellent internal consistency and construct validity, e.g., among Spanish speaking adolescents in Mexico (27) and English speaking adolescents in the US (28). In the current sample, internal consistency was excellent for the total score ($\alpha = 0.94$).

The Borderline Personality Features Scale for Children [BPFS-C-11; (29)] is an 11-item self-report measure of borderline personality features for children 9–18 years old. The BPFS-C-11 was developed using item response theory of the full, 24-item version of the measure (30) and has since been validated in separate samples demonstrating good criterion validity, internal consistency, and test-retest reliability (29, 31) and gender invariance (32). The German version of the BPFS-C-11 was developed using typical translation and back-translation procedures and evaluated in a pilot validation sample of $n = 393$ adolescents. In the current sample, Cronbach's α was 0.82.

Data Analytic Strategy

Descriptive analyses were conducted using SPSS 25 (33), factor analyses were conducted using Mplus 7 (34), and TVEM analyses were conducted using SAS 9.4 (35). There were four cases with missing data on a single scale; specifically, one case was missing the scale of Incoherence—Cognition; two cases missing Incoherence—Autonomy; and one case missing Discontinuity—Attributes. This amount of missing data was minimal and was estimated using maximum likelihood (ML) estimation. Missing data was minimal with no more than two cases with missing data. Values of skew and kurtosis ranged from 0.02 to 1.55 indicating that distribution of scales approximated a normal distribution in the full sample (see Table 1). Bivariate correlations were examined within the full sample. Fit of each model was examined using multiple fit indices (18): the root mean square error of approximation (RMSEA), with values of <0.08 indicating reasonable fit and values above 0.10 suggesting

TABLE 1 | Descriptive statistics and correlations for AIDA scales in full sample ($N = 2,381$).

	1	2	3	4	5	6
1. Discontinuity—attributes						
2. Discontinuity—relationships	0.52**					
3. Discontinuity—emotions	0.46**	0.63**				
4. Incoherence—self-consistency	0.49**	0.70**	0.73**			
5. Incoherence—autonomy	0.37**	0.54**	0.67**	0.65**		
6. Incoherence—cognitions	0.43**	0.60**	0.69**	0.72**	0.67**	
7. Borderline features	0.44**	0.62**	0.74**	0.75**	0.65**	0.70**
Mean (SD)	13.16 (5.51)	7.93 (6.10)	8.47 (5.06)	13.76 (7.93)	15.48 (7.47)	10.54 (5.45)
Range	0-36	0-40	0-28	0-44	0-48	0-32
Skew	0.37	1.15	0.67	0.71	0.48	0.46
Kurtosis	0.32	1.55	0.25	0.20	0.30	0.02

** $p < 0.01$.

poor fit (36); the comparative fit index [CFI; (37)], with values between 0.95 and 1.00 indicating excellent fit and values between 0.90 and 0.95 indicating acceptable fit (38); and the standardized root mean square residual (SRMR), with values < 0.08 indicating acceptable fit (38).

Prior to measurement invariance analyses, confirmatory factor analysis was used to evaluate model fit of a single factor defined by the six subscales within the full sample. Next, measurement invariance was examined across seven age groups using a hierarchical set of multigroup CFAs, with each subsequent model imposing additional constraints of equality across age groups. The baseline model tested configural invariance to examine whether the single factor structure of maladaptive identity was invariant across age groups. Next, metric invariance was tested to evaluate whether the pattern of factor loadings were equal across age groups. Finally, scalar invariance was tested to evaluate whether item intercepts were equal across age groups. Considering χ^2 difference tests are susceptible to similar problems as the χ^2 , including sample size dependency (18), two separate fit indices were used to evaluate difference in model fit: CFI change of < 0.010 and RMSEA change of < 0.015 (39) provided statistical evidence for invariance between the less constrained and more constrained model. Following invariance testing, latent factor means for identity diffusion adjusted for any invariance found were compared across age groups (each year compared to age 12 and the previous age group).

The association between borderline personality features and identity disturbance change over the course of adolescence was tested using the time-varying effect model [TVEM; (40, 41)], which estimates regression coefficients as a function of age. Intercept-only TVEM was used to examine borderline personality features across the age groups included in the study as a function of identity disturbance. Resulting regression coefficients are age-varying coefficients that expresses the change in borderline personality features for each unit change in identity disturbance as a smooth, non-parametric function of age. These models were run in SAS 9.4 using the %normal_TVEM macro [TVEM; (42)]. P-spline smoothing was used for the model, which automatically selects the optimal form of each coefficient function. These results are presented as a figure (Figure 2)

because coefficients are estimated as a function of continuous time, creating a number of coefficients across age too large to be presented in the text or a table.

RESULTS

Descriptive Results

Given that a subset of adolescents completed the BPFSC-11, we first examined differences between BPFSC-11 completers and non-completers. These results showed that completers were older ($M = 15.10$, $SD = 1.90$; $t(2378.88) = -4.26$, $p < 0.001$; $d = 0.18$), scored higher (more maladaptive) on the AIDA ($M = 73.58$, $SD = 33.14$; $t(2259.10) = -6.64$, $p < 0.001$; $d = 0.27$), and were 1.41 times more likely to be male [50% male; $\chi^2_{(1)} = 17.42$, $p < 0.001$] compared to non-completers ($M_{age} = 14.76$, $SD = 1.97$; $M_{LOPF} = 65.30$, $SD = 27.39$; 42% male). While these differences were statistically significant, effect sizes were small to minimal.

Table 1 lists the descriptive statistics of the six AIDA subscales within the full sample and Table 2 describes means and standard deviations of the subscales and total score within each age group.

Bivariate correlations revealed that subscales were all interrelated to a moderate to strong degree. AIDA subscales and borderline features correlated positively and strongly.

Age Invariance Results

Before conducting invariance testing, a confirmatory factor analysis was conducted; the model specified a single latent variable of maladaptive identity defined by the six AIDA subscales. The model was identified by fixing the factor variance to one and freely estimating all factor loadings. No covariances between subscales were estimated. This model demonstrated good fit to the data [$\chi^2_{(9)} = 206.04$, $p < 0.001$; RMSEA = 0.096; CFI = 0.976; SRMR = 0.027] and standardized estimates of factor loadings ranged from 0.554 (Discontinuity in attributes and goals) to 0.876 (Incoherence in consistent self-image) suggesting that a single dimension of maladaptive identity adequately represented variability across the different subscales.

Measurement invariance of this single factor model was tested across the seven age groups. First, to test configural invariance, the single factor model was evaluated across all age groups

TABLE 2 | Descriptive statistics by age group for observed and latent variables of identity diffusion.

	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
<i>N</i>	330	346	378	350	362	329	286
Observed							
Identity diffusion	64.04 (30.56)	61.81 (99.21)	68.02 (60.95)	74.61 (31.79)	73.09 (28.10)	61.17 (28.84)	63.51 (28.81)
Discontinuity—attributes	12.69 (5.28)	13.45 (5.60)	13.65 (5.75)	14.07 (5.72)	13.60 (5.16)	12.49 (5.50)	11.81 (5.22)
Discontinuity—relationships	6.73 (5.61)	8.11 (6.48)	7.83 (6.44)	9.14 (6.81)	8.71 (5.69)	7.54 (5.56)	7.24 (5.56)
Discontinuity—emotions	8.19 (5.42)	9.08 (5.52)	8.71 (5.21)	9.06 (5.06)	8.97 (4.73)	7.89 (4.72)	7.06 (4.22)
Incoherence—self-consistency	12.40 (7.96)	13.66 (8.46)	13.89 (8.23)	14.97 (8.29)	14.73 (7.49)	13.90 (7.70)	12.40 (6.71)
Incoherence—autonomy	14.45 (7.80)	15.64 (8.14)	15.62 (7.94)	16.06 (7.67)	16.22 (6.75)	15.21 (7.04)	14.93 (6.49)
Incoherence—cognitions	9.58 (5.83)	10.65 (6.02)	11.00 (5.67)	11.32 (5.54)	10.84 (4.93)	10.13 (4.93)	10.08 (4.88)
Latent							
Identity diffusion	0.00	0.18 (0.08)*	0.20 (0.08)*	0.33 (0.08)**	0.32 (0.09)**	0.11 (0.09)	−0.05 (0.09)

* $p < 0.05$, ** $p < 0.01$; descriptive statistics of observed variables include *M* and *SD* whereas descriptive statistics of latent variables include *M* and *SE*.

with factor loadings free to vary across groups. This model had satisfactory fit only across two out of three indices [$\chi^2_{(63)} = 264.72$, $p < 0.001$; RMSEA = 0.097; CFI = 0.976; SRMR = 0.031]. Modification indices were examined to determine what model changes may improve fit; it was suggested to allow Discontinuity in attributes and goals to correlate with Discontinuity in relationships and roles among 14-year-olds; however, RMSEA of this model was still not in the satisfactory range. The next model allowed Incoherence in consistent self-image to correlate with Discontinuity in relationships and roles among 12-year-olds; this model demonstrated satisfactory fit to the data [$\chi^2_{(61)} = 186.296$, $p < 0.001$; RMSEA = 0.078; CFI = 0.985; SRMR = 0.025], thereby making it the baseline model from which subsequent models were compared to.

To evaluate metric invariance, factor loadings were constrained to be equal across all age groups and the factor variance for all non-reference groups was freely estimated. This model demonstrated good fit [$\chi^2_{(91)} = 267.839$, $p < 0.001$; RMSEA = 0.076; CFI = 0.979; SRMR = 0.058] and change in CFI and RMSEA was below stated limits suggesting that there was metric invariance for the single factor model of maladaptive identity.

Finally, scalar invariance was tested by constraining intercepts to be equivalent across groups and allowing the factor mean for all non-reference groups to be freely estimated. This model demonstrated good fit [$\chi^2_{(121)} = 370.571$, $p < 0.001$; RMSEA = 0.078; CFI = 0.970; SRMR = 0.065] and change in CFI and RMSEA was below stated limits suggesting that there was scalar invariance for the single factor model of maladaptive identity.

Aim 1: Latent Mean Differences in Maladaptive Identity Across Age Groups

Because the latent mean of maladaptive identity was set to zero among 12-year-olds for identification purposes in the scalar model, latent means in subsequent age groups (listed in Table 2) could be examined for significant change from 12-year-olds. Results indicated that levels of maladaptive identity in 13–16-year-olds were significantly higher than latent mean levels in 12-year-olds. Latent means among 17- and 18-year olds were not

significantly different from 12-year-olds. Comparisons between adjacent age groups using Wald tests demonstrated that there was no significant increase in maladaptive identity between 13- and 14-year olds [0.01(0.08), $p = 0.929$], 14- and 15-year olds [0.12(0.08), $p = 0.122$], 15- and 16-year olds [−0.05(0.08), $p = 0.540$], 17- and 18-year olds [−0.14(0.07), $p = 0.068$]. However, there was a significant decrease in maladaptive identity between 16- and 17-year olds [−0.19(0.07), $p = 0.010$]. These findings are visually represented in Figure 1.

Aim 2: Associations Between Identity Disturbance and Borderline Features Across Age Groups

Lastly, we examined age-varying associations between borderline personality features and identity disturbance. Figure 2 presents the TVEM estimates plotted across age with 95% confidence intervals. We observed a positive and increasing association with borderline personality features between ages 12 to 13 (estimated value_{age12} = 1.92, SE = 0.48; 95% CI: 0.98, 2.86; estimated value_{age13} = 2.44, SE = 0.42; 95% CI: 1.62, 3.26), which largely leveled off, and then increased again from ages 15 to 18 (estimated value_{age15} = 2.51, SE = 0.42; 95% CI: 1.70, 3.33). The strongest association was observed around the age of 18 (estimated value = 3.26, SE = 0.54; 95% CI: 2.20, 4.31). These results suggest that throughout adolescence, maladaptive identity is significantly associated with increased borderline personality features, with these constructs becoming more closely associated with increasing age.

DISCUSSION

An empirically-based understanding of mean age differences in maladaptive personality is important to identify correlates and predictors of deviation from typical development in service of the early identification and treatment of personality pathology in young people (5–7). The current study aimed to evaluate age-group latent mean differences for maladaptive identity, which is one aspect of Level of Personality Functioning as well as ICD-11 entry criterion, in a large community sample of adolescents. We

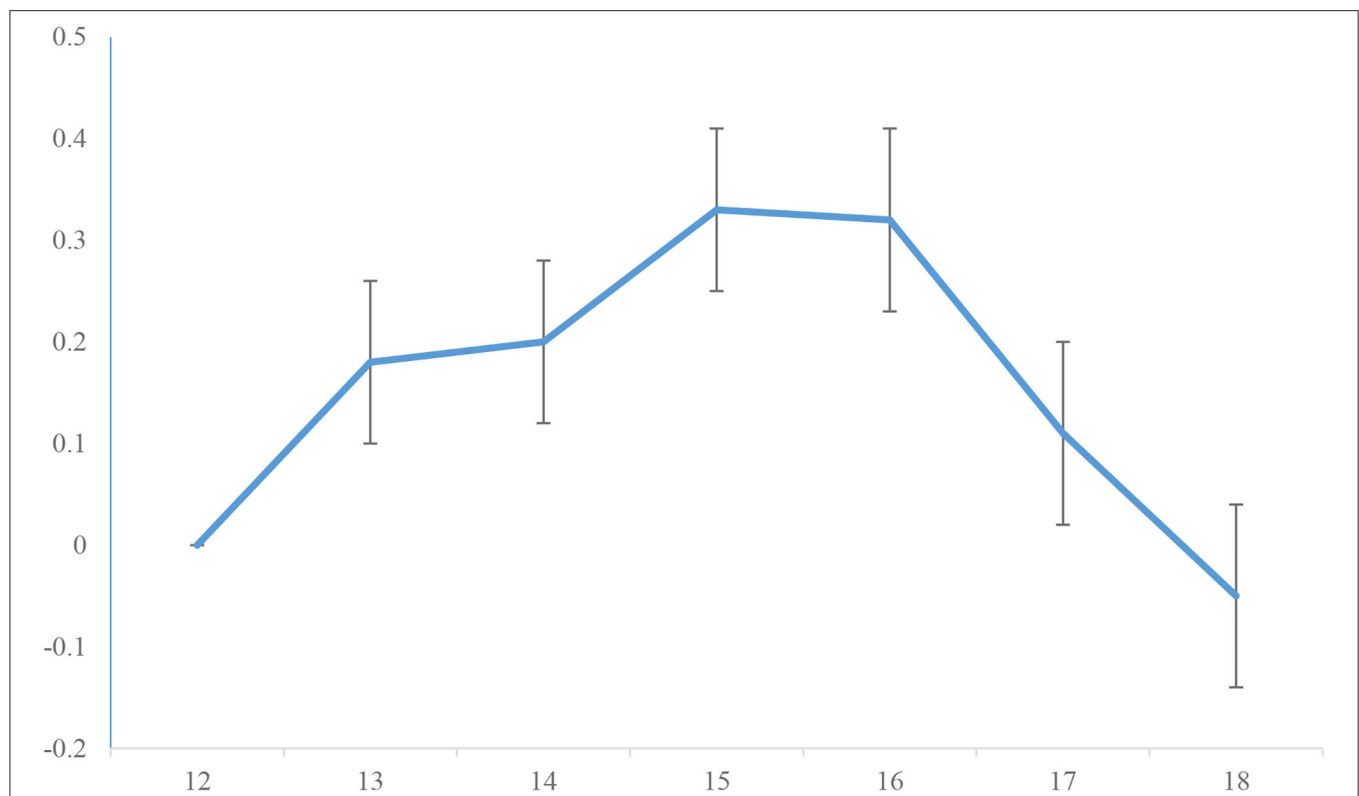


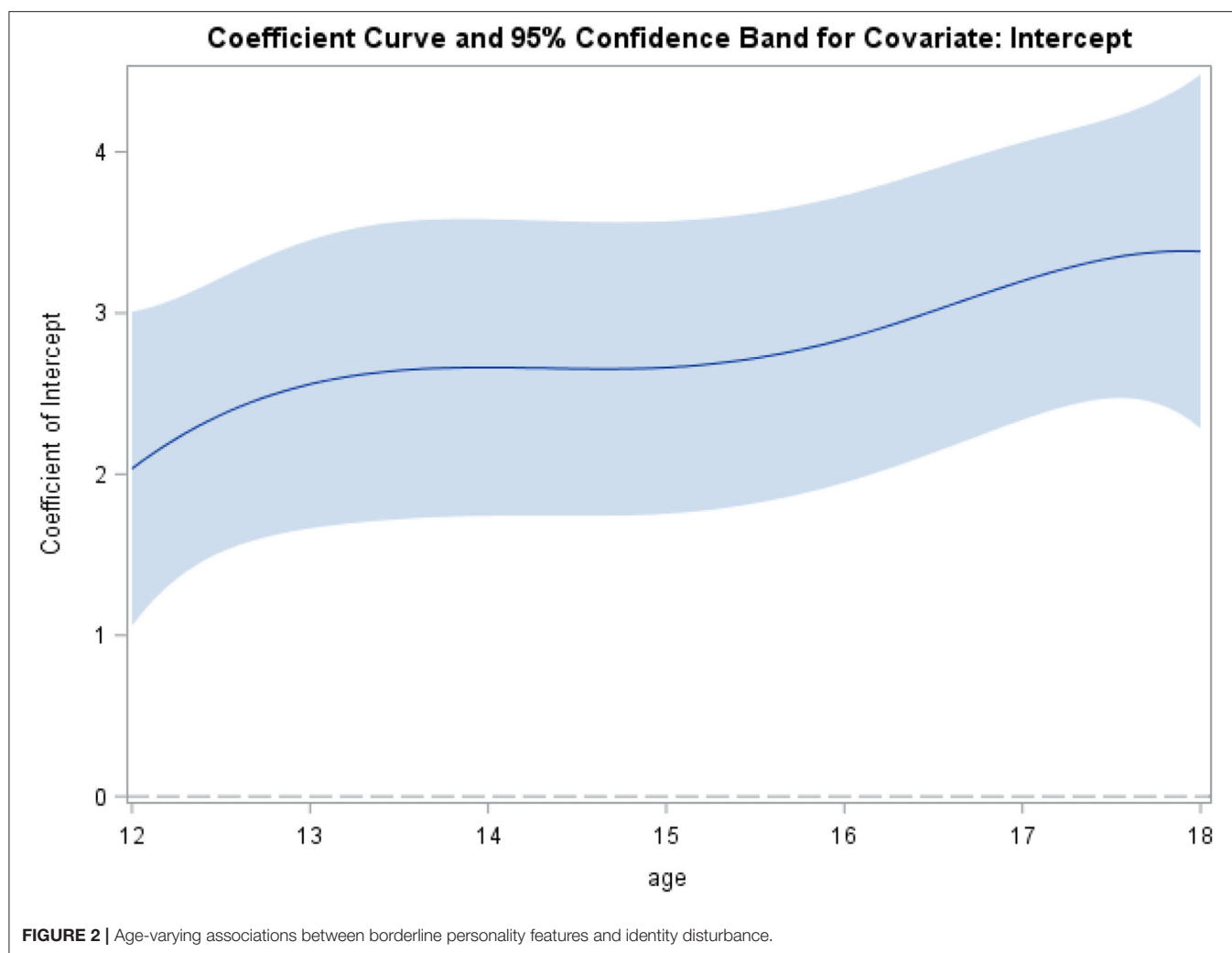
FIGURE 1 | Plot of latent means of identity diffusion for age groups 12 through 18.

were also interested in whether latent mean differences would track with latent mean differences in borderline pathology as conceptualized in Section II of the DSM-5.

Regarding our first aim, and consistent with our central hypothesis, our results suggest similar age mean differences for maladaptive identity development previously shown for maladaptive trait development [e.g., (43)], and DSM-5 Section II borderline personality disorder [e.g., (9, 21)]. Specifically, our results suggest higher levels of maladaptive identity after age 12, which remains consistent until age 17, after which it drops down to mean levels observed in 12-year-olds. Regarding our second aim, we showed that maladaptive identity is significantly associated with mean-level increases in borderline personality features, with these constructs becoming more closely associated with increasing age. This finding was consistent with our expectations based on prior cross-sectional research that have established an association between identity disturbance and borderline personality disorder (22). It was also consistent with more recent work utilizing another new measure of AMPD informed maladaptive identity function, the Dutch version of the Self-Concept and Identity Measure [SCIM; (44, 45)]. While this study did not examine associations between mean-level increases over time, it did show correlations between the SCIM and the BPFSC-11, as used in the current study.

Scholars from diverse theoretical backgrounds converge on the notion that a well-functioning identity enables one to experience feelings of personal meaning and well-being and

to find satisfying and fulfilling engagement in one's social context (46–50). These scholars also converge on the idea that adolescence confer a critical developmental period for the formation of a healthy identity (14). Substantial developmental research has been conducted to document progressive movement through Erikson's (47) identity formation process, from an identity based on identifications (foreclosure status), through an exploration (moratorium) process, to a new configuration, based on, but different from, the sum of its identificatory elements (achievement) (14, 15). By showing a return to baseline in maladaptive identity function by age 17, coupled with a strengthening of the association between maladaptive identity function and borderline features with increased age, our findings suggest an expected trajectory for the normative increase in maladaptive personality that can serve as a benchmark against which deviations can be monitored. While prominent scholars in the field have suggested that this be done (51, 52), until now, an empirically established expectation for age related changes in maladaptive personality function has not yet been determined. Pending replication, and given the nature of our sample—a community-based sample—our study provides the first description of a potential trajectory expected for typical development of Criterion A informed identity function against which atypical patterns can be evaluated. Clinical use of this normative trajectory as benchmark would necessitate explicit norms which could guide decision-making on whether an adolescent's scores are elevated even if normative



elevation is expected during middle adolescence. Adolescents with scores that significantly exceed the normative trajectory can thus be identified for intervention. Similarly, adolescents who stayed on the curve through middle adolescence, but failed to follow the normative decline in identity diffusion by late adolescence, can also be identified for intervention. By demonstrating strong correlations between means across different age groups between borderline features and maladaptive identity, the current study confirms that Criterion A (as measured by the AIDA) assesses a construct relevant to personality pathology in adolescence; and further emphasizes the need for intervention in adolescents who “fall off the normative curve.”

That maladaptive identity and personality pathology both increase over adolescence as demonstrated in the current study is consistent with developmental considerations incorporated in the ICD-11 (2) conceptualization of personality disorder. The ICD-11, for instance points out that “Personality Disorder is not typically diagnosed in pre-adolescent children. Over the course of their development, children integrate knowledge and experience about themselves and other people into a coherent identity and

sense of self, as well as into individual styles of interacting with others. Different children vary substantially in the rate at which this integration occurs, and there is also substantial variation in the rate of integration within individuals over time. Therefore, it is very difficult to determine whether a pre-adolescent child exhibits problems in functioning in aspects of the self, such as identity, self-worth, accuracy of self-view, or self-direction, because these functions are not fully developed in children.” These ideas about how personality disorder is tied to self-and identity development has been the focus of recent work in developmental personality pathology (11, 12).

Our findings also contribute to the psychometric basis of the AIDA. First, the AIDA items appear to be best represented by a single latent factor of maladaptive self and identity function. This finding is consistent with prior studies using the AIDA (53), and is of note especially when considering the fact that the AIDA was developed, in accordance with most theories of identity (46–50) and identity diffusion (54, 55) to cover both intra- and interpersonal components (25). While the extent to which the AIDA overlaps with measures of Level of Personality Function remains an empirical question, factor analytic evidence

for measures of the Level of Personality Function Scale suggest a unidimensional factor structure (56–58) consistent with the idea that aspects of self and interpersonal function are inextricably linked (59, 60).

Second, we demonstrated that the AIDA is equally valid for use across adolescent age groups. Invariance suggest that underlying factors really do reflect the same construct and that measurements themselves operate in the same way across age groups which is important in controversies of “changing persons vs. changing tests” (61). Even so, such methodological considerations are still regularly disregarded in contemporary applied developmental research (62). Here, we demonstrate that the AIDA taps the latent construct of maladaptive identity development similarly across adolescent age groups so that meaningful developmental inferences and comparisons can be made. Other studies have shown similar age invariance of measures of adaptive identity function based on Erikson’s (13) model [e.g., (63)] as well as maladaptive identity function (64). This should facilitate further work in continuity and change also for within person development studies of maladaptive identity.

The current study has several limitations. First, while we sampled a considerable number of adolescents across ages, the cross-sectional nature of our study limits within-person developmental inferences that can be made. Future research should examine these constructs longitudinally and furthermore examine growth curves individually and in association with each other. Helpful examples in this regard can be drawn on from typical/adaptive identity development literature [e.g., (63)]. In addition, our sample was limited to Swiss and German adolescents and there is a need to replicate these findings among those from various ethno-cultural backgrounds, as well as clinical populations. Finally, follow-up through young adulthood

would add important information about the expected age-related changes in maladaptive identity beyond adolescence.

Despite these limitations, we hope that these findings begin to provide preliminary support for the idea that adaptive self and identity function (which is intractably linked to adaptive interpersonal function) constitute a developmental milestone, that, if missed, may impede the binding of personality, and ultimately, the healthy transformation from child to adult personality function (12, 16).

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 Ethics Committee of Psychiatric University Clinics (UPK) Basel. Written informed consent to participate in this study was provided by the participants’ legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

CS conceptualized the study and analytic plan and wrote the first draft. SV conducted the analyses and made contributions to all aspects of the manuscript. MB, KS, and KG collected the data, were principal investigators on the study, and provided input on the methods, introduction, and discussion sections of the paper. All authors contributed to the article and approved the submitted version.

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Explicit and Implicit Measures of Identity Diffusion in Adolescent Girls With Borderline Personality Disorder

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The present study is the first to examine both the implicit and explicit self-concept of identity diffusion in a sample of adolescent patients with borderline personality disorder (BPD). A clinical sample of adolescent girls with diagnosed BPD ($N = 30$; M age = 15.9 years) and a sample of girls with a healthy personality development ($N = 33$; M age = 16.6 years) completed an implicit association test (IAT) that was adjusted to identity diffusion, the core of BPD. Common domains of child and adolescent psychopathology and core components of BPD were assessed using self-reports on the Strengths and Difficulties Questionnaire (SDQ), the Borderline Personality Features Scale for Children—11 (BPFSC-11) and the Assessment of Identity Development in Adolescence (AIDA). BPD patients scored significantly higher on explicit measures of borderline pathology than girls with a healthy personality development. A crucial finding for this study was that girls with BPD had a significantly lower implicit preference for stability than their counterparts in the control group. Moreover, explicit measures of borderline personality pathology were significantly correlated with an implicit measure of identity diffusion, the core of BPD. However, when looking at the predictive ability of implicit and explicit measures, only explicit identity diffusion was significantly associated with borderline features. Our data suggests that adolescent girls with BPD differ from healthy individuals not only in their conscious representation but also in their implicit representation of the self with regard to BPD related characteristics, which further advances the need for the identification of at-risk adolescents.

Keywords: identity diffusion, borderline personality disorder, adolescence, implicit association test, AIDA, BPFSC-11

INTRODUCTION

Adolescence is a complex developmental process, which still poses a challenge. For the adolescent, it is a period of profound biological, social, and psychological transformations and can be a tumultuous time, even when unfolding in a healthy manner. Moreover, it is a time of major life-impacting developmental tasks that one should complete in order to become a functional adult (1). For researchers and clinicians, the challenge is to determine what constitutes normal development and what should be the focus of concern and treatment (2).

A key process of normative adolescent development is identity formation (3). The importance of this process is evident through the impact it has on other areas of the individual's life. A continuous and coherent identity, manifesting as a clear self-definition and distinction yet connectedness with others, which is stable and persists over time and situations (3), provides the adolescent, and later the adult, with the capacity to form and maintain meaningful and reciprocal relationships, long-term goals and interests, and a positive self-image (4). Identity diffusion, on the other hand, manifests as a lack of self and other concept integration and an inability to set boundaries between self and others (5–7). Again, this affects other parts of personality functioning—intimacy, empathy, and self-direction (8). In light of these findings, focusing on identity diffusion seems crucial as it is among the most important symptoms leading to a correct diagnosis of borderline personality disorder (BPD) in adulthood (9), a severely impairing mental disorder characterized by a pervasive pattern of disturbed interpersonal functioning, self-image, affects, and heightened impulsivity (10). Furthermore, it seems that adolescents with prevalent borderline features struggle with many aspects of a distorted sense of self and that identity diffusion is the most important factor influencing the severity of their BPD (11).

This was recognized by the Alternative Model of Personality Disorders in the most recent edition of Diagnostic and Statistical Manual of Mental Disorders (10) and the upcoming International Classification of Diseases, which put identity disturbance as a core criterion in diagnosing BPD and personality disorders in general (7, 12). The aforementioned (sections of) classifications do not discourage the diagnosis of BPD in adolescence, but rather require that the symptoms be “relatively stable across time, with onsets that can be traced back to at least adolescence or early adulthood” (10, p. 761). Moreover, researchers are providing a growing body of evidence that BPD is a valid, reliable, and clinically important construct in adolescence (13–15). However, clinicians are still reluctant to diagnose personality disorders in adolescents (16), and consequently, we are failing to identify those who are in need of attention and treatment (17). Research and clinical experience show it is necessary to intervene during this developmental period, thus, we need measures that differentiate adolescents with a normal identity crisis from those with a diffused identity for prevention and early intervention purposes (18, 19). Dimensional models of PD are particularly well-suited for adolescents, as we can identify at-risk youth and (15), through early interventions, guide them to a less severely impaired identity development (14).

In a recent review, Kaufman and Meddaoui (20) concluded that even though identity function is central to BPD research the topic is severely under-represented in empirical studies. One challenge with identity pathology stems from the notion that identity is a private and subjective experience. Identity pathology is usually measured by direct, explicit measures in the form of questionnaires and self-reports. The authors call for multiple assessment approaches to comprehensively understand the topic and distinguish pathological identity problems from normal struggles.

In the last twenty years, we have witnessed the development of so-called implicit measures for assessing psychological traits that influence behavior in an automatic way. These measures do not rely on self-assessment but indirectly assess individual behavior on test tasks (21). The Implicit Association Test (IAT) is the most commonly used, a computer-based task where participants are presented with a word stimulus and required to classify it into overarching categories as quickly as possible (22). Presumably, it is a measure of automatic associations in memory and the reaction times reflect the strength of associations between different concepts. Originally, it was used to measure prejudice and later on to assess self-esteem and implicit self-concepts (23). The importance of such research is also emphasized in the field of mental disorders and personality pathology. Studies suggest that implicit cognitive processes play an important role in psychopathology and that symptomatic individuals differ from healthy control groups in the way they respond to characteristics associated with a mental disorder (24, 25). However, the results of studies vary according to the disorder, and it seems the two different IATs share the basic structure of tasks, but that is their only commonality (26); therefore, it is necessary to adjust the IAT for each disorder (24). In the context of BPD, IATs have been utilized to assess implicit associations between the self-concept and shame (27, 28), as well as neuroticism (29) and aggressiveness (30). All studies reported significant differences between women with BPD and a healthy control group, which is in line with findings that an IAT can show mean differences between groups and classify individuals into opposing groups (22, 31). When an IAT was used to examine the association between BPD features and implicit shame-prone self-concepts in children and adolescents, identity problems in girls were the only significant predictor (32). The authors name the identity problem component of BPD as a priority for future clinical and developmental research. Until now, we know of no other study that would include a clinical sample of adolescents with BPD or would adjust an IAT to the topic of identity diffusion.

The current study assessed the implicit self-concept of identity diffusion with an IAT adjusted to the subscales of an explicit, self-report questionnaire measuring identity diffusion in adolescents (33). The AIDA-IAT was developed, administered, and scored according to recommended IAT procedures (34, 35) in collaboration with the original authors of AIDA. Implicit associations are thought to reflect maladaptive schemas, and identity diffusion can be considered a cognitive symptom based on the assumption that the identity of patients with BPD is based on predominantly negative self-views and perceptions of the self (36). AIDA-IAT was used to index the relative strength of implicit associations between the target concept of “self” (vs. “other”) and the attribute concept of “instability” (vs. “stability”), representing the core aspect of BPD identity diffusion. The premise was that the task would become easier, and the word stimuli would get classified faster as target and attribute category pairings match the participant's automatic associations and vice versa when they do not. Therefore, when an individual whose self-concept is highly associated with instability completes the task, their reaction time should be faster when the target concept

“I” and the attribute concept “instability” are assigned to the same response key in comparison with the presentation of “I” and “stability” words.

Aims of the Study, Hypothesis

This study aimed to comprehensively assess identity development in adolescents. To our knowledge, this is the first study to date that assesses an adolescent patient population with both explicit and implicit measures of identity diffusion. Information about the prevalence of BPD across sexes still varies (15). However, women are more likely to seek help for mental health issues associated with BPD (10), which was also observed in our study, and therefore only girls were included in the sample.

More specifically, the objectives of the study were, firstly, to assess borderline features and identity diffusion with self-report inventories (33, 37), which represented the explicit part of the assessment. In line with previous studies (11, 33), we expected girls with BPD features to achieve higher scores on scales measuring borderline features and scales of identity diffusion than girls with healthy identity development.

Secondly, regarding the implicit assessment of identity diffusion, we expected patients with BPD features to classify pairings of self and instability faster than the healthy control group, which we expected to classify pairings of self and stability faster. This hypothesis was based on previous studies that assessed other aspects of BPD symptomatology and reported differences between patient and control groups [e.g., (28, 30)].

Thirdly, we wanted to see if our IAT indexes assess the same or different underlying latent constructs by checking if they parallel direct measures that rely on a self-report. There has been a significant debate whether implicit measures assess separable but positively related processes to explicit measures (23, 38) or whether direct and indirect measures reflect conceptually overlapping mental content expressed in a different manner and influenced by other factors (39). We hypothesized that an implicit identity diffusion-prone self-concept would positively correlate to explicit measures of identity diffusion and borderline features based on the findings of Wilkinson-Ryan and Westen (40). They found that patients with BPD are not unaware or unconcerned about their identity disturbances, as previously thought, but rather that they are distressed about their lack of coherence. Therefore, we expected that they can report on it explicitly on self-report measures and implicitly through performance-based tasks.

Lastly, one of the many critiques of the AIDA-IAT method is that implicit measures lack predictive validity over explicit measures (41, 42) and that the most promising use of an IAT is as a complementary method (31). In order to determine if the AIDA-IAT can be a valuable addition to the original AIDA, we analyzed if implicit identity diffusion is associated with borderline features above and beyond explicit measures of identity diffusion.

METHOD

Sample and Procedures

The sample consisted of 30 adolescent girls with confirmed BPD. The participants were undergoing inpatient or outpatient treatment at the Unit for Child and Adolescent Psychiatry, University Medical Centre Maribor. Diagnosis of BPD was made by a certified child and adolescent psychiatrist that was treating the adolescent, and it was based on clinical experience, a checklist of BPD symptoms based on the DSM-5 and verified by using the Borderline Personality Features Scale for Children-11 (BPFSC-11; 37) and the Assessment of Identity Development in Adolescence (AIDA; 33). Aside from confirmed identity diffusion, inclusion criteria demanded that participants were aged between 12 and 18 and have sufficient language and cognitive abilities to understand and complete the questionnaires and IAT. Participants were excluded if they had a concurrent diagnosis of an autism spectrum disorder, acute psychotic disorder, were in acute distress or had an organic disorder or injury. The mean age of participants in the clinical sample was 15.9 (SD = 1.2). During data collection, no boys were in treatment for BPD; therefore, no boys were included in the healthy control sample either. The sample of healthy controls consisted of 33 adolescent girls with healthy identity development. Recruitment of the healthy control group took place at one elementary and two secondary schools in Maribor. Adolescent girls included in this sample were not assessed by a child and adolescent psychiatrist as they were not in treatment for any mental health issue, therefore no checklist of BPD diagnostic criteria based on DSM-5 was applied. The assessment in this group was based on self-reports mentioned above and AIDA-IAT. Participants were aged between 13 and 18, with a mean age of 16.6 (SD = 0.9). The sample size was based on similar papers from the field [e.g., (29, 30)]. All participants were assessed individually with the AIDA-IAT using a laptop and completed self-report measures by paper and pen after informed consent was obtained by their legal guardians. The study was approved by the Republic of Slovenia National Medical Ethics Committee (Ref. No.: 0120-586/2019/4).

Measures

Self-Report Measures

Borderline features were assessed using the Borderline Personality Features Scale-11 (BPFSC-11; 37), an 11-item measure for ages nine and older. Items reflect core BPD characteristics, namely affective instability, identity problems, and impaired interpersonal relations. Self-harm was not included on the scale. These items assess how participants feel about themselves and others and are rated on a five-point Likert-type scale, ranging from “not true at all” to “always true.” The BPFSC-11 yields a total score (range: 11–55) measuring the overall level of borderline characteristics; the higher the BPFSC-11 total score, the greater the intensity of BPD features. Unpublished results by Plakolm Erlač and Gregorič Kumperščak show adequate psychometric properties of the scale in a Slovenian school and clinical sample.

Identity diffusion was assessed using the Assessment of Identity Development in Adolescence (AIDA; 33). It is a self-report measure that assesses identity development in adolescence, differentiating between healthy personality development and the clinically relevant state of identity diffusion, thus representing the core of BPD. The assessment has a 58-item measure ranging from 0 = no to 4 = yes. The total score varies from “Identity Integration” to “Identity Diffusion,” discriminating between healthy controls and patients with BPD. Reflecting the theoretical origins and complexity of the concept, the total scale was divided into two domains of Discontinuity and Incoherence, each containing three different aspects of identity development. However, in this study, only the total scale was used. In a Slovenian school and clinical sample, unpublished results by Plakolm Erlač and Gregorič Kumperščak showed excellent psychometric properties of the scale and were able to support a one-factor solution speaking for a joint factor of “Identity pathology” proposed by the original authors.

The 25-item Strengths and Difficulties Questionnaire (SDQ; 43) was utilized to check for psychopathology that is commonly comorbid to BPD. It screens for child and adolescent adjustment in the domains of Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Problems, and Prosocial Behavior. Each question is graded on a scale from 0 = not true to 2 = completely true based on the answers. The overall result is the sum of the results of the individual subscales. A higher score implies a greater probability of mental health difficulties. The validity and reliability of the measure has been examined by the original authors of the measure (43). An official translated version was since utilized in other studies conducted with Slovenian samples (44).

AIDA-IAT

The computer task was presented in a standard seven-block design structure (22). Each consisted of colored words appearing on a black background; target words and categories appeared in white, and attribute words and categories appeared in green. Words appeared one by one in the center of the screen, and the category names remained in the upper corners of the screen throughout all testing blocks. Six words were used to represent the target categories of Self (“me,” “myself,” “my,” “mine,” “I,” “Self”), and Other (“other,” “their,” “them,” “they,” “she,” “he”), as well as six of the attribute categories of Instability (“aimless,” “alone,” “confused,” “inconsistent,” “weak,” “chaotic”), and Stability (“systematic,” “connected,” “confident,” “consistent,” “strong,” “organized”). The words representing the attribute category Instability coincided with the domains of AIDA and were adjusted to match core features of BPD, namely identity diffusion.

There were three main categorization tasks in the AIDA-IAT: single-category classification (Block 1, 2, and 5), incompatible (Block 3 and 4) and compatible configuration of double categorization (Block 6 and 7). The AIDA-IAT started by training participants in the first Block to press the left response key (“E” on keyboard) when an attribute category “Stability” item appeared on the screen and the right response key (“I” on keyboard) when an “Instability” item appeared. In Block 2,

participants were trained to press left for the target category “I” items and right for “Other” items. Blocks 3 and 4 combined both discrimination tasks, making so-called incompatible combined blocks where items representing “Stability” and “I” shared the same left response key and those representing “Instability” and “Other” shared the right response key. The following Block 5 was again a single discrimination task switching the positions of target categories so that “Other” items were assigned to the left and “I” items were assigned to the right. The final Blocks 6 and 7 combined the attribute and the previously reversed target discrimination, making so-called compatible combined blocks where the “Stability” and “Other” shared the same left response key and the “Instability” and “I” items shared the right key. The first set in the combined blocks (Block 3 and 6) was for practice, and the second one was the actual testing set (Block 4 and 7).

Based on previous studies, we added 20 trials to the block of reversed target discrimination to reduce the undesirable order effect of combined blocks (35, 45). One of the common construct-unrelated effects observed on the IAT is the tendency for the precedent combined task to interfere with performance in the subsequent combined task. Specifically, participants who complete the compatible combined blocks before the incompatible usually show larger IAT effects than those who complete the combined blocks in a reversed order (35, 45). Nosek and colleagues (35) reported that extra practice trials could not always eliminate the order effects and suggest counterbalancing the order of the two critical combined tasks across participants to control for it, which we applied in our study.

An IAT is designed so that the participant can only indicate if the stimulus belongs to a category on the right or left side of the screen by pressing one of the two answer keys. Thus, participants classify stimuli from four concepts into two response options by pressing corresponding response keys. Upon pressing the wrong key a red “X” appeared, prompting participants to press the other key. The red “X” disappeared from the screen once the other key was pressed, and the subsequent stimulus appeared 150 ms after.

The AIDA-IAT was programmed in Inquisit (Version 6.4.2) by Millisecond Software and administered on a 15-in. laptop. This software was programmed to calculate an “instability” index for each participant and was based on the IAT scoring algorithm published by Greenwald, Nosek, and Banaji (34), which meant that the calculation of the final IAT index for instability—the D score—included mean latencies from both, practice and actual test blocks. A higher positive D score indicated a stronger implicit association between self-concept and instability, and a higher negative D score indicated an implicit association between self-concept and stability. Trials with latencies >10,000 ms were supposed to be excluded from the calculation of the D score, and if more than 10% of latencies were faster than 300 ms, the participants data would be excluded, however there were no such examples in our sample. The authors of the improved algorithm claim it is supposed to almost completely eliminate the artifact of an IAT measure producing falsely extreme IAT scores for people responding more slowly than the comparing group. This is especially useful in studies comparing IAT scores for groups that differ in speed of responding, such as children vs. adults, or in our example, when we expect that patients with BPD

reporting of hyperactivity and inattention problems would have more problems learning the task compared to healthy controls.

Statistical Analyses

The *t*-test for independent samples and Pearson product-moment correlations were performed to explore differences between borderline and control groups and relationships between scale scores, respectively. Effect sizes for *t*-test results are expressed as Cohen's *d*, whereby $d \approx 0.2$ conventionally represents a small, $d \approx 0.5$ a medium, and $d \approx 0.8$ a large effect. Multivariate linear regression analysis was run to analyse the incremental power of the AIDA-IAT over AIDA. Explicit and implicit identity diffusion were entered as independent variables and borderline features was entered as outcome variables. All analyses were performed with JASP 0.14.1. The significance level was set at $p < 0.05$.

RESULTS

Table 1 presents demographic and clinical data. Girls with BPD and HC differed in age. In the clinical sample the experts identified five or more symptoms of BPD, which is in concordance with DSM-5 requirements when setting the diagnosis (**Table 1**), in 21 out of 30 participants. Four symptoms were identified in six patients and three patients received a total score of three. Corresponding with our inclusion criteria and seen in **Table 1**, girls with BPD scored significantly higher on the measure of borderline pathology than the control group. Concerning the explicit measure of identity diffusion, girls with BPD reported significantly higher levels of identity diffusion compared to girls with a healthy personality development, who reported higher levels of identity integration. The effect sizes for these differences were large ($d > 2.0$; **Table 1**). The participants also differed in all SDQ symptom scores, with effect sizes ranging from $d \approx -0.6$ (prosocial behavior) to $d \approx 1.8$ (emotional symptoms) (**Table 1**). In the clinical sample 29 girls reported of heightened levels of emotional symptoms, 13 of conduct problems, 25 girls reported of symptoms of hyperactivity and inattention, 20 of having troubles in peer relationships and one girl reported of lack of prosocial behavior.

To avoid order effects, we counterbalanced the participants and checked for differences between the participants who started with a congruent condition and those who started with an incongruent condition. The independent *t*-test showed that the difference was not significant [$t_{(61)} = -0.52, p = 0.608$].

Most importantly and crucially for our study, girls with BPD had a significantly lower implicit preference for stability than their female counterparts in the control group; the corresponding effect size was high ($d \approx 1.04$; **Table 1**).

Graphical inspection of both the distribution of the explicit measure of identity diffusion self-report and implicitly assessed identity diffusion revealed only a few outliers in the latter, $n = 4$ in the patient group and $n = 1$ in the healthy control group (**Figure 1**). To test their potential to distort the reported analyses, we recalculated all central analyses with and without

these outliers. The control analysis did not reveal a notable difference; therefore, we did not exclude them.

Zero-order correlations were produced separately for the clinical sample and the control group as well as for the sample as a whole. **Table 2** presents the relationship between AIDA-IAT D-scores, the SDQ subscales, BPFSC-11, and AIDA scores for the full sample. As seen in **Table 2**, explicit measures of borderline personality pathology were significantly correlated with implicit measures of identity diffusion and each other. When looking separately, we observed a few notable deviations from the full-sample results presented in **Table 2**. For example, the clinical sample IAT score was significantly correlated with the BPFSC-11 total scale ($r = 0.49, p < 0.05$) and SDQ—Peer problems ($r = 0.45, p < 0.05$), yet not with the AIDA—Identity diffusion ($r = 0.31, ns$). In the healthy control sample, the IAT score was significantly correlated with SDQ—Emotional symptoms ($r = 0.37, p < 0.05$).

A multiple regression analysis was conducted to examine whether explicit and implicit identity diffusion are associated with borderline features. When controlling for each other, results indicated that borderline features can be predicted by implicit and explicit identity diffusion [$F_{(2,60)} = 63.13, p < 0.001, R^2_{adj} = 0.68$]. However, when considered simultaneously, only explicit identity diffusion predicted borderline features ($\beta = 0.74, p < 0.001$), as implicit identity diffusion became non-significant ($\beta = 0.15, p = 0.08$). This result implies that explicit identity diffusion overshadows implicit identity diffusion when predicting borderline features.

DISCUSSION

In the present study, the explicit and implicit self-concept of identity diffusion was investigated for the first time in adolescent girls with diagnosed BPD compared to girls with a healthy personality development using direct (AIDA and BPFSC-11) and indirect (AIDA-IAT) measures.

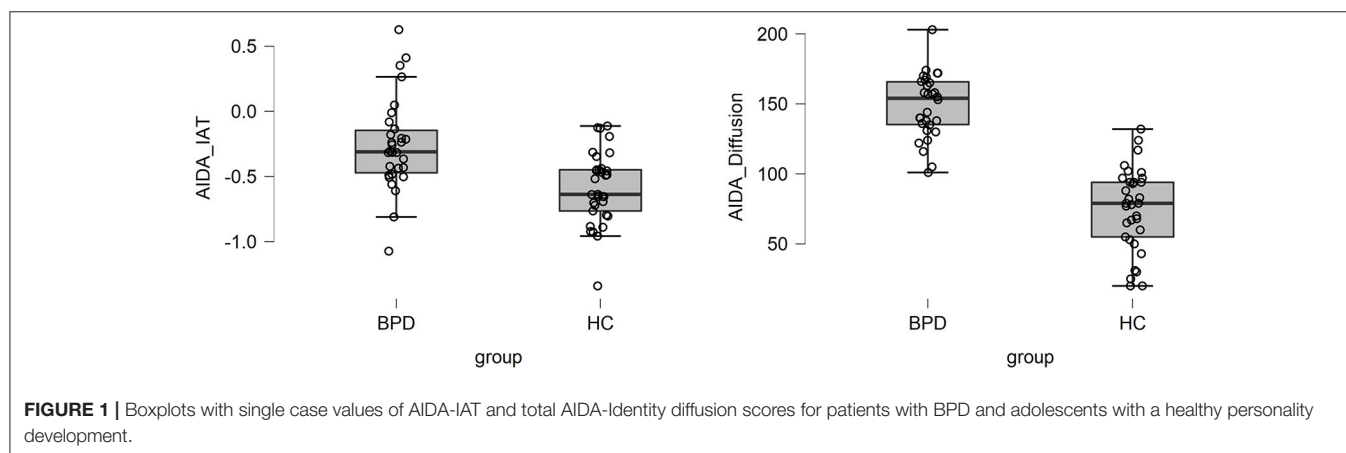
As expected and reported in previous studies (11, 33), according to our data girls with BPD reported higher levels of borderline features and identity diffusion, compared to girls with a normal identity development who reported of integrated identity. Previously thought identity diffusion was just a characteristic of adolescence, these findings add to the growing body of strong and consistent evidence indicating that adolescents with borderline features struggle with a distorted sense of self.

In order to gain a deeper understanding of various aspects of identity pathology in adolescents, we applied a multimodal methodological approach. The last decade has provided us with a plentitude of research indicating the importance of implicit negative self-concepts in different diagnostic groups (42). Although identity disturbance proved to be the central construct in diagnosing BPD (40), no other study adjusted the method to the self-concept of identity diffusion. Our findings regarding the implicit assessment only somewhat confirm our hypothesis. Girls with BPD did differ significantly from the control group, and the difference was substantial (as indicated by the observed

TABLE 1 | Demographic and clinical characteristics of girls with BPD and healthy control participants.

	BPD patients (n = 30)		HC (n = 33)		Statistics		
	M	SD	M	SD	t	p	d
Age	15.93	1.23	16.61	0.93	−2.46	0.017	−0.62
BPD checklist	5.07	1.17					
SDQ							
Emotional symptoms	8.13	1.53	4.58	2.32	7.12	<0.001	1.80
Conduct problems	3.27	2.12	1.55	1.03	4.16	<0.001	1.05
Hyperactivity/inattention	6.83	2.15	4.46	2.24	4.29	<0.001	1.08
Peer problems	4.37	2.57	2.42	1.89	3.44	0.001	0.87
Prosocial behavior	7.67	1.75	8.64	1.32	−2.50	0.015	−0.63
Total scale	22.60	5.90	13.00	5.12	6.91	<0.001	1.74
BPFSC-11	39.30	4.0	29.42	4.47	9.23	<0.001	2.33
AIDA—identity diffusion	148.63	22.75	74.97	29.58	11.00	<0.001	2.78
AIDA—IAT ^a	−0.26	0.35	−0.59	0.28	4.12	<0.001	1.04

BPD, borderline personality disorder; HC, healthy controls; BPD checklist, BPD diagnostic criteria based on DSM-5; SDQ, Strengths and difficulties questionnaire; BPFSC-11, Borderline Features Scale for Children – 11; AIDA, Assessment of Identity Development in Adolescence; AIDA-IAT, Identity Diffusion Self-Concept Implicit Association Test. ^a higher negative AIDA-IAT scores indicate stronger *me-stable* vs. *other-unstable* associations, while lower negative AIDA-IAT scores are indicative of a weaker association.



large effect size). However, we anticipated that girls with BPD would manifest higher implicit identity diffusion scores than their healthy counterparts, whereas they only had a weaker association with stability than girls with a healthy personality development. Five girls from the patient sample got results completely consistent with our hypothesis. However, no girls from the healthy control group got results inconsistent with our expectations. This implies that during this potentially turbulent time of adolescence, girls with a healthy personality development associate themselves with a stable, consistent, and coherent self-concept. On the contrary, adolescent girls with BPD do not associate themselves either with stability or instability, implying a lack of an integrated or a coherent self. When they have a stronger association, their identity is defined by more negative self-views, consistent with Gad and colleagues' findings (36).

Furthermore, we found a moderate relationship between explicitly assessed borderline features and the implicit AIDA-IAT measure. Interestingly, the relationship between the explicit and implicit identity diffusion was weak and non-significant.

Even though this result aligns with recent reviews reporting small-to-moderate implicit-explicit correlations between self-reports and disorder-specific associations (25), our findings are still somewhat counter-intuitive. The AIDA-IAT consisted of words in line with the explicit identity diffusion questionnaire AIDA, which leads us to expect a stronger association than the borderline features in general. A possible explanation of this finding could be the fact that BPFSC-11 also includes items assessing Identity problems, which are a core component of borderline features and was already found to predict implicit levels of shame-prone self-concept (another factor associated with BPD) in a community sample of girls aged 10–14 (32). Concerning the current study, this was the first application of the AIDA-IAT, and it is possible the stimulus chosen to represent the attributes of (in)stability also tap onto other aspects of borderline features that are captured by the BPFSC-11. Another interesting theory emerging from these results could be that the lack of integration between controlled processing and automatic, implicit processing is caused by impairments in mentalization,

TABLE 2 | Intercorrelations between AIDA-IAT, self-reported mental-health difficulties, borderline symptoms, and identity diffusion.

	1	2	3	4	5	6	7	8	9
1. IAT D (AIDA) score	—								
2. SDQ emotional symptoms	0.42**	—							
3. SDQ conduct problems	0.28*	0.40**	—						
4. SDQ hyperactivity/inattention	0.30*	0.46**	0.59**	—					
5. SDQ peer problems	0.42**	0.55**	0.37**	0.39*	—				
6. SDQ prosocial	−0.31*	−0.27*	−0.25*	−0.34**	−0.51**	—			
7. SDQ total difficulties	0.46**	0.81**	0.73**	0.79**	0.76**	−0.45**	—		
8. BPFSC-11 SUM	0.51**	0.71**	0.43**	0.47**	0.52**	−0.35**	0.70**	—	
9. AIDA diffusion	0.49**	0.78**	0.39**	0.44**	0.57**	−0.40**	0.72**	0.81**	—

AIDA-IAT, Identity Diffusion Self-Concept Implicit Association Test; SDQ, Strengths and difficulties questionnaire; BPFSC-11, Borderline Features Scale for Children – 11; AIDA, Assessment of Identity Development in Adolescence.

* $p < 0.05$, ** $p < 0.01$.

the capacity to reflect on internal mental states of the self (46). Our inspection of the practical significance of the AIDA-IAT revealed that we should still rely on self-report measures in clinical settings, combine them with expert opinions, and that the explicit AIDA is the most significant predictor of borderline features in adolescents. For now, we agree with the findings of Kurdi and colleagues (42), who see the potential use of the measure in research. However, it would be of interest to explore the relationship between these measures in more depth in the future.

Observed high correlations between the explicit measures are also in line with previous studies (19). Moreover, and in line with Bozzatello and colleagues (47), we also observed a correlation between the SDQ scales and the explicit and implicit measures of identity diffusion. This result could indicate internalizing and externalizing psychiatric disorders, particularly depression and ADHD, enhance the risk of early-onset BPD. In this sense, these authors have suggested that these disorders are not independent comorbidities but should be conceptualized as early signs of BPD pathology. To comprehensively understand BPD and its precursors, we need more studies tapping into the different aspects of BPD and spanning the lifetime for different developmental stages.

LIMITATIONS AND CONCLUSIONS

Our findings are preliminary, and several limitations should be considered when interpreting the findings of this study. Firstly, the sample size was modest and included only adolescent girls. Previous studies that included both sexes indicated that developmental processes that heighten the risk for BPD operate in sex-specific ways (32). Combining this finding with the nature of our sample does not allow us to generalize our findings to boys or adolescents in general. As the sample was modest and not balanced in terms of age, we did not divide the sample into younger and older adolescents, which would be of importance in the future research since previous studies found an age-related decline in the mean levels of borderline features and shame-prone self-concept (32).

Moreover, we did not recruit a psychiatric control group, and with the majority of our clinical sample reporting for other mental health difficulties as captured by the SDQ and commonly comorbid to BPD, it remains uncertain whether our findings are genuinely specific for BPD. We, therefore, recommend that alternative diagnostic groups be included in the future when investigating the topic. All these limitations should be addressed before the current findings can be considered conclusive.

The measures used in this study prove valuable when identifying a youth whose personality development is clinically distinctive from normative development. This combination of explicit and implicit measures is crucial not only to increase our knowledge of personality pathology but also for prevention and intervention purposes. This combination provides age-appropriate assessment tools to identify youth at risk and refer them to adequate treatment programs where there is the possibility of alleviating long-term deficits in functioning associated with BPD. The IAT has as many supporters as opponents, with evidence showing that implicit measures are not ideal. Even a plentitude of studies could not provide a straightforward answer to what an IAT measures, what processes produce the observed effect, or what would be the appropriate use of the measure (42). In line with this skepticism, our biggest methodological consideration refers to what is genuinely being measured by the AIDA-IAT. Even with the intent to adjust the measure to its explicit counterpart, it might well be that the variant of the IAT used in our study does not assess identity diffusion *per se*. However, this was the first study to indicate that adolescent girls with BPD differ from healthy individuals in their consciously reported levels of identity development and implicit representations of their self-concept related to BPD symptomatology.

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 Republic of Slovenia National Medical Ethics Committee. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

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AUTHOR CONTRIBUTIONS

SP: study design, data collection, statistical analysis, and writing. VB and HG: contribution to the writing and supervising the study. All authors contributed to the article and approved the submitted version.

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Identity Development and Maladaptive Personality Traits in Young Refugees and First- and Second-Generation Migrants

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Refugees are often exposed to a variety of stressors and traumatic events, posing a significant risk for the development of mental disorders. Young refugees may be particularly at risk because adverse life events affect identity formation, a developmental task that is typically expected in adolescence and emerging adulthood. Trauma and cultural changes may alter identity development, potentially leading to identity diffusion, a core concept of personality disorders. However, previous research on personality pathology among refugees is scarce. In this study, we examine identity development and maladaptive personality traits in young refugees and migrants. Refugees from 22 countries of origin were recruited in a German reception center ($n = 120$) and a group of adults with a migration background in first- or second generation was obtained via web-based recruitment ($n = 281$). Identity development was measured using the Assessment of Identity Development in Adolescence – Short Form. Maladaptive personality traits were assessed with the Personality Inventory for DSM-5-Brief Form. Group differences between refugees and migrants regarding identity development and trait expression were investigated using t -tests. The relationship between the two measures and their corresponding subscales was examined by means of correlation analyses. Refugees reported significantly higher levels of identity diffusion, negative affectivity, detachment, antagonism, and disinhibition compared to migrants. No significant differences were found for psychoticism. Correlation analyses revealed low to moderate positive associations between identity diffusion and maladaptive trait expression. Possible implications for early phase of resettlement, preventive psychiatric care and further research questions are discussed.

Keywords: identity, maladaptive traits, personality, refugees, migration

INTRODUCTION

According to the United Nations High Commissioner for Refugees' 2020 Global Trends Forced Displacement report (1), 82.4 million people have been forcibly displaced worldwide, a number which is approximately twice as high as 10 years ago and the highest record to date. Being forced to flee their homes due to persecution or violent conflicts, refugees and asylum seekers frequently experience pre- and peri-flight traumatic events (2–4) and high mental health needs, including increased rates of posttraumatic stress disorder (PTSD) and depression (5, 6). However, prevalence estimates vary significantly between studies (7, 8) and there is a lack of studies on the full spectrum of mental disorders (5, 9). Although trauma is an important etiologic factor in the development of personality disorders (PDs), which demonstrate substantial comorbidity rates with PTSD (10–12), current research on personality pathology in refugees is scarce. Moreover, refugees face a variety of post-migration stressors during the resettlement process (13), such as awaiting the decision on the asylum application, living in reception centers, separation from the family, and adjusting to life in a new host country. For young refugees, this phase may be particularly challenging, as identity formation is a key developmental task during adolescence and emerging adulthood (14, 15). Failure to develop a continuous and coherent sense of self and others is a hallmark of personality pathology (16–18), however, identity development and its relationship to maladaptive personality traits has not yet been studied in refugees and asylum seekers. As mental health difficulties are associated with poorer integration (19), it is crucial to evaluate refugees and asylum seekers' mental health burden and promote preventive strategies to improve mental health. The present study aims to address this gap in the literature by examining identity development and maladaptive personality traits in a sample of young refugees compared to first- and second-generation migrants.

Identity Development

The historical origins of the concept of identity reach back almost 100 years (20) and is related to psychodynamic (21) and social-cognitive theory (22). Erikson's stages of psychosocial development (15) proposed a broad definition of identity as a "[...] fundamental organizing principal [...]" [(23), p. 98], predominantly forming during adolescence that provides continuity of self but also a sense of uniqueness to distinguish between self and others (15, 23). Nowadays, in Western, industrialized countries, identity exploration is thought to expand into emerging adulthood (i.e., 18–29 years of age) (14, 24). Several determinants influence identity development, including individual (e.g., age and sex), social (e.g., family and peers), and cultural factors (e.g., collectivistic and individualistic societies) (25, 26). In addition, critical life events such as job loss, migration, or health impairment are associated with identity changes in adolescence and adulthood (27–29). However, if a clear and coherent sense of identity is not reached, non-integrated representations of self and significant others are "[...] split into an idealized and persecutory segment [...]" [(16), p. 977], which Kernberg (16) describes as the syndrome

of identity diffusion and a hallmark of personality pathology. Although identity impairment has previously been a diagnostic criterion mainly for borderline PD (30), the concept has been re-introduced in recent years to the dimensional PD classification systems in DSM-5 (31) and ICD-11 (32). The Alternative Model for Personality Disorders (AMPD) in DSM-5's Section III (31), designed to address the shortcomings of the categorical PD taxonomy (33), introduced impairments in self-functioning (identity and self-direction) and interpersonal functioning (empathy and intimacy) (31, 34) as central diagnostic criteria for all PD types (31). Moreover, ICD-11 (35) replaces traditional PD categories and defines personality pathology "by problems in functioning of aspects of the self (identity, self-worth, accuracy of self-view, self-direction), and/or interpersonal dysfunction."

Maladaptive Personality Traits

With DSM-5's alternative model (31) and the eleventh version of the ICD (35), trait-based assessment of PD is increasingly shaping the classification of personality pathology. The DSM-5 PD workgroup introduced an empirically based model of pathological personality traits for PD assessment in Criterion B in the AMPD (36, 37). According to this model, personality dimensions are organized in five higher order domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism) that represent maladaptive variants of the Five Factor Model of normative personality (31, 38–40). Each domain comprises a set of subordinate trait facets (e.g., the domain antagonism is split up into the facets manipulativeness, deceitfulness, grandiosity, attention seeking, callousness, and hostility) (31). Trait constructs not only provide a description of a person's personality style, but also demonstrate important clinical utility by predicting important diagnostic variables [e.g., hospitalization and suicide attempts; (41, 42)] and informing clinical decision making [e.g., intervention planning; (43–46)]. The occurrence of maladaptive trait domains can be demonstrated as early as in childhood (47) and remain relatively stable across different developmental stages (48–51), even over the course of treatment (52). Identity and other elements of personality function, however, represent more dynamic aspects of personality pathology (53). The maladaptive personality dimensions can be assessed using structured interviews (54) and questionnaires in self-report and informant-form, including the broadly validated Personality Inventory for DSM-5 (31, 37, 55).

Identity Development, Maladaptive Traits, and Migration Experiences

The experience of having to flee one's home or being displaced is a traumatic event that results in a radical change in familial, relational, social, and cultural life. However, little is known about how this experience affects the identity development of young refugees and asylum seekers, although preliminary studies suggest that the resettlement process is associated with identity problems (56, 57). Therefore, the first objective of this study is (a) to examine identity development among young refugees. To consider cultural aspects in identity development, a group of first- and second-generation migrants with no refugee experience was obtained as a control group.

Systematic reviews and meta-analyses document the high prevalence of mental disorders among refugees and asylum seekers (5, 7, 58). However, PDs have rarely been assessed in previous studies. A study by Latzman et al. (59) on callous and unemotional traits demonstrated that immigrant adolescents who had lived in a refugee camp prior to migration reported higher uncaring trait levels than migrants with no camp experience, which in turn was related to lower levels of agreeableness and openness. Therefore, there is a need to identify the diverse range of psychopathological symptoms typically found in refugee and asylum seeker populations. The second goal of this study is (b) to investigate maladaptive traits in refugees, a population exposed to a variety of stressors (e.g., living in a reception center and awaiting asylum decision), compared to migrants who have been born or living in the new host society for several years.

Identity processes act as a dynamic force in the development of personality over time (60, 61) that promote personality consistency (62). Impaired identity development has been associated with higher neuroticism (63, 64). However, the relationship between identity development and traits have been studied primarily in adolescent and student populations (65), and none of the previous work has addressed maladaptive traits among refugees and asylum seekers. Therefore, the third goal of this study is (c) to examine the relationship between identity development and maladaptive traits according to Criterion B of the AMPD.

METHODS

Materials and Procedures

The present study is based on the ethical principles of the Declaration of Helsinki (66) and was approved by the Ethics Committee of the Medical Faculty of the University of Heidelberg, Germany (S-636/2014) and the Ethics Committee of the Faculty of Psychology and Educational Sciences of Ludwig-Maximilians-University Munich (35_a_2019). Analyses are based on a sample of young refugees ($n = 120$) and a community sample of adults ($n = 281$) with a migration background in first- or second generation (i.e., individuals born outside of Germany or with at least one foreign-born parent).

Refugees were recruited at a German registration and reception center between May and October 2019. The survey was part of a larger project to develop an instrument to assess mental burden in refugees and asylum seekers. General exclusion criteria comprised (1) underage (<18 years) and (2) illiteracy prior to study. After providing written informed consent, participants completed a set of digitally provided questionnaires.

Young adults with an EU or a non-EU migration background were recruited during January and March 2020. The study was advertised on social media and accessible through the SoSci-Survey-portal (www.soscisurvey.de). General inclusion criteria comprised (1) age ≥ 18 , (2) a migrant background in the first- or second-generation, and (3) sufficient knowledge of the German language as the questionnaires for this group were

provided in German only. Electronic informed consent forms were obtained from all participants. Participants did not receive financial reimbursement but were able to take part in a raffle in which ten 25€-Amazon vouchers were drawn.

Sample of Young Refugees

A total of 120 young adult refugees (59 female, $M_{\text{age}} = 28.13$, $SD = 5.70$, range: 18–40 years) from 22 countries of origin participated in the study, including Nigeria (30%), Iran (20%), Turkey (10%), Iraq (8.3%), Syria (5%), Afghanistan (3.3%), and Tunisia (3.3%). The questionnaires employed were available in English (34.2%), Persian (25%), Arabic (24.2%), Turkish (10.8%), Croatian (4.2%), French (0.8%), and German (0.8%). When asked about one or more reasons for their departure, refugees indicated that they had experienced a threat to their family (35%), war (20%), political persecution (19.2%), torture (18.3%), discrimination (16.7%), loss of a family member (13.3%), abuse and/or rape (13.3%), and other reasons ($<10\%$). In terms of religious affiliation, 49.2% of respondents reported being Muslim, followed by Christianity (40%) and other religious beliefs (e.g., Atheism, Buddhism, Hinduism, Judaism). Participants varied significantly in terms of their educational background with 37.5% reporting to have attended school, 25.8% holding a high school diploma, 25.8% holding a University degree, and 10.8% reporting no formal schooling at all. In a self-report form, 28.3% reported suffering from mental health problems and 18.3% were taking any psychotropic medication at the time of the study.

Sample of First- and Second-Generation Migrants

Two hundred eighty-one young adults (241 female, 1 diverse, $M_{\text{age}} = 23.29$, $SD = 4.37$, range: 18–40 years) with a first- or second-generation migration background enrolled in this study. Regarding foreign origin, 16.4% of respondents indicated being born outside of Germany (i.e., first-generation migrants), while the vast majority (83.6%) were native-born German citizens with at least one foreign parent (i.e., second-generation migration). Most participants had lived in Germany for many years: 30.4% of first-generation migrants and 74% of second-generation migrants reported that the date of migration was more than 20 years ago, compared to 10 or fewer years for 4.4 and 39.1%, respectively. First-generation migrants originated from 22 countries, while the parents of second-generation migrants were mostly from Turkey (43.7%), Bosnia-Herzegovina (10.8%), and Afghanistan (8.1%). 92.5% of respondents reported being Muslim, followed by Christianity (3.6%) and other religious affiliations (e.g., Atheism, Buddhism, Hinduism, Judaism). Participants had a high level of education: 64.1% had a high school diploma and another 34.9% held a University degree. Two participants reported having a primary school diploma. At the time of participation, 65.1% were enrolled as students, 15.3% employed, 5.7% trainees, 4.6% pupils, 3.9% unemployed, and 2.8% self-employed; 2.5% indicated other occupational statuses.

Measures

Assessment of Identity Development in Adolescence – Short Form (AIDA Short)

Identity development was measured using the AIDA Short (especially created research version by the original authors for supporting this study), a 23-item self-report inventory assessing impairments in identity in adolescents and young adults. The AIDA Short was developed from the original 58-item AIDA (67), a comprehensive measure of healthy and disturbed identity development in terms of personality functioning (Criterion A) that integrates approaches from both psychoanalytic and social-cognitive psychology (68, 69). Each item is answered on a 5-point Likert-scale ranging from 0 (*no*) to 4 (*yes*). The version AIDA Short is equivalent to the scale “Identity” of the questionnaire LoPF-Q 12-18 (70) to assess the full spectrum of personality functioning with the four domains identity, self-direction, empathy, and intimacy. It was developed based on empirical item selection in school and clinic samples and showed good scale reliability (71). The identity total score also differed at a highly significant level and with a relevant effect size of $d = 2.0$ standard deviations between the general population and a subsample of $N = 96$ patients diagnosed with PD (SCID-2) as a sign of excellent clinical validity. Compared to the original AIDA with 58 items, the scoring of the AIDA Short provides a total scale (identity integration vs. identity diffusion), as well as two subscales, namely discontinuity and incoherence. The discontinuity scale assesses lack of identity-consolidating perspectives, roles, and emotional self-experience, whereas the incoherence scale reflects inconsistent self-images, lack of autonomy, and diffuse representations [see (68, 69) for a detailed description]. The scales are coded toward the degree of identity impairment. The AIDA full version is available in various language versions, is freely available for research projects at the project website (<https://academic-tests.com>), and its psychometric properties have documented in several studies and populations (68, 69, 72–75). In the total sample, internal consistencies of two subscales were acceptable to good, with Cronbach's α ranging from 0.73 for

identity discontinuity to 0.83 for identity incoherence. For the total scale, internal consistency was good with Cronbach's $\alpha = 0.87$.

Personality Inventory for DSM-5 – Brief Form (PID-5-BF)

The PID-5-BF is a 25-item self-report questionnaire assessing maladaptive personality traits according to Criterion B of the AMPD (APA, 2013). Developed from the 220-item pool of the original PID-5 (37), the PID-5-BF provides a brief screening measure of the AMPD's higher order trait domains of negative affectivity, detachment, antagonism, disinhibition, and psychoticism (APA, 2013). Each domain is measured by 5 items, which are rated on a 4-point Likert-scale ranging from 0 (*very false or often false*) to 3 (*very true or often true*). The scoring procedure provides mean scores for each domains as well as an overall mean score, coded toward personality pathology (31). The full version of the PID-5 has been used in numerous studies and demonstrates adequate validity and reliability (55), fewer studies, on the other hand, have been devoted to the psychometric properties of the 25-item version (76). In this study, internal consistencies of the PID-5 trait scales varied substantially, with Cronbach's α ranging from 0.61 for antagonism to 0.76 for psychoticism. For the total scale, internal consistency was good with Cronbach's $\alpha = 0.88$.

Statistical Analyses

Because data collection was done electronically employing a forced-choice format, the data set did not contain any missing values. All statistical analyses were performed using JASP (version 0.14.1.0). The significance level was set at $p < 0.05$, two-tailed. Effect sizes are interpreted according to Cohen (77): small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) effect. Descriptive statistics for the AIDA Short and the PID-5-BF were obtained separately for the refugee and migrant sample. Preliminary analyses examined associations between the AIDA Short, PID-5-BF, and age and sex.

For our first and second research question, i.e., whether refugees and first- and second-generation migrants show

TABLE 1 | Descriptive statistics, reliability, and group differences between the refugee and migrant sample.

Scale	Refugee sample ($n = 120$)					Migrant sample ($n = 281$)					Welch's <i>t</i> -test			
	<i>M</i>	<i>SD</i>	<i>Skew</i>	<i>Kurt</i>	α	<i>M</i>	<i>SD</i>	<i>Skew</i>	<i>Kurt</i>	α	<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
AIDA Short total	36.35	17.71	0.47	−0.41	0.85	29.78	13.87	0.53	−0.22	0.88	3.62	184.10	<0.01	0.41
AIDA Short discontinuity	14.09	8.64	0.95	0.77	0.72	12.92	6.28	0.58	0.29	0.75	1.34	175.05	1	0.15
AIDA Short incoherence	22.26	11.62	0.18	−0.96	0.82	16.86	8.63	0.56	−0.30	0.83	4.58	177.38	<0.001	0.53
PID-5-BF total	1.19	0.55	0.19	−0.69	0.87	0.94	0.42	0.45	0.25	0.87	4.42	181.02	<0.001	0.51
PID-5-BF negative affectivity	1.59	0.79	−0.02	−0.82	0.71	1.29	0.61	0.10	−0.47	0.67	3.74	182.04	<0.01	0.43
PID-5-BF detachment	1.25	0.77	0.26	−0.62	0.66	0.94	0.58	0.59	0.22	0.67	3.91	180.19	<0.01	0.45
PID-5-BF antagonism	0.78	0.53	1.16	2.48	0.52	0.48	0.47	1.39	2.64	0.69	5.36	203.71	<0.001	0.60
PID-5-BF disinhibition	1.21	0.70	0.34	−0.28	0.62	0.95	0.56	0.46	−0.16	0.71	3.64	187.70	<0.01	0.41
PID-5-BF psychoticism	1.11	0.84	0.32	−0.88	0.78	1.03	0.65	0.47	−0.39	0.75	0.86	183.10	1	0.10

AIDA Short, Assessment of Identity Development in Adolescence – Short Form; PID-5-BF, Personality Inventory for DSM-5 – Brief Form. *P*-values are adjusted with Bonferroni correction for multiple comparisons.

TABLE 2 | Intercorrelations between the AIDA Short and the PID-5-BF in the refugee (below the diagonal, $n = 120$) and the migrant sample (above the diagonal, $n = 281$).

Scale	1	2	3	4	5	6	7	8
1. AIDA Short total	–	0.90***	0.95***	0.65***	0.54***	0.27***	0.50***	0.55***
2. AIDA Short discontinuity	0.81***	–	0.72***	0.52***	0.50***	0.20***	0.45***	0.44***
3. AIDA Short incoherence	0.91***	0.53***	–	0.67***	0.51***	0.28***	0.46***	0.56***
4. PID-5-BF negative affectivity	0.64***	0.43***	0.64***	–	0.40***	0.33***	0.45***	0.49***
5. PID-5-BF detachment	0.66***	0.65***	0.54***	0.58***	–	0.26***	0.32***	0.48***
6. PID-5-BF antagonism	0.36***	0.24**	0.37***	0.36***	0.35***	–	0.40***	0.39***
7. PID-5-BF disinhibition	0.44***	0.39***	0.38***	0.45***	0.46***	0.34***	–	0.56***
8. PID-5-BF psychoticism	0.66***	0.48***	0.64***	0.64***	0.59***	0.32***	0.46***	–

AIDA Short, Assessment of Identity Development in Adolescence – Short Form; PID-5-BF, Personality Inventory for DSM-5 – Brief Form. ** $p < 0.01$, *** $p < 0.001$. Significant between-group differences for the AIDA Short and PID-5-BF are in bold.

differences in the expression of identity development and maladaptive traits, we conducted independent samples Welch's t -tests. Bonferroni correction was applied to adjust for multiple comparisons. For our third research question, i.e., whether identity development is related to maladaptive personality traits in refugees and migrants, we ran Spearman correlation analyses. Correlation coefficients were calculated separately by group. Statistically significant correlations between the AIDA Short and the PID-5-BF were then transformed using Fisher's r to z transformation to test for between-group differences.

RESULTS

Descriptive statistics of the AIDA Short and the PID-5-BF in the refugee and migrant samples are provided in **Table 1**. Exploratory analyses in the total sample are available in the electronic **Supplementary Material**.

Do Refugees and First- and Second-Generation Migrants Show Differences in the Expression of Identity Development?

Test statistics and effect sizes are listed in **Table 1**. Refugees showed significantly higher levels of identity diffusion compared to migrants. Cohen's effect size value suggested a small to medium effect for the total score of the AIDA Short. Regarding the two subscales of the AIDA Short, the results were mixed: While refugees demonstrated significantly higher levels of identity incoherence, resulting in a medium-sized effect, no mean difference was found regarding identity discontinuity.

Do Refugees and First- and Second-Generation Migrants Show Differences in the Expression of Maladaptive Personality Traits?

An independent samples t -test revealed that refugees demonstrated significantly higher overall expression of maladaptive personality traits than migrants with a medium effect size. Regarding the DSM-5 trait domains, refugees scored significantly higher on negative affectivity, detachment, antagonism, and disinhibition with medium effect sizes.

However, no significant difference was found between the two groups for psychoticism.

Is Identity Development Related to Maladaptive Personality Traits in Refugees and First- and Second-Generation Migrants?

Bivariate correlations among the AIDA Short scales and the DSM-5 trait domains are displayed in **Table 2**. The AIDA Short total score was significantly positively associated with all PID-5-BF scales, in both refugees ($r = 0.36$ – 0.66) and migrants ($r = 0.27$ – 0.55). In the refugee group, the strongest associations were found between identity diffusion and detachment ($r = 0.66$) as well as psychoticism ($r = 0.66$), the lowest between identity diffusion and antagonism ($r = 0.36$). In the migrant sample, the highest correlation was found between identity diffusion and negative affectivity ($r = 0.65$), the lowest for antagonism ($r = 0.27$). The two subscales of the AIDA Short were also significantly associated with all DSM-5 trait domains, in refugees ($r = 0.24$ – 0.65) and migrants ($r = 0.20$ – 0.67). Using Fisher's r to z transformation and a two-tailed test of significance, no significant differences were found in the correlations between identity diffusion and trait domains. Only the AIDA Short identity discontinuity subscale demonstrated a significantly higher association with detachment in refugees ($r = 0.65$) than migrants ($r = 0.50$).

DISCUSSION

This study investigated identity development and maladaptive traits in refugees living in a registration and reception center and first- and second-generation migrants who were born in Germany or had lived in the host society for several years.

The first objective of this study was to examine whether the two groups exhibit differences in the extent of identity development. Participants from the refugee sample reported significantly higher levels of identity diffusion as measured by the total scale of the AIDA Short. This result is consistent with previous research showing that refugees face identity-related challenges and problems (56). However, the results were less decisive at the substructure of identity: Refugees yielded higher

scores on the incoherence subscale, but the two groups did not differ regarding the discontinuity scale. Thus, refugee identity in the present sample seems to be less pronounced only in terms of coherence of identity integration, i.e., being often confronted with contradictions, over-identification, and superficial, diffuse representations regarding the clarity of their self-definition (68). However, no differences were found between refugees and migrants regarding identity continuity, that is, the capacity to dedicate oneself to long-term goals, to internalize stable moral and inner values, and to have a sense of subjective self-sameness (68). In contrast, other research has also found significant differences with respect to this identity component: Ertorer (56) studied identity problems among Karen refugees from Burma and found lower identity continuity compared to non-migrants from the host society. However, the two studies applied different methods in measuring identity and the present study used a migrant sample for normative comparison, whereas as Ertorer (56) recruited non-migrant individuals. The present findings suggest that refugees are more likely to experience conflicting or ambivalent self-images. This finding could be explained by the fact that refugees and asylum seekers are repeatedly confronted with discrepancies between their self-image and the cultural environment of the host society (e.g., social norms, cultural values, and language) through forced migration, resettlement, and acculturation.

The second aim of this study was to examine whether refugees and first- and second-generation migrants differ in the expression of maladaptive personality traits. Refugees reported higher overall expression of maladaptive personality traits and had higher scores in four of the five DSM-5 personality domains, while no group difference was observed for psychoticism. The refugee sample was recruited in a reception center where asylum seekers are required to stay until a decision is made on their asylum application. Prolonged stress in arrival and reception centers, without certainty about the future, can trigger intense experiences of negative emotions that may manifest in higher levels of negative affectivity. Traumatic experiences and the high prevalence of PTSD among refugees may contribute to the frequent and intense experience of negative emotions: Doolan et al. (78) investigated emotion regulation in traumatized refugees, demonstrating that PTSD symptoms are associated with emotion regulation difficulties, in particular a lack of access to emotion regulation strategies, and a lack of emotional clarity.

Refugees also reported higher levels of detachment, which could be a coping mechanism to deal with negative experiences during migration and the stressful environment in a reception center. To protect themselves from these highly arousing situations, they may develop a tendency to avoid interpersonal interactions and express restricted affective experiences. This is in line with the aforementioned study by Latzmann et al. (59) that adolescent migrants who had lived in a refugee camp reported higher uncaring trait levels.

Furthermore, refugees displayed higher levels of antagonism and disinhibition. Antagonism (e.g., manipulateness, callousness, deceitfulness, and hostility) and disinhibition (e.g., risk taking, impulsivity and irresponsibility) are prominent characteristic traits of antisocial PD. However, little is known

about the etiology of this disorder, nor about its prevalence among refugees as it is often not assessed [e.g., (79)]. Because the migrant group in our study was predominantly female, it seems likely that these results reflect sex differences in levels of antagonism and disinhibition (80) rather than trait differences between refugees and migrants.

A systematic review by Brand et al. (81) found that refugees have an increased risk for developing schizophrenia and associated non-affective psychoses, compared to non-refugee migrants and native populations. In contrast, the present study found no difference between refugees and migrants regarding levels of psychoticism. However, it should be noted that psychoticism in the AMPD, defined by unusual beliefs and experiences, eccentricity, and cognitive and perceptual dysregulation (31), demonstrates only moderate correlations with psychotic symptoms (82). Moreover, a recent meta-analysis by Blackmore et al. (5) reported comparable rates of psychosis in refugees and the general population.

The third objective of this study was to examine the relationship between identity development and maladaptive personality traits. In both samples, significant positive association between identity diffusion and maladaptive trait severity were observed. Regarding the hierarchical structure of personality traits, impairments in identity were somewhat more strongly associated with the internalizing spectrum of personality pathology (negative affectivity and detachment) than with the externalizing component (antagonism and disinhibition). Exploratory analyses of differences in correlation coefficients between the groups revealed a consistent pattern, with only identity discontinuity and detachment showing a slightly stronger association in the refugee sample. Therefore, the present results replicate previous findings on identity and its relation to the normative Big Five personality traits [e.g., reduced identity development is associated with higher neuroticism (63, 64)] and extend it to a multi-ethnic mixed sample. However, no specific patterns between constituents of identity and individual traits can be established in either of the present samples, as traits, among other factors, also show significant intercorrelations.

Implications for Early Phase of Resettlement and Preventive Psychiatric Care

Diagnosing personality pathology is considered difficult (83), and PD assessment by clinical interviews is often impractical in studies with time constraints (79). However, PDs are prevalent globally (84) and associated with greatly reduced life expectancy (85). The assessment of personality pathology in adolescents and young adults is particularly important because PDs usually develop during this developmental period (86). Early detection of personality impairments and promotion of appropriate psychosocial interventions for this at-risk population soon after their arrival, may counteract the manifestation of a PD. However, although there is a high need for care, refugees' access to psychosocial services is often inadequate (87). Therefore, in addition to identifying mental health problems, it is equally important to overcome corresponding barriers (e.g., legal and

language barriers) (88, 89). Our results may be interpreted in the direction that supporting identity development in refugees might be a successful strategy to promote resilience. This may be in addition to classic mental health care by allowing refugees to share their cultural heritages with the hosting cultures, exchange and discuss cultural norms, and by relieving them of the impression that they would need to give up cultural identity if they want to remain in the hosting country.

Limitations and Future Directions

The present study had some limitations that should be considered in the interpretation of the results. First, there was no standardized assessment of mental health problems or disorders, so their effects on identity functioning and personality traits could not be considered in the analyses. Future studies should therefore include a structured assessment of common mental disorders among refugees and asylum seekers. Second, the generalizability of our results is limited to comparisons between refugees and first- and second-generation migrants, as no individuals without any migration experience were included in this study. This is particularly relevant considering the immigrant paradox: studies suggest that immigrants, especially when they move from low-income to high-income countries, demonstrate better mental health than their counterparts without migration experience (90–92). Initial studies suggest that this effect also applies to personality pathology, as immigrants also have a lower risk of developing a PD than native-born citizens (91, 93). Therefore, future studies of personality in refugees should include individuals without any migration experience. Furthermore, only German-speaking first- and second-generation immigrants were included in this study, limiting the generalizability of the results. Third, refugees participated in the study briefly after their arrival in Germany, and little is known to date about the immediate impact of refugee experiences on psychological well-being. In addition, situational factors (e.g., living in a reception center and waiting for the asylum decision) may represent a potential bias in self-assessment of identity and personality and underscore the need for longitudinal studies. Fourth, methodological aspects should be considered in the operationalization of identity and personality: The AIDA Short and AIDA are designed to assess identity development in adolescents (12–18 years). Age-relevant differences in the assessment of identity should therefore be considered in the selection of instruments in future studies. Meanwhile a special version AIDA 19+ for young adults is established and only 5 items had to be adjusted very slightly to also fit for older probands (94). However, this age-adapted version of the AIDA is currently only available in English and German and was therefore not suitable for this study. Furthermore, the PID-5-BF is only a screening instrument and does not allow the diagnosis of PD or the assessment

of lower-order personality facets. In addition, its psychometric properties are less well-documented and internal consistency of the PID-5-BF scales varied significantly in the present study. ICD-11 also introduces the domain of anancasm in place of psychoticism into its trait-model (35). Therefore, future studies should employ new instruments such as the PID-5-BF+ (95) that provide assessment of maladaptive traits from the perspective of DSM-5 and ICD-11.

To summarize, this cross-sectional study demonstrates that refugees experience higher levels of identity impairment and maladaptive personality traits compared to first- and second-generation migrants. Furthermore, identity diffusion is significantly related to maladaptive trait expression in both samples.

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 approved by the Ethics Committee of the Medical Faculty of the University of Heidelberg, Germany (S-636/2014) and the Ethics Committee of the Faculty of Psychology and Educational Sciences of Ludwig-Maximilians-University Munich (35_a_2019). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MZ has analyzed the data and written the manuscript. ZA has recruited participants, collected data, and supported data analyses and manuscript writing. SB, KG, CN, and CZ have supported manuscript writing. ST and KB have received funding for the study, designed the study, supervised data collection, and supported data analyses and manuscript writing. All authors have read, reviewed, and approved the final version of the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsy.2021.798152/full#supplementary-material>

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The Assessment of Dual-Cycle Identity Models Among Secondary School Students: The Hungarian Adaptation of DIDS and U-MICS

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The aim of the present study was to evaluate the factor structure and validity of the Hungarian versions of the Dimensions for Identity Development Scale (DIDS) and Utrecht-Management of Identity Commitments Scale (U-MICS). Both models assume that the iterative process of exploring and evolving commitments occurs in two distinct cycles. The sample for testing the factor structure of DIDS consisted of 808 adolescents (357 boys and 451 girls) aged between 14 and 21 years ($M_{\text{age}} = 16.86$; $SD = 1.35$). The sample for testing the factor structure of U-MICS consisted of 803 adolescents (353 boys and 450 girls) aged between 14 and 21 years ($M_{\text{age}} = 16.88$; $SD = 1.34$). Results indicated a five factor model of DIDS in the present sample. All the five dimensions correlated as hypothesized both internally and externally. In line with previous research, six clusters emerged based on the dimensions of DIDS, including ruminative moratorium. Regarding U-MICS, results indicated a three factor model in the present sample. All the three dimensions were internally and externally correlated as hypothesized regarding both ideological and interpersonal identity domains. With regard to the identity status cluster solution, five clusters emerged in both the educational and friendship domains. We found specific variation regarding identity clusters in the two identity domains. Our results support the use of these two measurements in Hungarian context. Further, our results confirm the divergent developmental dynamics of ideological and interpersonal identity domains.

Keywords: adolescence, identity development process, identity status, U-MICS, DIDS, cultural validation

INTRODUCTION

Dual cycle models of identity development have strongly influenced the field of identity research on adolescence and emerging adulthood. These approaches provide a dynamic approach to identity processes. Both the five-dimensional model (1) and the three-dimensional model (2) of identity formation assume that the iterative process of exploring and evolving commitments occur in two distinct cycles. To our knowledge, no previous study has ever compared the processes and statuses based on these two approaches. Thus, the aims of the present study are two-fold. Primarily this paper discusses the methodological characteristics of the Hungarian adaptation of identity measurements based on the five- and three-dimensional model. Additionally, we make some theoretical proposals for consideration based on our result.

One of the most fundamental developmental tasks of adolescence is identity synthesis (3–5). Identity is the notion of who one is. It can be defined as the sense of personal uniqueness and the sense of self-sameness across different times and contexts (6). In his psychosocial theory, Erikson (7) assumed that identity formation was a lifelong process that already began in early childhood and became emphasized and conscious in adolescence, during the psychosocial crisis of identity vs. identity diffusion. At this stage of life, conflicts from earlier stages of development are revived, and previous identities and continuities become questioned. The childhood identifications are no longer sufficient, so the re-evaluation of them is necessary in order to be integrated at a more mature level. Furthermore, the increasingly wider social environment requires the individual to match individual and social identities. The result of these processes will form the sense of an integrated self (6, 7).

For decades, the most prominent model that operationalized Erikson's identity theory into measurable constructs was Marcia's (8, 9) identity status approach. Marcia introduced two qualitatively distinct dimensions of identity: crisis that was later called exploration and the concept of commitment. Exploration refers to "the adolescent's period of engagement in choosing among meaningful alternatives," while commitment is defined as "the degree of personal investment the individual exhibits" [(8), p. 551]. Based on the presence or absence of these two main processes, Marcia (8) identified four distinct identity statuses: identity achievement (commitment after exploration), foreclosure (commitment without exploration), moratorium (exploring but not committed) and identity diffusion (no exploration and no commitment).

In the last decades, based on Marcia's (8) identity status approach, dual-cycle models of identity development emerged. The two most prominent models, that refined the dimension of exploration and commitment, are the five-dimensional (1) and the three-dimensional models (2). These models represent a more process-oriented approach, as they shift the focus on the formative and evaluation processes underlying identity statuses and their interrelated nature. Dual-cycle models have made a significant contribution to identity research. By identifying the underlying processes of commitment making and exploration, these dual-cycle approaches provide a more complex evaluation of developmental trajectories. Both theories consider identity formation as a dynamic and recurring process of exploration and making commitments, which occurs in two cycles. However, the two models assess identity formation in different domains. The model by Crocetti et al. (2) evaluates the formation of identity separately in specific areas such as education and friendship. In contrast, the model described by Luyckx et al. (1) captures identity development along future plans, which integrate specific context into a more general domain. Self-report measures are available for both models (1, 2). Different cultural adaptations supported the utility of both dual-cycle approaches (10–20).

Luyckx et al. (21) introduced a dynamic model of identity formation by dividing both exploration and commitment into

two components. As a result of this, four interrelated identity processes were distinguished. These dimensions are commitment making, identification with commitment, broad exploration and deep exploration. The *commitment* dimension refers to whether the individual has already made a decision in identity relevant questions, while *identification with commitment* captures the process when adolescents identify with their choices and the commitment evolves into an integrated part of the self. *Exploration in breadth* refers to the mapping of different identity alternatives, which is an important facilitator of commitment making. By comparison, during *in depth explorations*, the individual collects information about current commitments, which makes it possible to assess the extent to which the choice meets the individual's own inner criteria (22). During the first cycle of identity formation, adolescents explore different alternatives and make some initial commitments. During the second cycle adolescents evaluate these initial commitments by exploring them in depth, and either identify with them or a new commitment formation cycle begins (21). Later, the model was extended with *ruminative exploration* as the fifth dimension that proved to be a significant risk factor regarding healthy identity development (1, 23). In contrast to reflective exploration processes, ruminative exploration is a maladaptive process characterized by continuous exploration without forming commitments (1). Ruminative moratorium was found to be associated with higher presence of depressive feelings and more negative and more unstable self-esteem (23). By unpacking exploration and commitment and introducing ruminative exploration, the five-dimensional model has the advantage of identifying more than four identity statuses.

Based on the five-dimensional model, Dimensions for Identity Development Scale (DIDS) was developed by Luyckx et al. (1). In line with the theoretical approach, DIDS assesses identity processes with five distinct scales in the domain of general future plans: commitment making, exploration in breadth, exploration in depth, identification with commitment, and ruminative exploration. In recent years, many cultural adaptations of DIDS were developed, for instance, German, Turkish, American, Swiss, Polish, Japanese, Greek, Georgian, and Finnish (13–20, 24). Although a number of the above mentioned studies confirmed the original five-dimensional model, six factor models emerged in French, Georgian and Finnish samples (13, 18, 19). Along similar lines in all three samples, the exploration in depth dimension proved to be inconsistent and had to be divided in two different dimensions. One dimension referred to the reflective nature of exploration in depth that strengthened commitments. This was consistent with the proposition of Luyckx et al. (1). In contrast, the other dimension referred to the questioning and revision of existing commitments. This idea was in line with Grotevant's (25) assumption that exploration can induce the questioning of commitments. Identity statuses can be empirically classified through cluster analysis based on the five dimensions. Luyckx et al. (1) identified altogether the following six clusters. The *achievement* status consisted of individuals who scored above average on both commitment dimensions, as well as on exploration in breadth and exploration in depth, and below average on ruminative exploration. Individuals with the

foreclosure status scored above average on both commitment dimensions and below average on in breadth, in depth, and ruminative exploration. The moratorium status described by Marcia (8) did not emerge, but a ruminative moratorium status was identified. *Ruminative moratorium* composed of individuals who scored average on commitment dimensions, and above average on the exploration dimensions including ruminative exploration. Luyckx et al. (1) distinguished two diffusion clusters. Individuals with the *diffused diffusion* cluster had scores below average on both commitment dimensions, average scores on exploration in breadth and exploration in depth, and scores above average on ruminative moratorium. In comparison, individuals with the *carefree diffusion* status scored below average on both commitment dimensions, on in breadth and in depth exploration, and average on ruminative exploration. Although it seems that individuals with the carefree diffusion status ruminate less on future plans than their diffused peers, both proved to be a risk group concerning psychosocial well-being (17). Finally, an undifferentiated cluster also emerged, in which individuals scored intermediate on all the five dimensions. Although fundamentally identical identity statuses emerged across nations and cultures, some differences in the distribution of identity statuses were revealed in empirical literature. In the study of Schwartz et al. (17) a searching moratorium cluster emerged. Searching moratorium was theoretically described by Meeus et al. (26); individuals in this status appeared to be exploring new alternatives while maintaining some of their prior commitments.

Crocetti et al. (2) proposed a three-factor model of identity development with emphasis on the formation, evaluation, and revision of identity elements in ideological and interpersonal identity domains. They assumed that adolescents already have preliminary commitments based on childhood identification when they enter adolescence (27). Consequently the first cycle is identity formation, during which adolescents evaluate their present commitments and compare them with potential alternatives. In case they feel their commitments to be no longer satisfactory, they start to revise them. The second cycle is identity maintenance, during which the focus shifts from finding new commitments to reflecting on and validating existing commitments (27). Three principal processes have been identified. *Commitment* refers to permanent and strong life choices, the gain of these choices will be self-confidence. *In depth exploration* refers to active exploration processes about the existing commitments by searching for further information and talking about them with significant others. Finally, *reconsideration of commitments* represents the comparison of existing commitments with new alternatives, when current commitments are no longer sufficient. High levels of reconsideration of commitments have been proved to be strongly related to depressive symptoms and to be negatively associated with self-concept clarity (2).

Utrecht-Management of Identity Commitments Scale (U-MICS) was developed to assess commitment, in depth exploration and reconsideration of commitments (2). An important advantage of this questionnaire is that it can be

employed to assess identity formation processes distinctively in ideological (e.g., education) and relational (e.g., friendship) domains. Dynamics of identity formation can be different in different identity domains and can have different associations with outcomes of interest. It seems that global identity processes show low convergence of identity processes across distinct identity domains (28). Considering the dimensions of the instrument, numerous studies confirmed the three-factor structure of U-MICS in various countries including the Netherlands, Italy, Romania, Switzerland, Turkey, Poland, Bulgaria, Czech Republic, Kosovo, Slovenia, Portugal, China, Japan, Taiwan, Spain, and Israel (2, 10–12, 14, 19, 29–31).

Furthermore, identity statuses can be empirically classified through cluster analysis based on the three identity process. Crocetti et al. (32) distinguished five identity statuses on the sample of early and middle adolescent groups, four of which relied on the work of Marcia (8). Individuals with the *achievement* status typically had scores above average on commitment and in depth exploration and below average on reconsideration of commitment. Likewise, the *foreclosure* status was consisted of individuals with scores above average on commitment, but scored average on in depth exploration dimensions and below average on reconsideration. The *diffusion* status composed of individuals scored below average regarding commitment, in depth exploration and reconsideration of commitment. Individuals with the *moratorium* status scored below average on commitment, average on in depth exploration and above average on reconsideration of commitment. The fifth status has been titled *searching moratorium* and was separated from moratorium. Individuals with searching moratorium scored above average on both commitment and in depth exploration, just like on reconsideration of commitment. While moratorium considered representing the current struggle for finding satisfying commitment, the searching moratorium refers to the revision of existing commitments by looking for new alternatives (32).

The present study had four main objectives. First, we wanted to test to factor structure of the Hungarian versions of DIDS and U-MICS. With regard to DIDS, we tested six different models: four four-factor models, a five-factor model, and a six-factor model. The four-factor models and the five-factor model were based on the work by Luyckx et al. (1). The six-factor model was based on the validation study of the Finnish and Greek versions of DIDS (13, 20). We expected either the five- or the six-factor model to show the most adequate fit to our data. With regard to U-MICS, we tested three models based on Crocetti et al. (33) for both domain versions. We expected that the three-factor model would show adequate fit to our data for both domain versions.

Second, we wanted to reveal how H-DIDS and H-U-MICS would classify Hungarian adolescents. We expected that Hungarian adolescents would be classified into six and five clusters (for H-DIDS and H-U-MICS, respectively) that would be similar to those in previous studies [e.g., (1, 33–35)].

Third, we wanted to test the validity of H-DIDS and H-U-MICS. We did this on the level of variables and also in a person-centered approach. With regard to the variable-level approach,

our expectations were based both on theoretical assumptions about the identity development process and on empirical results (for a summary see the corresponding sections of Introduction). We expected commitment to be positively associated with favorable psychosocial outcomes (i.e., more positive self-esteem, lower levels of behavioral problems, more adaptive and less maladaptive cognitive emotion regulation strategies). We also expected ruminative exploration and reconsideration of commitments to be negatively associated with the same set of phenomena. With regard to the person-centered approach, we expected that diffused adolescents would show the least, while foreclosed and achieved adolescents the most favorable psychosocial outcomes.

Fourth, given the similarity of the two models behind DIDS (1) and U-MICS (33), we expected to find significant associations between the corresponding dimensions of the Hungarian versions of the scales and also between the classifications based on H-DIDS and H-U-MICS in both measured identity domains.

METHODS

Participants and Procedure

The study was approved by the United Ethical Review Committee for Research in Psychology (EPKEB; Reference No.: 2019-82). After receiving their parents' informed consent, all participants filled in the questionnaires in paper-pencil format in classroom settings supervised by undergraduate psychology students serving as research assistants. All data were collected from secondary schools in the South-Western part of Hungary, therefore, data are not representative of Hungarian adolescents in general. Data were collected in several waves and were collapsed to gain the largest possible statistical power. Thus, sample sizes differ for different parts of the Results section. Samples are not independent but overlapping samples.

The sample for testing the factor structure of the Hungarian version of DIDS consisted of 808 adolescents (357 boys and 451 girls). The age of participants was 16.86 years on average (minimum = 14; maximum = 21; SD = 1.35; Skewness = 0.014; SE skewness = 0.086; Kurtosis = -0.688; SE kurtosis = 0.172). The sample for testing the factor structure of the Hungarian version of UMICS consisted of 803 adolescents (353 boys and 450 girls). The age of participants was 16.88 years on average (minimum = 14; maximum = 21; SD = 1.34; Skewness = 0.010; SE skewness = 0.086; Kurtosis = -0.674; SE kurtosis = 0.172).

The sample for testing the validity of the Hungarian version of DIDS 233 adolescents (62 boys and 169 girls; two participants didn't report their gender). The age of the participants was 16.78 years on average (minimum = 14; maximum = 20; SD = 1.60; Skewness = 0.089; SE skewness = 0.160; Kurtosis = -1.161; SE kurtosis = 0.319). The sample for testing the validity of the Hungarian version of UMICS 223 adolescents (56 boys and 165 girls; two participants didn't report their gender). The age of the participants was 16.85 years on average (minimum = 14; maximum = 20; SD = 1.57; Skewness = 0.051; SE skewness = 0.164; Kurtosis = -1.155; SE kurtosis = 0.326).

Measures

The **Utrecht-Management of Identity Commitments Scale** (U-MICS) (2) was used in the assessment regarding identity processes in the domain of education and friendship. Scales for each identity domains composed of 13 items (commitment: five items, in depth exploration: five items, reconsideration of commitments: three items) rated on a five-point Likert-scale ranging from 1 (completely untrue) to 5 (completely true). Translation in Hungarian was done by the first author. Each translated item was then discussed among the co-authors to develop the final items. Back translation was accomplished by an independent translator, which procedure provided English versions identical in content with the original items of the UMICS.

The **Dimensions of Identity Development Scale** (DIDS) (1) assesses the five identity processes (CM, commitment making; IC, identification with commitment; EB, exploration in breadth; ED, exploration in depth; RE, ruminative exploration) with 25 items. Scales for each identity dimensions composed of five items rated on a five-point Likert-scale ranging from 1 (completely disagree) to 5 (completely agree). Translation in Hungarian was done by the last author. Each translated item was then discussed among the co-authors to develop the final version. Back translation was accomplished by an independent translator, which procedure provided English versions identical in content with the original items of DIDS.

The **Rosenberg Self-esteem Scale** (RSES-H) (36) was used to assess global self-esteem of the participants. The questionnaire/measurement was translated into Hungarian by Sallay et al. (37). The questionnaire consists of 10 items rated on a 4-point scale. The scale proved to be reliable (Cronbach's $\alpha = 0.883$).

The **Child Behavior Checklist—Youth Self Report** (CBCL-YSR) (38) was assessed to measure behavioral and emotional problems for the previous 6 months. The Hungarian short version of CBCL youth self-report (39, 40) form consists of 44 items. *Social problems* (e.g., "I would rather be alone than with others"), *anxious/depressed* (e.g., "I am afraid I might think or do something bad"), *somatic complaints* (e.g., "I feel overtired without good reason"), *attention problems* (e.g., "I have trouble concentrating or paying attention"), *aggression* (e.g., "I argue a lot"), and *deviant behavior* (e.g., "I hang around with kids who get in trouble"). Each item is rated on a 0–2 scale (0 "not true," 1 "somewhat or sometimes true," and 2 "very true or often true"). Internal reliability was good to excellent for all scales (Cronbach's $\alpha > 0.703$), except for Deviant behavior that demonstrated poor reliability (Cronbach's $\alpha = 0.493$).

The **Cognitive Emotion Regulation Questionnaire** (CERQ) (41) was assessed to evaluate conscious attentional and thinking processes that people use to regulate emotions. The Hungarian version was adapted by Miklósi et al. (42). The questionnaire consists of 36 item measuring nine subscales. The adaptive strategies are *acceptance* (having thoughts of accepting and resigning with regard to what one has experienced), *positive refocusing* (thinking about positive, happy and pleasant issues instead of thinking about threatening and stressful events),

refocus on planning (thinking about what steps to do and how to handle the negative event), *positive reappraisal* (having thoughts of giving a positive meaning to the negative events in terms of personal growth), and *putting into perspective* (having thoughts that relativize the seriousness of the negative event comparing it to other events). The less adaptive strategies are *self-blame* (having thoughts of putting the blame on oneself for what one have experienced), *rumination* (having thoughts about the feelings and thoughts associated with the negative events), *catastrophizing* (having thoughts of explicitly emphasizing the negativity of the experience) and *blaming others* (having thoughts of putting the blame on others for what one have experienced). The items are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). The scales demonstrated good internal reliability (Cronbach's α > 0.732), except for Acceptance that had questionable reliability (α = 0.602).

Statistical Analytical Plan

For statistical analyses, we used IBM SPSS Statistics version 22 and IBM SPSS AMOS version 24. To describe the dimensions of H-DIDS and H-U-MICS, means (Ms) and standard deviations (SDs) were computed. To establish the internal reliability of all measured variables, Cronbach's α values were computed. Cronbach's α values above 0.70 were interpreted as indicating acceptable reliability, values between 0.60 and 0.70 as indicating questionable reliability, and values below 0.60 as indicating poor reliability (43). To test the factor structure of the adapted scales, we used confirmatory factor analyses (CFAs). Fit indices were interpreted in accordance with the suggestions of Hu and Bentler (44): a cut-off value close to 0.95 in the case of the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI), and a cut-off value close to 0.06 for the Root Mean Square Error of Estimation (RMSEA) result in lower Type II errors without significant increase in Type I errors. Thus, these values can be considered as indices of excellent fit. As a direct comparison of the models, we used Akaike Information Criterion (AIC) values (45), where relatively lower values indicate better fit. To test linear associations between measured variables, we used Pearson's correlations. Besides taking statistical significance at the level of 0.05 into account, only correlation coefficients of |0.20| or higher were interpreted as meaningful.

To classify participants, we followed a two-step procedure previously applied in studies of Finnish (13), Greek [Mastrotheodoros and Motti-Stefandi, (20)], and Italian (46) adaptations of DIDS. In step one, we investigated the visual outputs (dendograms) of hierarchical cluster analyses to determine the number of clusters. Final cluster memberships were determined with k-means cluster analyses performed on the z-scores of the variables. To compare the different cluster groups on the measured variables, we used one-way analyses of variance (ANOVAs) with Tukey's honestly significant difference (HSD) *post-hoc* tests. This *post-hoc* tests establish homogenous subsets of groups whose scores are not significantly different from each other (47). Finally, to compare the distribution of participants across clusters based on different sets of variables, we used χ^2 -tests.

RESULTS

Testing the Factor Structure of H-DIDS

We used CFAs to test the fit of the six models described in section Methods. According to the results (Table 1), the five-factor model showed the best fit among the tested model, as indicated by the AIC values. This model showed an adequate fit to data, and this fit could be further improved with the implementation of covariances between six pairs of error terms. This final model with error covariances fitted significantly better than the six-factor model ($\Delta\chi^2 = 252.439$; $\Delta df = 1$; $p < 0.001$). For the five-factor model with error covariances, factor loadings of the items and correlations between the error terms are shown in Supplementary Figure 1. Correlations between latent variables are shown in Supplementary Table 1.

Means, standard deviations, and internal reliability indices for the five dimensions of H-DIDS are shown in Supplementary Table 1. Except for Exploration in depth, all dimensions showed good to excellent internal reliability. The internal reliability of Exploration in depth proved to be questionable.

The intercorrelations of the five dimensions of H-DIDS were tested with Pearson's correlations (Supplementary Table 1). Dimensions referring to commitment (CM and IC) and dimensions referring to exploration (EB and ED) showed positive correlations with each other with moderate strength, respectively. Ruminative exploration showed significant associations to all the other four dimensions with meaningful strength. It was positively and weakly related to exploration dimensions (EB and ED), whereas it was negatively related to commitment dimensions (CM and IC) with a moderate strength.

Testing the Factor Structure of H-UMICS

We used CFAs to test the fit of the three models described in section Methods with respect to both educational and relational identity versions of H-UMICS. With regard to both versions, none of the three models showed acceptable fit (Tables 2, 3). On further investigation of factor loadings and error covariances, the possibility of a four-factor model emerged, where the 5-item In depth Exploration factor would be split into two factors: one referring to reflective exploration (i.e., done individually with reflecting upon possibilities; items 6, 7, and 8) and the other referring to socially scaffolded exploration (i.e., discussing possibilities with significant others; items 9 and 10). This model showed acceptable fit that was relatively superior to all three other models (Tables 2, 3). However, the factor referring to socially scaffolded exploration showed questionable to poor internal reliability (Cronbach α s = 0.65 and 0.61 for educational and relational identity, respectively).

With the implementation of error covariances, the three-factor models could be improved both for educational and relational identity versions. These models with error covariances showed adequate fit, even superior to the four-factor models (Tables 2, 3). Based on these results, we decided to retain the three-factor models for further analyses. For these models, factor loadings of the items and correlations between the error terms and latent factors are shown in

TABLE 1 | Candidate models of the structure of H-DIDS; results of CFAs.

Models	χ^2	df	χ^2/df	TLI	CFI	RMSEA (90% CI)	AIC
Four-factor model: CM and IC in a single factor	1,808.484	269	6.723	0.822	0.841	0.084 (0.081–0.088)	1,970.484
Four-factor model: EB and ED in a single factor	1,640.007	269	6.097	0.842	0.858	0.079 (0.076–0.083)	1,802.007
Four-factor model: EB and RE in a single factor	2,105.829	269	7.828	0.788	0.810	0.092 (0.088–0.096)	2,267.829
Four-factor model: ED and RE in a single factor	1,795.781	269	6.676	0.824	0.842	0.084 (0.080–0.088)	1,957.781
Five-factor model	956.302	260	3.678	0.917	0.928	0.058 (0.054–0.062)	1,136.302
Six-factor model	1,167.106	260	4.489	0.892	0.906	0.066 (0.062–0.070)	1,347.106
Five-factor model with six error covariances	914.667	259	3.532	0.921	0.932	0.056 (0.052–0.060)	1,096.667

CM, commitment making; IC, identification with commitment; EB, exploration in breadth; ED, exploration in depth; RE, ruminative exploration.

TABLE 2 | Candidate models of the structure of H-UMICS (educational identity); results of CFAs.

Models	χ^2	df	χ^2/df	TLI	CFI	RMSEA (90% CI)	AIC
One-factor model	1,696.171	65	26.095	0.628	0.690	0.177 (0.170–0.184)	1,774.171
Two-factor model	1,318.074	64	20.595	0.710	0.762	0.156 (0.149–0.164)	1,398.074
Three-factor model	460.966	62	7.435	0.905	0.924	0.090 (0.082–0.097)	544.966
Four-factor model	316.072	59	5.357	0.935	0.951	0.074 (0.066–0.082)	406.072
Three-factor model with seven error covariances	15.658	55	2.849	0.973	0.981	0.048 (0.039–0.057)	254.685

TABLE 3 | Candidate models of the structure of H-UMICS (relational identity); results of CFAs.

Models	χ^2	df	χ^2/df	TLI	CFI	RMSEA (90% CI)	AIC
One-factor model	2,056.104	65	31.632	0.599	0.666	0.195 (0.188–0.203)	2,134.104
Two-factor model	1,555.368	64	24.303	0.695	0.750	0.170 (0.163–0.178)	1,635.368
Three-factor model	454.993	62	7.339	0.917	0.934	0.089 (0.081–0.097)	538.993
Four-factor model	388.256	59	5.733	0.938	0.953	0.077 (0.069–0.085)	428.256
Three-factor model with six error covariances	170.640	56	3.047	0.973	0.981	0.051 (0.042–0.059)	266.640

Supplementary Figures 2, 3 for the educational identity and relational identity versions, respectively.

Means, standard deviations, and internal reliability indices for the three dimensions of H-UMICS (educational identity) and the three dimensions of H-UMICS (relational identity) are shown in **Supplementary Table 2**. All dimensions showed

good to excellent internal reliability. The intercorrelations of the altogether six dimensions of H-UMICS were tested with Pearson's correlations (**Supplementary Table 2**). Correlations showed the same pattern for both versions. Commitment was related to both In depth Exploration (positively) and Reconsideration of Commitment (negatively) with moderate

TABLE 4 | Relationship between the five dimensions of H-DIDS and measured variables; results of Pearson's correlations.

		CM	EB	RE	IC	ED
RSES		0.479***	0.039	−0.461***	0.508***	−0.057
CBCL	Social problems	−0.241***	0.042	0.232***	−0.309***	0.044
	Anxious	−0.408***	0.022	0.384***	−0.395***	0.124
	Somatic complaints	−0.259***	−0.037	0.150*	−0.277***	−0.015
	Attention problems	−0.278***	−0.060	0.312***	−0.349***	−0.020
	Deviant behavior	−0.148*	−0.054	0.157*	−0.199**	−0.072
	Aggression	−0.121	−0.082	0.151*	−0.174**	−0.033
CERQ	Self-blame	−0.260***	−0.015	0.303***	−0.238***	0.215**
	Acceptance	−0.026	0.107	0.036	−0.014	0.172**
	Rumination	−0.110	0.146*	0.238***	−0.180**	0.312***
	Positive refocusing	0.224**	0.134*	−0.107	0.308***	0.086
	Refocusing on planning	0.140*	0.074	−0.044	0.173**	0.133*
	Positive reappraisal	0.221***	0.107	−0.156*	0.259***	0.110
	Putting into perspective	0.026	0.113	0.066	0.001	0.152*
	Catastrophizing	−0.151*	0.041	0.176**	−0.062	0.146*
	Other-blame	0.017	−0.015	0.052	0.016	0.012

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. CM, commitment making; EB, exploration in breadth; RE, ruminative exploration; IC, identification with commitment; ED, exploration in depth; RSES, Rosenberg self-esteem scale; CBCL, child behavior checklist; CERQ, cognitive emotion regulation questionnaire.

strength, while In depth Exploration and Reconsideration of Commitment were unrelated to each other. Across versions, corresponding dimensions showed weak but significant positive correlations in the case of Commitment and In depth Exploration. For Reconsideration, the strength of correlation between educational identity and relational identity was significant but negligible in strength.

Validation of H-DIDS: Variable-Level and Person-Centered Approaches

At the level of variables, we tested the relationship between the dimensions of H-DIDS and measured variables with Pearson's correlations. Results are shown in **Table 4**. More positive self-esteem was associated with more intense commitment—both at the level of commitment making and the level of identification with commitment. At the same time, more positive self-esteem was associated with less ruminative exploration. Self-esteem was unrelated to processes of exploration.

Regarding problem behaviors, aggression, and deviant behavior were found to be unrelated to the dimensions of identity development. Social problems, anxious symptoms, somatic complaints, and attention problems showed similar associations with the identity development processes. All problems had negative associations with both processes of commitment, while all—except for somatic symptoms—had positive associations with ruminative exploration. The strongest correlations were found for anxious symptoms; these correlations were moderate in strength.

With regard to cognitive emotion regulation strategies, self-blame, rumination, positive refocusing, and positive reappraisal showed significant and weak but meaningful associations with

any of the identity development processes. Adaptive strategies (i.e., positive refocusing and positive reappraisal) were associated with more pronounced commitment—both at the level of making commitments and at the level of identifying with them. Negative strategies (i.e., self-blame and rumination) showed somewhat distinct patterns. More self-blame—i.e., blaming yourself for the negative event experienced—was associated with weaker commitments and more intense ruminative and in depth exploration. More ruminative coping strategies—i.e., thinking more about thoughts and feelings related to negative events—were associated with more intensive ruminative and in depth exploration.

To implement a person centered approach, we used hierarchical cluster analysis to determine the number of clusters. Upon the visual investigation of the dendrogram and results of the original study of Luyckx et al. (1), we decided to have six clusters. Cluster memberships for the six clusters were computed by k-means cluster analysis. Z-scores of the dimensions of H-DIDS for the six clusters are shown in **Figure 1**. Scores with at least one standard deviation away from means were referred to as below or above average scores. Scores with at least a half standard deviation away from means but not further than one standard deviation were referred to as elevated or depressed scores. For labeling the clusters we relied on the works of Luyckx et al. (1) and Marcia (8) whenever it was possible.

Individuals in the first cluster ($n = 35$) had above average scores on all exploration dimensions. Therefore, this cluster was labeled Moratorium. Scores of individuals ($n = 72$) in the second cluster were close to average on all dimensions, thus, this cluster was labeled Undifferentiated. Individuals ($n = 19$) in the third cluster had above average scores on Ruminative exploration, and somewhat elevated scores on the other two

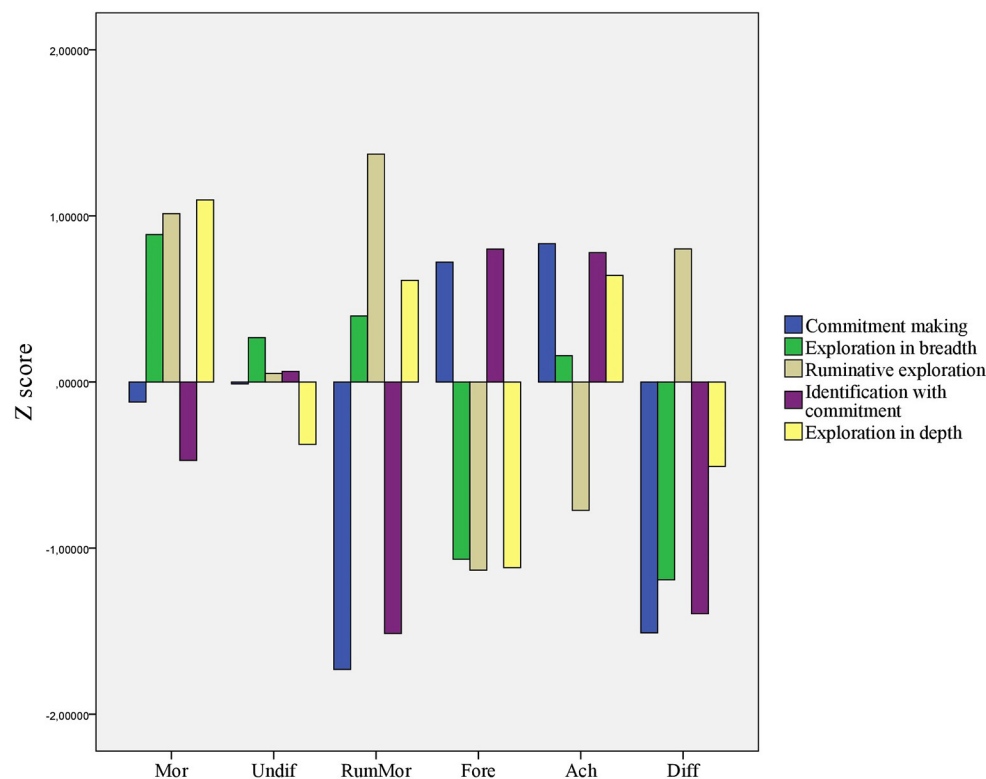


FIGURE 1 | Six clusters based on the Z-scores of the five dimensions of H-DIDS; results of k-means clustering. Mor, Moratorium cluster; Undif, Undifferentiated cluster; RumMor, Ruminative Moratorium cluster; Fore, Foreclosure cluster; Ach, Achievement cluster; Diff, Diffusion cluster.

exploration dimensions. They had below average scores on both commitment dimensions. We labeled this cluster Ruminative Moratorium. The fourth cluster included individuals ($n = 39$) with elevated scores on both commitment dimensions and below average scores on all three exploration dimensions. We labeled this cluster Foreclosure. The fifth cluster consisted of individuals ($n = 48$) who had elevated scores on both commitment dimensions and on the Exploration in depth dimension. They had a depressed score on Ruminative exploration at the same time. This cluster was labeled Achievement. Finally, individuals ($n = 20$) in the sixth cluster has elevated scores on the Ruminative exploration dimensions, while scores for all the other dimensions were either depressed or below average. This final cluster was labeled Diffusion.

To compare the six clusters on the measured variables, we performed ANOVAs with Tukey's HSD *post-hoc* tests. Results are shown in **Table 5**. Significant differences were found between the six clusters in the case of self-esteem, social problems, anxious symptoms, somatic complaints, attention problems, deviant behavior, self-blame, rumination, positive refocusing, and catastrophizing. In all cases, the most favorable outcomes—the most positive self-esteem, the least problem behaviors, the most intensive reliance on positive cognitive emotion regulation strategies, and least intensive reliance on negative cognitive emotion regulation strategies—were connected to the Achievement or Foreclosure clusters. These outcomes were

significantly more favorable than the outcomes for the Diffusion or Ruminative Moratorium clusters. Exceptionally, in the case of rumination Achievement and Ruminative Moratorium clusters showed the least favorable outcomes. These two clusters formed a homogenous subset with no significant difference.

Validation of H-UMICS: Variable-Level and Person-Centered Approaches

At the level of variables, we tested the relationship between the dimensions of H-UMICS and measured variables with Pearson's correlations. Results are shown in **Table 6**. Self-esteem was significantly associated with identity processes in the domain of educational identity. More positive self-esteem was associated with more pronounced commitment and less reconsideration of commitment. Neither in depth exploration in the domain of educational identity, nor any identity processes in the domain of relational identity were associated with self-esteem.

With regard to problem behaviors, commitment (educational identity) was associated with all problem behaviors but aggression. More commitment to education was associated with lower levels of social problems, anxious symptoms, somatic complaints, attention problems, and deviant behavior. More in depth exploration in the domain of education was related to more deviant behavior. More reconsideration of educational commitment was associated with more social problems, attention

TABLE 5 | Comparison of the six H-DIDS clusters on the measured variables; results of ANOVAs.

		Mor (n = 35)		Undif (n = 72)		RumMor (n = 19)		Fore (n = 39)		Ach (n = 48)		Diff (n = 20)		F	p	Tukey's HSD post-hoc test
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD			
RSES		26.06	4.96	26.40	4.99	20.32	3.74	30.15	4.82	29.27	5.51	22.45	6.14	14.951	<0.001	RumMor, Diff < Diff, Mor < Mor, Undif, Ach < Ach, Fore
CBCL	Social problems	3.14	2.65	3.04	2.33	5.95	3.46	2.38	3.01	2.69	2.37	4.35	2.46	6.109	<0.001	Fore, Ach, Undif, Mor < Ach, Undif, Mor, Diff < Diff, RumMor
	Anxious	6.09	4.12	5.01	3.77	9.00	4.67	2.95	2.69	4.23	3.53	7.85	5.24	9.269	<0.001	Fore, Ach, Undif < Ach, Undif, Mor < Mor, Diff < Diff, RumMor
	Somatic complaints	2.49	2.27	2.14	2.62	4.63	2.97	1.87	2.19	1.96	2.48	3.15	3.63	3.864	<0.001	Fore, Ach, Undif, Mor, Diff < Diff, RumMor
	Attention problems	5.26	2.49	5.35	2.73	7.16	2.79	4.10	2.55	4.06	2.32	6.50	2.78	6.193	<0.001	Ach, Fore, Mor, Undif < Mor, Undif, Diff, RumMor
	Deviant behavior	2.57	1.46	2.60	1.64	3.63	2.31	2.59	1.96	2.19	1.59	3.25	1.68	2.430	0.036	Ach, Mor, Fore, Undif, Diff < Mor, Fore, Undif, Diff, RumMor
	Aggression	2.94	1.80	3.35	2.50	4.37	3.13	2.97	2.25	2.60	1.82	3.40	3.10	1.775	0.119	NA
CERQ	Self-blame	12.03	3.02	10.71	2.84	12.63	2.95	9.77	3.31	10.46	3.54	12.85	3.96	4.552	0.001	Fore, Ach, Undif, Mor < Ach, Undif, Mor, RumMor < Undif, Mor, RumMor, Diff
	Acceptance	12.69	3.00	12.25	2.63	12.68	2.93	11.31	2.87	12.54	2.71	12.20	3.07	1.246	0.288	NA

(Continued)

TABLE 5 | Continued

	Mor (<i>n</i> = 35)		Undif (<i>n</i> = 72)		RumMor (<i>n</i> = 19)		Fore (<i>n</i> = 39)		Ach (<i>n</i> = 48)		Diff (<i>n</i> = 20)		<i>F</i>	<i>p</i>	Tukey's HSD <i>post-hoc</i> test
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD			
Rumination	14.97	4.08	12.26	2.86	14.00	3.43	10.92	3.47	12.73	3.97	12.05	4.02	5.666	<0.001	Fore, Diff, Undif, Ach < Diff, Undif, Ach, RumMor < Ach, RumMor
Positive refocusing	11.17	4.98	10.76	3.85	10.05	4.45	10.85	4.15	12.69	4.03	9.50	4.30	2.298	<0.05	Diff, RumMor, Undif, Fore, Mor < RumMor, Undif, Fore, Mor, Ach
Refocusing on planning	14.46	3.59	13.61	2.97	13.11	4.29	13.92	3.56	14.48	3.05	13.15	3.59	0.997	0.421	NA
Positive reappraisal	13.80	4.25	12.94	2.99	11.26	4.72	13.26	4.05	13.96	3.40	11.90	3.97	2.156	0.060	NA
Putting into perspective	13.11	3.94	11.89	3.32	12.16	4.44	11.10	3.39	12.35	3.26	12.05	3.63	1.290	0.269	NA
Catastrophizing	9.97	3.48	9.18	3.32	10.32	3.67	7.77	2.66	8.71	3.69	8.75	4.00	2.274	<0.05	Fore, Ach, Diff, Undif, Mor < Ach, Diff, Undif, Mor, RumMor
Other- blame	7.49	1.99	8.07	2.95	7.74	2.49	7.38	2.82	7.73	2.66	7.80	3.00	0.409	0.842	NA

Mor, Moratorium cluster; Undif, Undifferentiated cluster; RumMor, Ruminative Moratorium cluster; Fore, Foreclosure cluster; Ach, Achievement cluster; Diff, Diffusion cluster; RSES, Rosenberg Self-Esteem Scale; CBCL, Child Behavior Checklist; CERQ, Cognitive Emotion Regulation Questionnaire.

TABLE 6 | Relationship between the six dimensions of H-UMICS (three dimensions each for educational and relational identity) and measured variables; results of Pearson's correlations.

		COM _{Ed}	IDE _{Ed}	RECON _{Ed}	COM _{Rel}	IDE _{Rel}	RECON _{Rel}
RSES		0.468***	0.115	−0.251***	0.195*	−0.162*	−0.112
CBCL	Social problems	−0.271***	−0.133*	0.243**	−0.304**	−0.076	0.170*
	Anxious	−0.298***	0.038	0.194**	−0.248***	0.152*	0.219**
	Somatic complaints	−0.237***	−0.012	0.094	−0.078	0.154*	−0.034
	Attention problems	−0.301***	−0.193**	0.204**	−0.092	0.022	0.047
	Deviant behavior	−0.301***	−0.204**	0.210**	−0.089	0.022	0.047
	Aggression	−0.113	−0.154*	0.074	−0.165*	0.058	0.112
CERQ	Self-blame	−0.125	0.127	0.070	−0.063	0.174**	0.096
	Acceptance	−0.023	0.014	0.052	0.057	0.123	0.009
	Rumination	−0.084	0.181	0.140	−0.030	0.275***	0.023
	Positive refocusing	0.234***	0.092	−0.013	0.267***	0.097	−0.065
	Refocusing on planning	0.191**	0.251***	−0.030	0.305***	0.196**	−0.034
	Positive reappraisal	0.321***	0.205**	−0.027	0.300***	0.183**	−0.012
	Putting into perspective	0.056	0.047	0.158*	0.197**	0.221**	−0.028
	Catastrophizing	−0.107	0.176**	0.166*	−0.045	0.208**	0.138*
	Other-blame	−0.039	0.046	0.181**	−0.165*	0.043	0.274***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; COM, commitment; IDE, in depth exploration; RECON, reconsideration of commitment; RSES, Rosenberg self-esteem scale; CBCL, child behavior checklist; CERQ, cognitive emotion regulation questionnaire. Subscripts Ed and Rel stand for educational and relational identity, respectively.

problems, and deviant behavior. Commitment to friendships and friends was associated to less social problems and to less anxious symptoms. In depth exploration and reconsideration of commitment in the domain of relational identity were unrelated to any of the measured problem behaviors.

Regarding cognitive emotion regulation strategies, more commitment to education was associated with more intensive positive refocusing and positive reappraisal (i.e., thinking more to joyful events when facing adversities and more effort to create positive meanings to negative events, respectively). More in depth exploration of educational issues was associated with more intensive refocusing on planning and positive reappraisal (i.e., thinking more about what actions to take to solve the negative situation and more effort to create positive meanings to negative events, respectively). Reconsideration of educational commitment was unrelated to cognitive emotion regulation strategies.

Being more committed to friendships and friends was associated with more intensive positive refocusing, refocusing on planning, and positive reappraisal (i.e., thinking more to joyful events when facing adversities, thinking more about what actions to take to solve the negative situation, and more effort to create positive meanings to negative events, respectively). More in depth exploration of friendships was associated with more rumination, more putting into perspective, and more catastrophizing (i.e., thinking more about thoughts and feelings related to negative events, emphasizing the relativity of the negative event more, and putting more explicit emphasis on the terror of what they experienced, respectively). Reconsideration of commitment to friendships and friends was associated only with other-blame. More reconsideration of commitments in the relational domain was associated with more thoughts of putting

the responsibility for the negative event on the environment or others.

To implement a person centered approach, we used hierarchical cluster analyses—separately for the two identity domains—to determine the number of clusters. Because we were ignorant of any study using clusters based on UMICS, we relied on the visual investigation of the dendrograms. Accordingly, we decided to have five clusters each both for educational and relational identity domains. Cluster memberships for the five-five clusters were computed by k-means cluster analysis. Z-scores of the dimensions of H-UMICS (educational identity) for the five clusters and Z-scores of the dimensions of H-UMICS (educational identity) for the five clusters are shown in **Figures 2A,B**, respectively. Scores with at least one standard deviation away from means were referred to as below or above average scores. Scores with at least a half standard deviation away from means but not further than one standard deviation were referred to as elevated or depressed scores. For labeling the clusters we relied on the fact, that the theory behind U-MICS (2, 48, 49) is highly process-oriented. Therefore, labels for the cluster imply processes—despite the fact that we are aware of the cross-sectional nature of our study.

Four clusters showed identical patterns across identity domains. Individuals in the first cluster ($n = 29$ and 7 for educational and relational identity, respectively) had below average scores on Commitment and above average scores on Reconsideration of commitment with either average or depressed scores on In depth exploration. These individuals are reconsidering their commitments with loosening them at the same time. Therefore, we labeled this cluster Discarding (i.e., discarding commitments). Individuals in the second cluster ($n = 43$ and 40 for educational and relational identity, respectively)

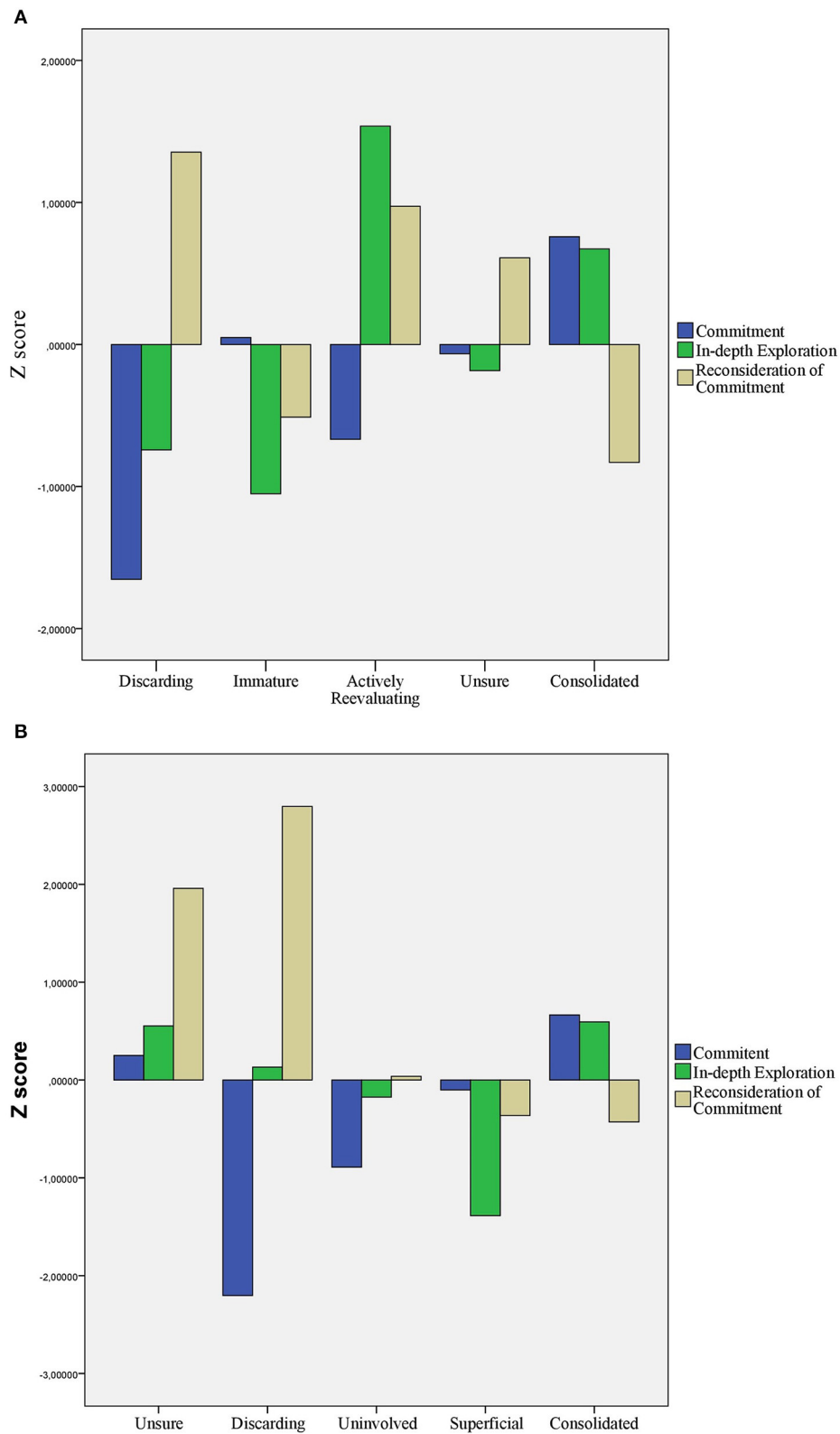


FIGURE 2 | Clusters based on the Z-scores of the dimensions of H-UMICS; results of k-means clustering. Clusters in charts (A,B) are based on H-UMICS (educational identity) and H-UMICS (relational identity), respectively.

showed average scores on Commitment, below average scores on In depth Exploration, and slightly depressed scores on Reconsideration of commitment. These individuals are most prominently characterized by their reluctance to reflect on their choices without being really committed. Although the cluster is similar to foreclosure, focusing on identity development processes, we labeled it Immature for the educational identity domain and Superficial for the relational identity domain. Individuals in the third cluster ($n = 56$ and 15 for educational and relational identity, respectively) had elevated or above average scores on Reconsideration of commitment, but in contrast with individuals in the Discarding cluster, they had average scores on Commitment. These adolescents made thoughts about changing their commitments but without loosening them. Thus, we labeled this cluster Unsure. Individuals in the fourth cluster ($n = 48$ and 108 for educational and relational identity, respectively) had elevated scores on Commitment and In depth exploration and depressed scores on Reconsideration of commitment. These individuals were committed to education and friends while being reflective on these topics at the same time. Therefore, we labeled this cluster Consolidated.

The fifth cluster for the education identity domain included individuals ($n = 15$) who had depressed scores on Commitment, above average scores on In depth exploration, and elevated scores on Reconsideration of commitment. These individuals were actively exploring current commitments without being really committed to them. Additionally, they also made thoughts about discarding these commitments. With emphasizing processes, this cluster was labeled Actively Reevaluating despite its resemblance of moratorium. Individuals in the fifth cluster for the relational identity domain ($n = 53$) had depressed scores on Commitment and average scores on In depth exploration and Reconsideration of commitment. These individuals were uncommitted to friendships and friends without actively reflecting upon or reconsidering the issue. Therefore, this cluster was labeled Uninvolved.

We compared the clusters on the measured variables separately for the two identity domains. For this purpose, we performed ANOVAs with Tukey's HSD *post-hoc* tests. Results for the educational identity domain are shown in **Table 7**. With regard to self-esteem, significant differences were detected. The *post-hoc* test revealed that adolescents in the Discarding cluster had significantly more negative self-esteem than adolescents from any other cluster. Regarding problem behavior, significant differences were detected between clusters for all kinds of problem behaviors but aggression. For each kind of problem behavior, adolescents from the Consolidated cluster reported the least problems, whereas adolescents from either the Actively Reevaluating or the Discarding clusters reported the most problems. Regarding cognitive emotion regulation strategies, ANOVAs showed significant differences between the clusters for rumination, positive reappraisal, and catastrophizing. *Post-hoc* tests showed that adolescents from the Actively Reevaluating cluster thought significantly more frequently about thoughts and feelings related to negative events than adolescents from any other clusters (rumination). Further, adolescents from the Consolidated cluster made significantly more effort to create

positive meanings to negative events than their peers from the Discarding cluster (positive reappraisal). Finally, participants from the Actively Reevaluating cluster put significantly more explicit emphasis on the terror of what they experienced (catastrophizing). Further significant differences between the clusters were indicated by ANOVAs for positive refocusing and refocusing on planning. However, *post-hoc* Tukey's HSD showed only one homogeneous subset of clusters for these variables.

We also compared clusters on the measured variables for the relational identity domain. Results are shown in **Table 8**. Regarding self-esteem, adolescents in the Discarding cluster had significantly lower self-esteem than their peers from any other cluster. With regard to problem behaviors, clusters differed significantly in social problems, anxious symptoms, and aggression. *Post-hoc* tests revealed that adolescents from the Discarding cluster reported significantly more social problems than their peers from the Consolidated, Superficial, or Unsure clusters. Discarding adolescents also reported significantly more anxious symptoms than their peers from the Superficial or Consolidated clusters. Finally, participants from the Discarding cluster reported significantly more aggression than their peers from any other cluster.

Regarding cognitive emotion regulation strategies, ANOVAs showed significant differences between the clusters for all strategies, except for acceptance. However, for refocusing on planning and putting into perspective, only one homogeneous subset was detected by *post-hoc* tests. Adolescents from the Discarding cluster blamed themselves more for negative events (self-blame) and thought more frequently about thoughts and feelings related to negative events (rumination) than their peers from the Superficial, Uninvolved, or Unsure clusters. Adolescents from the Consolidated and Unsure clusters reported using more positive refocusing (thinking more to joyful events when facing adversities) and positive reappraisal (putting more effort to create positive meanings to negative events) to cope with negative events than their peers from the Discarding cluster. Discarding adolescents put significantly more explicit emphasis on the terror of what they experienced (catastrophizing) than their peers from the Superficial or Uninvolved clusters. Finally, discarding adolescents put the responsibility for negative events significantly more frequently on the environment or significant others (other-blame) than their peers from the Superficial, Consolidated, or Uninvolved clusters.

Associations Between H-DIDS and H-UMICS: Variable-Level and Person-Centered Approaches

To test the association between H-DIDS and H-UMICS at the level of variables, we used Pearson's correlations. According to the results (**Table 9**), the following significant correlations were revealed. More commitment in both domains (as measured by H-UMICS) was associated with more commitment making and identification with commitment and with less ruminative exploration. The correlations were weak to moderate for the educational domain and weak for the relational

TABLE 7 | Comparison of the five H-UMICS (educational identity) clusters on the measured variables; results of ANOVAs.

		Disc (<i>n</i> = 29)		Immat (<i>n</i> = 43)		ActReev (<i>n</i> = 15)		Unsure (<i>n</i> = 56)		Cons (<i>n</i> = 48)		<i>F</i>	<i>p</i>	Tukey HSD <i>post-hoc</i> test
		M	SD	M	SD	M	SD	M	SD	M	SD			
RSES		22.28	6.10	27.12	5.99	24.47	4.34	26.29	4.55	29.13	5.67	10.210	<0.001	Disc, ActReev < ActReev, Unsure. Immat < Unsure, Immat, Cons
CBCL	Social problems	4.31	2.42	2.86	2.75	3.47	2.17	3.50	2.90	2.18	2.20	4.788	0.001	Cons, Immat, ActReev, Unsure < Immat, ActReev, Unsure, Disc
	Anxious	6.62	5.00	4.79	3.83	8.27	3.10	5.50	4.22	3.79	3.43	5.977	<0.001	Cons, Immat, Unsure < Immat, Unsure, Disc < Disc, ActReev
	Somatic complaints	2.83	2.58	2.74	3.27	3.93	3.20	2.32	2.59	1.65	2.10	3.283	0.012	Cons, Unsure, Immat, Disc < Unsure, Immat, Disc, ActReev
	Attention problems	6.66	2.68	5.09	2.69	5.20	2.18	5.14	2.84	3.98	2.36	6.141	<0.001	Cons, Immat, Unsure, ActReev < Immat, Unsure, ActReev, Disc
	Deviant behavior	3.76	1.81	2.72	1.78	2.53	1.88	2.46	1.54	2.20	1.58	4.851	0.001	Cons, Unsure, ActReev, Immat < Immat, Disc

(Continued)

TABLE 7 | Continued

		Disc (n = 29)		Immat (n = 43)		ActReev (n = 15)		Unsure (n = 56)		Cons (n = 48)		F	p	Tukey HSD post-hoc test
		M	SD	M	SD	M	SD	M	SD	M	SD			
CERQ	Aggression	3.66	2.81	3.35	2.19	2.93	1.91	2.80	2.32	2.75	2.17	1.187	0.318	NA
	Self-blame	11.21	3.40	10.44	3.07	12.67	3.66	11.23	3.45	10.51	2.98	1.848	0.121	NA
	Acceptance	12.48	2.98	12.05	2.75	13.13	2.95	12.05	2.44	12.18	2.71	0.598	0.665	NA
	Rumination	12.90	3.65	11.95	4.15	16.07	2.55	12.89	3.26	12.20	3.40	4.408	0.002	Immat, Cons, Unsure, Disc < ActReev
	Positive refocusing	10.03	4.62	9.70	3.86	10.00	5.03	11.02	3.97	12.05	4.06	2.941	0.021	OHS
	Refocusing on planning	12.93	4.03	12.95	3.02	14.27	4.01	13.70	3.12	14.68	2.81	2.877	0.024	OHS
	Positive reappraisal	11.55	4.41	11.56	3.24	13.07	4.76	13.00	3.16	14.30	3.29	5.751	<0.001	Disc, Immat, Unsure, ActReev < Unsure, ActReev, Cons
	Putting into perspective	12.28	4.17	11.49	3.11	11.87	4.88	12.75	3.14	11.86	3.43	0.924	0.451	NA
	Catastrophizing	9.41	3.41	8.09	3.18	11.73	3.59	9.05	3.18	8.41	3.34	4.178	0.003	Immat, Cons, Unsure, Disc < ActReev
	Other-blame	8.17	3.31	6.93	1.91	7.67	2.23	8.21	3.25	7.49	2.50	1.703	0.150	NA

Disc, discarding cluster; Immat, immature cluster; ActReev, actively reevaluating cluster; Cons, consolidated cluster; RSES, Rosenberg self-esteem scale; CBCL, Child behavior checklist; CERQ, cognitive emotion regulation questionnaire; OHS, one homogenous subset.

Dimensional assessment of personality disorders in young people: A closer look on personality functioning in younger ages, different cultures, and various clinical settings

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and Klaus Schmeck

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TABLE 8 | Continued

		Unsure (n = 15)		Disc (n = 7)		Uninv (n = 53)		Sup (n = 40)		Cons (n = 108)		F	p	Tukey HSD post-hoc test
		M	SD	M	SD	M	SD	M	SD	M	SD			
	Refocusing on planning	14.73	3.49	12.43	2.76	12.38	3.04	13.38	2.89	14.70	3.19	5.894	<0.001	OHS
	Positive reappraisal	14.73	3.26	10.29	3.20	11.94	3.06	11.70	3.96	13.94	3.57	6.523	<0.001	Disc, Sup, Uninv < Sup, Uninv, Cons, Unsure
	Putting into perspective	12.67	3.75	11.71	5.53	11.23	3.26	10.60	3.16	12.96	3.35	4.672	0.001	OHS
	Catastrophizing	10.47	4.26	11.57	3.05	8.40	3.19	8.10	3.07	8.98	3.26	2.931	0.022	Sup, Uninv, Cons, Unsure < Cons, Unsure, Disc
	Other- blame	9.40	2.53	10.43	2.88	7.58	2.94	7.23	2.80	7.44	2.46	3.957	0.004	Sup, Cons, Uninv, Unsure < Unsure, Disc

Disc, discarding cluster; Uninv, uninvolved cluster; Sup, superficial cluster; Cons, consolidated cluster; RSES, Rosenberg self-esteem scale; CBCL, child behavior checklist; CERQ, cognitive emotion regulation questionnaire; OHS, one homogenous subset.

TABLE 9 | The relationship between the five dimensions of H-DIDS and the six dimensions of H-UMICS (educational and relational identity); results of Pearson's correlations.

	COM _{Ed}	IDE _{Ed}	RECON _{Ed}	COM _{Rel}	IDE _{Rel}	RECON _{Rel}
CM	0.459***	0.257***	−0.361***	0.263***	−0.040	−0.076
EB	0.031	0.086	0.220**	0.020	0.102	−0.063
RE	−0.392***	−0.095	0.362***	−0.279***	0.047	0.141*
IC	0.508***	0.286***	−0.337***	0.253***	−0.011	−0.018
ED	0.150*	0.252***	0.118	0.028	0.197**	0.106

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. CM, commitment making; EB, exploration in breadth; RE, ruminative exploration; IC, identification with commitment; ED, exploration in depth; COM, commitment; IDE, in depth exploration; RECON, reconsideration of commitment. Subscripts Ed and Rel stand for educational and relational identity, respectively.

domain. No other associations were found between H-DIDS and H-UMICS (relational domain). For the educational domain, further significant correlations were revealed. More in depth exploration (as measured by H-UMICS) was associated with more commitment making, exploration in depth, and identification with commitment. More reconsideration of commitments (as measured by H-UMICS) was associated with less commitment making and identification with commitment, and with more ruminative exploration. The correlations between the dimensions of the two domain versions of H-UMICS have been already reported in section Testing the Factor Structure of H-UMICS (**Supplementary Table 2**).

To test the associations at the level of clusters (person-centered approach), we used χ^2 -tests. According to results (see **Supplementary Tables 3, 4** for crosstabs), H-DIDS clusters showed a significant overlap with the classification of H-UMICS in the educational identity domain [$\chi^2_{(20)} = 111.269$; $p < 0.001$]. Adolescents from the Undifferentiated cluster of H-DIDS qualified mostly as members of the Unsure cluster of H-UMICS (educational identity). Adolescent both from Foreclosure and Achievement clusters qualified as members of the Consolidated cluster of H-UMICS (educational identity). However, H-DIDS clusters were independent from the classification of H-UMICS in the relational domain [$\chi^2_{(20)} = 23.285$; $p = 0.275$]. Moreover, clusters based on the two domain versions of H-UMICS also proved to be unrelated [$\chi^2_{(16)} = 22.244$; $p = 0.135$; see **Supplementary Table 5** for the crosstab].

DISCUSSION

The aim of the present study was to investigate the psychometric properties and validity of the Hungarian version of two identity scales. Both scales are process-oriented scales that enable us to measure different processes related to identity development. The uniqueness of DIDS is to capture ruminative exploration (1), while in U-MICS a cyclic model of identity is expressed with the introduction of reconsideration of commitments (33). Results are discussed in the same structure as they were reported.

Factor Structure of H-DIDS

With regard to the possible factor structure of H-DIDS, we tested six candidate models found in the literature: four

four-factor models, a five-factor model (1), and a six-factor model (13). The result of CFAs proved that the five-factor model showed an excellent fit; the best among the candidate models. According to these results, both commitment factors and all three exploration factors were independent, collapsing any of those factors resulted in a poorer fit. These results are in accordance with the original conceptualization of the theoretical model behind DIDS (1). We found no proof of the distinction between reflective exploration in depth and reconsideration of commitment—as in the case of the Finnish and Greek versions (13, 20). Exploration in depth was unrelated to any of the commitment dimensions. There is no need to assume two negatively correlated components to plausibly explain these results. It could be simply due to the fact that all exploration dimensions refer to the “work” of identity, while commitment dimensions refer to the—either temporary or relatively permanent—outcome of this exploration process (25). Further, both in breadth and in depth exploration dimensions were positively correlated with ruminative exploration. This might be due to the fact that all three dimensions share a form of reflection. In breadth exploration reflects upon possibilities, in depth exploration upon choices, and ruminative exploration upon despair or lack of choices and possibilities. Thus, we hypothesize that it is not the process of constant reflection on mental processes and their consequences [i.e., rumination itself; for a definition see e.g., (50)] are responsible for the detrimental consequences of rumination (see for previous results; and also see the results in the validation section of this study), but despair. This despair can be elicited by the lack of choices and possibilities as indicated by the negative correlations between in breadth and in depth exploration and ruminative exploration. We hypothesize that this despair is what makes ruminative adolescents vulnerable to depression and anxiety (51) rather than the process of compulsive reflection that they might share with their peers with more favorable outcomes. Therefore, we might consider in furthering the models of identity development to relabel ruminative exploration to aimless or despaired exploration.

Factor Structure of H-U-MICS

In investigating the factor structure of H-U-MICS, we tested the fit of three candidate models based on previous studies

(30, 33). Contrary to our expectations, none of the three tested models had adequate fit. Upon investigation of factor loadings and modification indices, a possible solution with a four-factor model emerged. The factor of in depth exploration was split into two: into a factor with three items reflecting individual reflections about identity elements (reflective exploration) and into another factor with two items reflecting in depth explorations *via* communication with others (socially scaffolded exploration). In the light of its psychosocial roots and the synthesizing function of identity (3, 4, 52, 53), it is rational to assume that while making commitments or even reconsidering them is a *per se* individual, intrapsychic process, exploration takes place in the interpersonal sphere. If we consider the process-orientation of the three-factor model of identity formation (2), we can speculate that socially scaffolded identity precedes reflective exploration. First, the social environment (e.g., parents, peers, and society) offer different possibilities, and then the possibilities are further explored alone in a reflective way. However, these speculations remain hypothetical, because—presumably due to containing only two items—the dimension of socially scaffolded identity showed poor internal reliability in both the educational and the relational identity versions. Therefore, the three-factor model was improved with implementing error covariances, which resulted in a model with acceptable fit for both domain versions of H-U-MICS.

Factors and dimensions showed similar associations for the two domains. Commitment was positively related to in depth exploration and negatively associated with reconsideration of commitment. In depth exploration was unrelated to reconsideration of commitments. These results are in accordance with the results of previous studies (11, 19, 30, 33).

Classification Based on H-DIDS

Based on the dimensions of H-DIDS, we were able to differentiate between six clusters; as expected. Four of them represented ego identity statuses originally described by Marcia (8): achievement, foreclosure, moratorium, and diffusion. We also found an undifferentiated cluster in which adolescents showed average scores on each dimension. In accordance with the original intentions and results of Luyckx et al. (1), ruminative moratorium emerged as the sixth cluster. None of the adaptation studies that used five dimensions of DIDS (35, 46) was successful in attaining such a cluster. This cluster of ruminative exploration was clearly distinguishes both from the moratorium and the diffusion clusters. In the ruminative moratorium cluster, besides the above average score on ruminative moratorium, adolescents showed elevated scores on the dimensions of in breadth exploration and in depth exploration. Contrasted to that diffused adolescents showed below average scores on the two reflective exploration dimensions—especially on the dimension of in breadth exploration. Moratorium and ruminative moratorium clusters differed both on reflective exploration and commitment dimensions, while ruminative exploration was present in both clusters to the same amount. In moratorium, above average scores on ruminative moratorium was accompanied by above average scores on in breadth and in

depth exploration, while these were only elevated for adolescents in the ruminative moratorium cluster. Further, scores for the commitment dimensions were average for adolescents in the moratorium cluster, while being two standard deviations below average for their peers in the ruminative moratorium cluster. Thus, indecision and rumination in the case of adolescents in moratorium might be considered as typical or normal ingredients of this identity development stage or ego identity status, where adolescents are on their way of searching for identity (54). In contrast, rumination and indecision become more pronounced in ruminative moratoriums, where these are accompanied by lack of commitment making and identification with commitment. Using attachment terminology (55), moratoriums have a secure base to explore from (although they might be loosening their commitments), ruminative moratoriums clearly lack this secure base. This speculation is in accordance with results from studies showing that moratoriums experience a family functioning similar to achieved adolescents [e.g., (56, 57)].

Classification Based on H-U-MICS

With regard to classifications based on the two domain versions of H-U-MICS, adolescents could be classified into five clusters for both the educational and the relational identity versions of H-U-MICS. Thus, the number of clusters is identical to that reported by Crocetti et al. (32) and met our expectations. Four out of the five clusters reported by Crocetti et al. (32) corresponded to the four clusters that showed similar patterns across identity domains. Our consolidated cluster corresponded to achievement, immature (educational identity) and superficial (relational identity) to foreclosure, discarding to moratorium, and unsure to searching moratorium. Although we used a process-oriented terminology for labeling our clusters, in three out of four cases the different labels refer to similar phenomena. However, we consider the label by Crocetti et al. (32) for their moratorium cluster misleading. Moratorium is usually characterized by intensive exploration (8) is not clearly present in this cluster. Adolescents in this cluster are rather loosening their commitments while discarding them. Thus, they move toward the identity vacuum of diffusion rather than toward possible identities, as in the case of moratorium. Hence, we labeled this cluster as discarding.

In our study, with regard to either the educational identity or the relational identity version, no clear-cut diffusion cluster emerged with below average scores on each of the three dimensions (32). Moreover, the fifth clusters were dissimilar for the two identity domain versions. With regard to the educational identity domain, adolescents in the fifth cluster were actively reevaluating their commitments. Above average levels of both in depth exploration and reconsideration of commitment indicated that they really put effort into reflecting on their commitments and into deciding whether or not these commitments suited them. In our view, this pattern is much closer to moratorium with its inherent indecisiveness and uncertainty (8, 54) than the pattern labeled as moratorium by Crocetti et al. (32). With regard to the relational identity domain, adolescents in the fifth cluster

showed below average scores on commitment and average scores on in depth exploration and reconsideration of commitment. They were labeled as uninvolved because seemingly their lack of commitment to friends neither motivated them to reconsider the situation or to explore how friendships would suit them. This cluster is most similar to clusters usually labeled as carefree diffusion in studies using DIDS (1, 35, 46).

Validity of H-DIDS

With regard to the variable-level approach, commitment making and identification with commitment were positively, whereas ruminative exploration was negatively associated with self-esteem. These results are in accordance with previous results [56, (58)]. In our cross-sectional study, we can only speculate on the causal relationship between identity processes and self-esteem. Both directions seem to make sense (59). Positive self-esteem can be a buffer to protect against the vicissitudes of identity formation and contributing to firmer commitments (58). Also having commitments (as opposed to being despaired as in the case of ruminative exploration) can help the development of more positive self-esteem.

Associations between dimensions of identity development and behavioral problems and cognitive emotion regulation strategies showed a similar pattern. Both internalizing and externalizing problems showed negative correlations with dimensions of commitment and positive correlation with ruminative exploration. These results are in accordance with the results of previous studies, where strong intercorrelations were found between identity formation processes and behavioral problems (1, 23, 60). Commitment and ruminative exploration also showed associations with adaptive and maladaptive cognitive emotion regulation strategies. More commitment making and identification with commitment were associated with more adaptive and less maladaptive cognitive emotion regulation strategies, while ruminative exploration was related to less adaptive and more maladaptive cognitive emotion regulation strategies. Given the potential mediator role of emotion regulation between identity processes and behavioral problems (61) and the consequent interrelatedness of identity and emotion regulation across diagnostic groups (62), these results are unsurprising. As exception from the above described pattern, in depth exploration was also positively associated with self-blame and rumination. Given the reflective nature of in depth exploration (1), this process of identity formation inherently includes reflecting upon and being aware of previous commitments. Authentic self-awareness (63) includes being aware of ones strengths and weaknesses at the same time. The latter might lead to self-blame or rumination. The lack of notable associations with cognitive emotion regulation strategies and behavioral problems was observed regarding in-breadth exploration. These results are in accordance with the results of previous studies [31, (58)], which indicate that exploration processes are healthy and adaptive in middle-adolescence, but gradually lose their functionality in the late 20s and they are associated with emotional symptoms with increasing age.

With regard to the person-centered approach, achieved and foreclosed adolescents reported the most favorable outcomes

(the most positive self-esteem, the least behavioral problems, and the most adaptive and the least maladaptive cognitive emotion regulation strategies) while ruminative moratoriums and diffused adolescents reported the least favorable outcomes. These results correspond to those of previous studies, where identity clusters with high levels of commitment (i.e., foreclosure and achievement) outperformed identity clusters with low levels of commitment and high levels of ruminative exploration (i.e., diffusion, moratorium, and ruminative moratorium) [e.g., (17, 64–66)]. According to our results, moratorium didn't show as detrimental effects on psychosocial adjustment as either diffusion or ruminative moratorium. Therefore, we speculate that high levels of reflective exploration (i.e., in breadth and especially in depth exploration) might buffer against the negative effects of ruminative exploration [for similar interaction effects see (23)]. While without reflective exploration, ruminative exploration means despair and purposelessness, together with in breadth and in depth exploration, it might indicate nothing more than the temporary insecurity of the normative adolescent crises (54). The maladaptive cognitive emotion regulation strategy of rumination as an exception from this pattern can further strengthen the above line of reasoning. Diffused and foreclosed adolescents showed the lowest levels of rumination in face of adverse life situations, while their peers in the achievement and ruminative moratorium clusters ruminated the most. Rumination defined as the process of constant reflection on mental processes and their consequences (50) is shared by achieved adolescents and their peers in ruminative moratorium. But there is also a main distinction: achieved adolescent with commitments, plans, and life goals have something to reflect upon, while ruminative moratoriums seem to have nothing else but the lack of commitments, plans, and life goals to ruminate about.

Validity of H-U-MICS

At the level of variables, the following results were obtained. Commitment to education and reconsideration of this commitment were significantly related to self-esteem. More commitment to education was associated with more positive self-esteem, while more reconsideration of commitment was associated with more negative self-esteem. The same pattern was found by Crocetti et al. (32) with regard to self-concept clarity, while Crocetti et al. (10) found the same associations between the dimensions of U-MICS and self-esteem for Arab and Jewish adolescents living in Israel. However, in our study, these associations only emerged for educational identity. With regard to lack of associations in the domain of relational identity, we speculate as follows. Commitment to friendships and friends might have the same importance for adolescents as education (67). At the same time, friendship quality might play a moderating role between commitment and self-esteem (68). We hypothesize that being committed to socially acceptable friends might contribute to positive self-esteem, being committed to socially discarded (i.e., rejected, forbidden) friends might contribute to negative self-esteem.

With regard to behavioral problems, commitment to education was negatively associated with most of the behavioral problems measured, while commitment to friendships was negatively associated only with social problems and anxious symptoms. These results are in accordance with previous studies revealing that externalizing problems interfere with educational identity (69). With regard to friendship, the quality of friendship might again play an important moderating role (70). Previous studies with U-MICS tended to use composite scores of the two domains, but the importance of commitment in relation with behavioral problems in those studies were similar to our results (10, 11, 71).

With regard to emotion regulation, results in general confirmed those of previous studies showing a positive association between commitment, exploration and adaptive emotion regulation [e.g., (72, 73)]. In contrast to our previously reported associations between identity dimensions and psychosocial functioning, dimensions—especially commitment and in depth exploration—from the relational identity domain produced the more frequent significant correlations as compared to dimension from the educational identity domain. This might be due to methodological issues. We used a scale that measures cognitive emotion regulation strategies in face of negative life events (41). Most negative life events in adolescence are relational in nature (74), therefore, it is unsurprising that we obtained stronger association for cognitive emotion regulation strategies with dimensions from the relational identity domain than with dimensions from the educational identity domain.

In a person-centered approach, results supported the correlational results. Adolescents in the consolidated cluster outperformed their peers in the discarding cluster in psychosocial adjustment and adaptive emotion regulation strategies. These results are in line with those from studies that used a person-centered approach (32, 34, 72). As exceptions, rumination and catastrophizing was significantly characteristic for adolescents in the actively reevaluating cluster than in any other clusters. We speculate that the reflectivity of in depth exploration might potentiate the emergence of negative thoughts (a common characteristic of ruminations and catastrophizing) (41) about negative life events.

The Association Between H-DIDS and H-U-MICS and the Association Between the Two Identity Domain Versions of H-U-MICS

Finally, the potential associations between H-DIDS and H-U-MICS and the potential association between the two identity domain versions of H-U-MICS were tested. We are ignorant of any studies comparing the two instruments with similar theoretical background (1, 2). Further, based on the fact that scores from the two domains of U-MICS are most frequently used aggregated (10, 19, 31, 32), we are also ignorant of any systematic comparisons between the two identity domain versions of U-MICS.

As for the relation of H-DIDS with the two identity domain versions of H-U-MICS, commitment dimensions in both versions of H-U-MICS were positively associated with commitment dimensions of H-DIDS and negatively with the ruminative exploration dimension of H-DIDS. Accordingly, it seems that commitment—the outcome of the identity work (25)—is quite stable across measures and identity domains. At the same time, even for the commitment dimensions of H-U-MICS, associations with the aforementioned dimensions of H-DIDS were stronger for the educational identity domain. For the educational identity domain version of H-U-MICS, in depth exploration and reconsideration of commitment were also significantly and meaningfully correlated with most of the dimensions of H-DIDS. These results are not surprising, given the fact that items of DIDS (1) are formulated with regard to life goals, whereas the educational identity domain version of U-MICS (2) was designed to tap the ideological aspect of identity. Comparing classifications across the two measures also supported the above line of reasoning. Adolescents who were classified based on the five dimensions of H-DIDS were distributed in H-U-MICS (relational identity) clusters by chance. With regard to H-U-MICS (educational identity), a significant overlap with H-DIDS in classification was found. Undifferentiated adolescents (based on H-DIDS) were mostly classified as unsure based on H-U-MICS, whereas achieved and foreclosed adolescents (based on H-DIDS) were mostly classified as consolidated. Based on the conceptualization of identity statuses (8), both foreclosed and achieved adolescents have a solid identity, therefore it is unsurprising that adolescents from both clusters of H-DIDS were classified as consolidated based on the three dimensions of H-U-MICS.

With regard to the two identity domain versions of H-U-MICS, their corresponding dimensions showed weak correlations and classification based on the two versions were independent from each other. On the one hand, these results are important from a methodological aspect. Based on these results, we would advise against the aggregated use of the two domains (10, 19, 31, 32). We also assume that especially reconsideration of commitment could have different meanings for different identity domains. In adolescence, it is more the rule than the exceptions that adolescents question their friendships and change their friends (68). Changing education might be more unusual. This might be partly due to societal expectations. While friendships are voluntary dyadic relationships of affection (75), choices in education is highly effected by parents (76). However, it might be a cultural characteristic of Hungary; a country with considerable levels of uncertainty avoidance (i.e., maintaining rigid codes of belief and behavior and being intolerant of unorthodox behavior and ideas) (77). On the other hand, it is developmentally appropriate for adolescents to be in different phases of identity development (78) that could be another reason for the independence of the two identity domain versions of H-U-MICS.

Limitations and Conclusions

The current study clearly has its own limitations. The most severe limitations were the use of self-report questionnaires and

the cross-sectional design of our study. This latter didn't allow us to evaluate the dynamic nature of identity formation and the direction of the tested associations. Further, our sample cannot be considered representative, as the representativeness was limited by convenience sampling. Another methodological limitation to our study is that we examined a high school sample of adolescents that included individuals ranging in age from 14 to 21 years. Although the identical schooling levels provide a common social norm and expectation toward our participants, the sample cannot be considered homogeneous. However, we decided not to investigate age invariance, because forming group might be arbitrary because of the aforementioned reasons. Future studies should address age invariance of the measures by selecting late primary school students (aged 14–15 years) and university freshmen (aged 18–21 years). This would allow for a clear distinction between the age groups. Furthermore, we did not analyze gender invariance either. This should also be addressed by systematic data collection, i.e., providing a balanced distribution of genders across age groups. The use of item response theory and differential item functioning analyses in future research may further contribute to a more accurate understanding of the psychometric properties of H-DIDS and H-UMICS. Last but not least, in examining the factor structure of U-MICS, the possibility of a four factor model emerged. This raises the question whether in depth exploration can be considered as a homogeneous construct.

In conclusion, the findings of the present study indicate that both H-DIDS and H-U-MICS proved to be reliable and valid instruments to assess identity processes and identity statuses in a Hungarian-speaking context. The parallel work with these two instruments with similar theoretical background (1, 2) gave us the opportunity to compare them with each other, which led us to some theoretical and methodological proposals. Comparing H-DIDS and the two identity dimensions of H-U-MICS revealed that commitment seems to be quite stable across measures and identity domains. Likewise the educational identity domain of H-UMICS also corresponded with H-DIDS as both were designed to grab the ideological aspect of identity. However, the friendship identity domain of H-U-MICS proved to be unrelated to the two ideological domains of identity. This result highlights the divergent developmental dynamics of the ideological and interpersonal identity domains. It is unsurprising because to be at different stages in different domains of development at the same time is developmentally appropriate for adolescents (78). Therefore, for further research, we suggest the assessment of multiple identity domains to get a clearer picture of adolescent identity development, its antecedents and consequences.

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 United Ethical Review Committee for Research in Psychology (EPKEB; Reference No.: 2019-82). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

AL and AR: conceptualization and writing—original draft preparation. AL, AR, and NA: methodology. AR, AL, NA, EJ, and BP: item translation process. AL, AR, and EJ: formal analysis and investigation. AL and BP: writing—review and editing and supervision. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsy.2022.804529/full#supplementary-material>

Supplementary Figure 1 | The five-factor model of H-DIDS; results of a CFA. All factor loadings and correlations are significant at $p < 0.05$. Correlations between factors are omitted for clarity and are presented in **Table 2**. CM, Commitment making; EB, Exploration in breadth; RE, Ruminative Exploration; IC, Identification with commitment; ED, Exploration in depth.

Supplementary Figure 2 | The three-factor model of H-UMICS (educational identity); results of a CFA. All factor loadings and correlations are significant at $p < 0.05$. COM, Commitment; IDE, In-depth Exploration; RECON, Reconsideration of Commitment.

Supplementary Figure 3 | The three-factor model of H-UMICS (relational identity); results of a CFA. All factor loadings and correlations—both between factors and between error terms—are significant at $p < 0.05$. COM, Commitment; IDE, In-depth Exploration; RECON, Reconsideration of Commitment.

Supplementary Table 1 | The interrelations of the five dimensions of H-DIDS; descriptives, internal reliability indices and results of Pearson's correlations. Note: $*p < 0.05$; $**p < 0.01$; $***p < 0.001$; CM = Commitment making; EB = Exploration in breadth; RE = Ruminative Exploration; IC = Identification with commitment; ED = Exploration in depth. Correlation between the corresponding latent variables of the final CFA with error covariances are in parentheses.

Supplementary Table 2 | The interrelations of the six dimensions of H-UMICS (three dimensions each for educational and relational identity); descriptives, internal reliability indices and results of Pearson's correlations. Note: $*p < 0.05$; $**p < 0.01$; $***p < 0.001$; COM = Commitment; IDE = In depth Exploration; RECON = Reconsideration of Commitment. Subscripts Ed and Rel stand for educational and relational identity, respectively. The corresponding dimensions of H-UMICS educational and relational identity scales are bolded.

Supplementary Table 3 | The relationship between H-DIDS and H-UMICS (educational identity) classifications. Note: Undif = Undifferentiated cluster; Diff =

Diffusion cluster; Ach = Achievement cluster; Fore = Foreclosure cluster; Mor = Moratorium cluster; RumMor = Ruminative Moratorium cluster; ActReev = Actively Reevaluating cluster; Immat = Immature cluster; Cons = Consolidated cluster; Disc = Discerning cluster.

Supplementary Table 4 | The relationship between H-DIDS and H-UMICS (relational identity) classifications. Note: Undif = Undifferentiated cluster; Diff = Diffusion cluster; Ach = Achievement cluster; Fore = Foreclosure cluster; Mor =

Moratorium cluster; RumMor = Ruminative Moratorium cluster; Uninv = Uninvolved cluster; Disc = Discarding cluster; Sup = Superficial cluster; Cons = Consolidated cluster.

Supplementary Table 5 | The relationship between H-UMICS (educational identity) and H-UMICS (relational identity) classifications. Note: Uninv = Uninvolved cluster; Disc = Discarding cluster; Sup = Superficial cluster; Cons = Consolidated cluster; ActReev = Actively Reevaluating cluster; Immat = Immature cluster.

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Prevalence and 10-Year Stability of Personality Disorders From Adolescence to Young Adulthood in a High-Risk Sample

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Background: With the implementation of the 11th edition of the International Classification of Diseases (ICD-11) in early 2022, there will be a radical change in the framework and process for diagnosing personality disorders (PDs), indicating a transition from the categorical to the dimensional model. Despite increasing evidence that PDs are not as stable as previously assumed, the long-term stability of PDs remains under major debate. The aim of the current paper was to investigate the categorical and dimensional mean-level and rank-order stability of PDs from adolescence into young adulthood in a high-risk sample.

Methods: In total, 115 young adults with a history of residential child welfare and juvenile-justice placements in Switzerland were included in the current study. PDs were assessed at baseline and at a 10-year follow-up. On a categorical level, mean-level stability was assessed through the proportion of enduring cases from baseline to follow-up. Rank-order stability was assessed through Cohen's κ and tetrachoric correlation coefficients. On a dimensional level, the magnitude of change between the PD trait scores at baseline and at follow-up was measured by Cohen's d . Rank-order stability was assessed through Spearman's ρ .

Results: The prevalence rate for any PD was 20.0% at baseline and 30.4% at follow-up. The most frequently diagnosed disorders were antisocial, borderline, and obsessive-compulsive PDs, both at baseline and at follow-up. On a categorical level, the mean-level stability of any PD was only moderate, and the mean-level stability of specific PDs was low, except of schizoid PD. Likewise, the rank-order stability of any PD category was moderate, while ranging from low to high for individual PD diagnoses. On a dimensional level, scores increased significantly for most PDs, except for histrionic traits, which decreased significantly from baseline to follow-up. Effect sizes were generally low. The rank-order stability for dimensional scores ranged from low to moderate.

Conclusion: The findings indicate low to moderate stability of Pds and Pd traits from adolescence to adulthood, which supports the growing evidence that categorical diagnoses of Pds are quite unstable. This in turn, emphasizes the use of the upcoming ICD-11 that Acknowledgments Pds to be only “relatively” stable.

Keywords: personality disorders (PDs), prevalence, stability, high-risk sample, youth

INTRODUCTION

The introduction of personality disorders (PDs) in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) (1) led to a substantial increase in empirical research and clinical interest (2). Yet, the advent of specific diagnostic criteria and a multi-axial approach that differentiated PDs (i.e., Axis II) from clinical syndromes (i.e., Axis I) set the stage for an ongoing controversy about the conceptualization and diagnosis of PDs. While PDs were defined as discrete, distinct categories, the shortcomings of such a categorical classification model became quickly apparent (3–5), and a shift to a more dimensional model, in which PDs are perceived as extreme variants of normal personality dimensions, became inevitable (6, 7). With the upcoming 11th edition of the International Classification of Diseases (ICD-11) (8), the conceptualization of PDs is finally in transition, acknowledging PDs to be only “relatively” stable (9–11). For over decades, however, temporal stability consisted in one of the major distinguishing features between Axis I and Axis II disorders with the stability of PDs being substantially higher than for other mental disorders. Yet cumulative findings slowly appeared to question the stability of PDs, by suggesting considerable improvement over time (12, 13). Thus, against the common assumption that PDs are “enduring,” “inflexible,” and “stable” the categorical stability of PDs has found to be not much higher than the stability of other mental disorders (14). Indeed, the Collaborative Longitudinal Study of PDs (CLPS) (15), which investigated the stability of schizotypal, borderline, avoidant, and obsessive-compulsive PDs over time, found that fewer than half of PD patients still met the criteria for a diagnosis after 2 years (16). With regard to borderline PD (BPD), 85% of the original sample had remitted after 10 years (17).

Nevertheless, as outlined in Morey and Hopwood’s narrative review (18), temporal stability is a complex notion and has to be examined with respect to several factors. First, estimates tend to vary as a function of the type of stability being assessed. In the present study, the focus relies on the two types of stability that have been studied most frequently, namely mean-level and rank-order stability. Mean-level stability refers to the degree to which the average level of a PD or a PD trait in a given sample changes over time. Rank-order stability, on the other hand, refers to the consistency of an individual’s relative ordering compared to others in a given sample, capturing, thus, the extent to which interindividual differences persist over time (18). Rank-order stability is high if the participants in a given sample maintain their ordering with regard to a specific PD or PD trait relative to each other over time, even if the sample as a whole increases or decreases with regard to that PD or PD trait. As such, rank-order changes are independent of mean-level changes (19). Second,

estimates depend in part on the type of PD construct being assessed (i.e., categories or traits), suggesting higher stability for dimensional traits rather than for distinct categories (20–22). In their narrative review, Grilo and McGlashan (21) reported that the rank-order stability for meeting any PD diagnosis is fair to moderate, while individual PD diagnoses often exhibit lower stability. In contrast, dimensional scores tend to show slightly higher stability estimates. Durbin and Klein (20) confirmed these findings by showing that rank-order stability was low to fair for categorical PD diagnoses over a 10-year follow-up in depressed outpatients, while rank-order stability for dimensional PD traits was fair to moderate. According to Grilo et al. (23), mean-level stability, when assessed dimensionally, is generally lower than rank-order stability, which indicates that symptoms tend to decrease on average, but the rank-ordering of individuals within a defined sample remains roughly the same. Third, estimates may be affected by the assessment method being used to measure PDs. Self-report questionnaires tend to show a relatively higher stability than clinical interviews (20, 24). For instance, the findings from Samuel et al. (22) for dimensional ratings showed significantly greater rank-order and mean-level stability for self-report questionnaires compared to clinical interviews. Findings regarding categorical PD diagnoses, in contrast, indicated comparable rank-order and mean-level stability. Finally, Morey and Hopwood (18) outlined how the clinical status and age range of a given sample are critical factors affecting PD stability estimates over time. Studies investigating the course of PDs, however, seem to focus mainly on adult samples, and studies on children and adolescents are scarce. This paucity of research has been in part due to the widespread reluctance to diagnose PDs in youth (25, 26) and to the belief that personality in adolescence is inconstant and characterized by emotional outbursts and impulsive behavior (27, 28). Existing literature, however, clearly states that PDs can be validly and reliably diagnosed among juveniles (27, 28) and that the stability of PDs in adolescence is found to be comparable to the stability in adulthood (29, 30).

Given the apparent number of developmental tasks [e.g., achieving emotional independence from parents, developing close relationships with peers, preparing for a professional occupation (31)], the transition from adolescence to adulthood seems to be a salient period for investigating the stability of PDs (18, 32). To the best of our knowledge, however, only two studies have explicitly investigated the stability of PDs from adolescence to early adulthood. The Children in the Community (CIC) study investigated the stability of PD traits in a community sample ranging in age from 9 to 28 (33). Findings show that mean PD traits were highest in adolescence and declined linearly to adulthood, although effect sizes were small. Rank-order stability

was found to be low to moderate, and cluster C traits seemed to be less stable than cluster A and B traits (34). Similarly, Bornovalova et al. (35), who investigated the stability and heritability of BPD in a community sample, showed a significant mean-level decline from age 14 to 24, although rank-order stability was high. A third study, namely the study from Chanen et al. (36), investigated the 2-year stability of PDs in older adolescent outpatients, aged 15–18 years, and found that 74% of those diagnosed with a PD at baseline still met the criteria for a PD at follow-up. Regarding dimensional ratings, both rank-order and mean-level stability ranged from low (PD NOS) to moderate (borderline, histrionic, and schizotypal) to high (antisocial and schizoid) (36).

Given the apparent role of developmental influences on the etiology of PDs, studies about the stability of PDs in high-risk samples are surprisingly lacking. The aim of the present study was therefore to examine the prevalence of PDs and their stability over a 10-year period from adolescence to adulthood in adolescents placed in residential care and juvenile-justice institutions. Due to multiple risk factors – such as childhood adversities (37), unfavorable parenting practices, low socioeconomic status, parental mental disorders (38), early mental-health problems (e.g., ADHD, oppositional defiant disorders, and attachment disorders), symptoms of depression and anxiety (39), substance use (40), self-harming behavior (41), psychopathic traits, and youth delinquency (42) – adolescents in residential care and juvenile-justice institutions are particularly at risk of developing a PD, and PD prevalence rates among them are high, ranging from 18 to 40% across studies (43–45). To account for conceptual and methodological factors, both categorical and dimensional mean-level and rank-order stability were investigated.

MATERIALS AND METHODS

Study Design

Baseline

Data was obtained from the longitudinal “Swiss Study for Clarification and Goal-Attainment in Child Welfare and Juvenile-Justice Institutions” [German: Modellversuch zur Abklärung und Zielerreichung in stationären Massnahmen (MAZ)] (46). The study was conducted between 2007 and 2011 with the primary aims of describing the mental health of children and adolescents in residential care and of investigating the effects of residential youth care over an approximately 1-year period in Switzerland. Child welfare and juvenile-justice institutions accredited by the Swiss Federal Ministry of Justice were invited to participate, of which 64 institutions agreed to take part. Juveniles who had been living for at least 1 month in 1 of these 64 included child welfare and juvenile justice institutions and possessed sufficient language skills in German, French, or Italian as well as sufficient intelligence scores ($IQ > 70$) were eligible for participation. The juveniles had been placed in the child welfare and juvenile-justice institutions by penal law, by civil law, or voluntarily. Both voluntary placement and placement by civil law were due to severe mental distress or precarious living conditions. Prior to participation, juveniles, parents or legal

guardians, and social workers were asked to provide informed consent. Participants then completed computer-administered questionnaires as well as semistructured clinical interviews regarding mental health, psychosocial problems, and offending behavior. Assessment was conducted by trained psychologists and research assistants. Overall, 592 children and adolescents aged 6–26 years (mean age = 16.3 years) participated at baseline. Of those participants, 511 agreed to be contacted for a possible follow-up study. The study procedure was approved by the Ethics Committees on Research Involving Humans at the University of Basel and the University of Lausanne (Switzerland) and by the Institutional Review Board at the Ulm University (Germany).

Follow-Up

After a follow-up period of approximately 10 years, participants were reassessed in the study “Youth Welfare Trajectories: Learning from Experiences” [German: Jugendhilfverläufe: Aus Erfahrung Lernen (JAEL)], which is currently being conducted to examine participants’ psychosocial development over time and their transition out of care. Participants were contacted by postal mail, phone, email, and social media. Of the 511 participants, 231 (45.2%) agreed to participate in the follow-up. Despite considerable efforts, 8 (1.6%) participants could not be located, 121 (23.7%) could not be reached, 99 (19.4%) refused to participate, 44 (8.6%) did not provide informed consent, and 8 (1.6%) were deceased. A study flow-chart is provided in **Supplementary Figure 1**. An analysis of the sample attrition showed no significant differences in sociodemographic features (i.e., age, gender, number of former placements, and average duration in residential care) between the participants who took part in the follow-up and those who did not. The follow-up assessment consisted primarily of a set of online questionnaires that participants could complete from home. Participants were then invited to a face-to-face meeting, where they were reassessed using semistructured clinical interviews and semistructured qualitative in-depth interviews regarding mental health, psychosocial problems, and offending behavior. Assessment was conducted by trained psychologists, doctoral students, and research assistants. The study procedure was approved by the Ethics Committee Northwestern and Central Switzerland (EKNZ, Ref.: 2017-00718).

Participants

As the primary aim of this study was to investigate the stability of PDs from adolescence to adulthood, only participants with complete data from the Structured Clinical Interview for DSM-IV-TR Axis II Personality Disorders (SCID-II) (47) at baseline and at follow-up were included, which left a study sample of 138 participants. In addition, participants younger than 12 years of age or older than 18 years at baseline were excluded. The final sample included 115 participants (39.13% female) with a mean age of 15.82 ($SD = 1.93$; range 12–18) at baseline and a mean age of 25.89 ($SD = 2.18$; range = 21–30) at follow-up (**Table 1**). Excluded participants revealed no statistically significant differences from participants at baseline in age [$t(169) = -1.54$; $p = 0.126$], gender [$\chi^2(1) = 0.002$; $p = 0.964$], number of placements in residential care [$t(551) = 0.40$;

TABLE 1 | Sample characteristics at baseline and follow-up ($N = 115$).

	Baseline	Follow-up
	<i>M (SD)</i>	<i>M (SD)</i>
Age (years)	15.8 (1.9)	25.9 (2.2)
Number of placements in residential care	0.7 (1.0)	3.4 (2.8)
Average duration in residential care (years)	1.4 (1.7)	6.3 (4.8)
	<i>n (%)</i>	<i>n (%)</i>
Gender (female)	45 (39.1)	45 (39.1)
Current mental-health disorders^a		
Any current mental-health disorder	74 (64.9)	64 (55.6)
ADHD ^b	13 (11.4)	24 (20.9)
Anxiety disorder ^b	29 (25.4)	19 (16.5)
Conduct disorder ^{b,c}	34 (29.8)	
Mood disorder ^b	16 (14.0)	22 (19.1)
Personality disorder	23 (20.0)	35 (30.4)
Psychotic disorder ^b	2 (1.7)	2 (1.7)
PTSD ^b	5 (4.4)	6 (5.2)
Substance-use disorder ^b	17 (14.9)	41 (35.6)
Current mental-health treatment ^d	55 (61.1)	27 (23.5)

^aParticipants with multiple mental-health disorders are displayed more than once.

^bDue to missing data, the sample size at baseline was $N = 114$. ^cOnly available at baseline. ^dDue to missing data, the sample size at baseline was $N = 90$.

$p = 0.689$], average duration in residential care [$t(228) = -0.19$; $p = 0.849$], PDs [$\chi^2(1) = 2.41$; $p = 0.120$], and mental-health problems other than PDs [$\chi^2(1) = 0.56$; $p = 0.451$].

Measurements

Sociodemographic Characteristics

Sociodemographic information – age, gender, number of former placements, average duration in residential care (i.e., total time spent in residential care and juvenile-justice institutions), and current mental-health treatment – was collected using a computer-based questionnaire at baseline and at follow-up. Participants' data on social welfare, disability, and unemployment insurance were only assessed at follow-up.

Mental Disorders

Mental disorders at baseline were assessed with the Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL) (48). The K-SADS-PL is a semistructured clinical interview that provides a reliable and valid measurement of DSM-IV diagnoses in children and adolescents. At follow-up, mental disorders were examined with the Structured Clinical Interview for DSM-5 Disorders – Clinician Version (SCID-5-CV) (49). The SCID-5-CV is a semistructured clinical interview based on DSM-5 diagnoses covering the most common diagnoses seen in clinical settings: depressive and bipolar disorders, schizophrenia spectrum and other psychotic disorders, substance-use disorders, anxiety disorders, obsessive-compulsive disorder, post-traumatic stress disorder (PTSD), attention-deficit hyperactivity disorder (ADHD), and adjustment disorder. In addition, the SCID-5-CV screens for 17 additional DSM-5 diagnoses. Items and diagnoses are scored based on dichotomous “present” and

“absent” response options. The SCID-5-CV presents excellent reliability, with Cohen's κ ranging from 0.70 to 0.75 (50).

Personality Disorders

Personality disorders were assessed at baseline and at follow-up using the SCID-II (47). The SCID-II is a semistructured interview designed to yield PD diagnoses based on the DSM-IV and DSM-IV-TR (i.e., paranoid, schizoid, schizotypal, histrionic, borderline, antisocial, narcissistic, avoidant, dependent, obsessive-compulsive, depressive, and passive-aggressive PDs) and consists of 134 items, which are rated on a 3-point Likert scale (1 = absent, 2 = subthreshold, and 3 = threshold). Since depressive and passive-aggressive PDs were removed in the DSM-5, both disorders were included in the PD NOS section in the following analyses. Categorical diagnoses are provided according to the specific diagnostic thresholds of PDs the DSM-IV. Dimensional scores are provided by summing the scores from each individual item for each separate PD. Interrater reliability for categorical diagnoses varies from 0.48 to 0.98 (Cohen's κ), and internal consistency ranges from 0.71 to 0.94 (51). At baseline, the diagnosis of antisocial PD was assigned only if study participants were over 18 years old. Due to participants' young age, most of them could not be given the diagnosis. To anticipate later analyses of the stability of antisocial PD, the criteria for antisocial PD were nevertheless collected for participants both under and over 18 years old. The present analyses therefore include antisocial PD diagnoses in participants who were both younger and older than 18 years old at baseline.

Statistical Analysis

First, to determine the prevalence rates of PDs at baseline and at follow-up, we performed descriptive statistical analyses. Group comparisons regarding social benefits between participants with and without a PD were assessed at follow-up using χ^2 tests. Second, categorical mean-level stability was measured by the proportion of enduring cases from baseline (t1) to follow-up (t2), that is, the number of participants meeting the criteria for a PD at both measurement times divided by the total number of participants with a PD at baseline. Categorical rank-order stability was calculated by Cohen's κ and tetrachoric correlations (r_{tet}). Cohen's κ is one of the most commonly used statistics to test diagnostic agreement between diagnoses assigned at baseline and at follow-up. A negative value indicates an agreement worse than expected or even a disagreement. A value between 0 and 0.20 represents a low agreement, and a value ranging from 0.21 to 0.40 a fair agreement. A κ between 0.41 and 0.60 indicates a moderate agreement, a κ between 0.61 and 0.80 a substantial agreement, and 0.81–1.0 a perfect agreement between two assessments (52). While Cohen's κ takes into account the possibility of an agreement occurring by chance, tetrachoric correlation coefficient (r_{tet}) measures the mere relationship between binary baseline and follow-up scores with the assumption of bivariate normality (53). Similar to Pearson's r , a value between 0.1 and 0.3 is considered to be low, a value between 0.3 and 0.5 moderate, and a value between 0.5 and 0.8 high. Finally, for dimensional PD ratings, mean-level stability was measured by calculating mean trait scores and

standard deviation at baseline and at follow-up, resulting in a mean-difference score. Cohen's d was used to estimate the effect size of the magnitude of change between baseline and follow-up scores. According to Cohen (54), an effect size of 0.20 is considered a small effect, an effect size of 0.50 a moderate effect, and an effect size of 0.80 a large effect. Dimensional rank-order stability was measured using Spearman's ρ (r_s), given a substantial positive skew. The interpretation of Spearman's ρ (r_s) is similar to that of Pearson's r . Additional explorative sensitivity analyses regarding the prevalence as well categorical and dimensional mean-level and rank-order stability of PD according to specific age ranges at baseline (12–14 and 15–18 years) are presented in the **Supplementary Material**. All statistical analyses were conducted using RStudio [Version 1.4.1106; (55)]. Statistical significance was set to $p < 0.05$ for all analyses. Complete case analyses were performed.

RESULTS

Prevalence Rates of Current Mental Disorders at Baseline and at Follow-Up

Findings regarding the prevalence rates of mental disorders at baseline and at follow-up are presented in **Table 1**. At baseline, 74 (64.9%) participants reported a current mental-health disorder; conduct disorders (29.8%), anxiety disorders (25.4%), and PDs (20.0%) were the most frequent diagnoses. Fifty-five (61.1%) participants were receiving mental-health treatment at the time of the assessment. At follow-up, the prevalence rate for any mental disorder was about 55.6%; substance-use disorders (35.6%), PDs (30.4%), and ADHD (20.9%) were the most common. A total of 27 (23.5%) participants reported receiving mental-health treatment at follow-up (**Table 1**). Participants with a PD at follow-up were significantly more likely to report disability insurance than participants without a PD at follow-up [$\chi^2(1) = 6.10$; $p = 0.010$] (**Table 2**) [see (56)].

Prevalence Rates of PDs at Baseline and at Follow-Up

Findings regarding the prevalence rates of PDs at baseline and at follow-up are presented in **Table 3**. At baseline, 23 (20.0%) participants met the criteria for any PD. While 10 (8.7%) participants met the criteria for one PD diagnosis, 5 (4.3%) met the criteria for two, and 8 (7.0%) met the criteria for three or

TABLE 3 | Prevalence rates of personality disorder diagnoses at baseline (t1) and follow-up (t2) ($N = 115$).

Personality disorders (PDs)	Baseline (t1)	Follow-up (t2)
	<i>n</i> (%)	<i>n</i> (%)
Any PD	23 (20.0)	35 (30.4)
One PD	10 (8.7)	18 (15.6)
Two PDs	5 (4.3)	8 (7.0)
≥ Three PDs	8 (7.0)	9 (7.8)
Cluster A	5 (4.3)	8 (7.0)
Paranoid	3 (2.6)	3 (2.6)
Schizotypal	0 (0.0)	2 (1.8)
Schizoid	3 (2.6)	5 (4.3)
Cluster B	16 (13.9)	23 (20.0)
Histrionic	2 (1.7)	0 (0.0)
Narcissistic	4 (3.5)	2 (1.7)
Borderline	10 (8.7)	9 (7.8)
Antisocial ^a	7 (6.1)	19 (16.5)
Cluster C	8 (7.0)	13 (11.3)
Avoidant	3 (2.6)	5 (4.3)
Dependent	1 (0.9)	1 (0.9)
Obsessive compulsive	4 (3.5)	8 (7.0)
PD NOS ^b	3 (2.6)	5 (4.3)
Passive aggressive	5 (4.3)	5 (4.3)
Depressive	4 (3.5)	7 (6.1)

Participants with multiple PDs are displayed more than once. ^aIncluding participants younger than 18 years at baseline. ^bPD not otherwise specified (NOS).

more PD diagnoses. With a prevalence rate of 8.7%, borderline PD was the most common diagnosis, followed by antisocial PD (6.1%). Every participant with a PD at baseline also met criteria for another type of mental disorder at baseline. At follow-up, the prevalence rate for any PD was 30.4%. Overall, 18 (15.6%) participants met the criteria for only one PD, while 8 (7.0%) had two PD diagnoses, and 9 (7.8%) met the criteria for three or more PD diagnoses. The most frequently diagnosed disorders were antisocial (16.5%), borderline (7.8%), and obsessive-compulsive PDs (7.0%). At the cluster level, cluster B PD disorders were the most prevalent diagnoses, both at baseline (13.9%) and at follow-up (20.0%). All participants with a PD at follow-up, except one, met the criteria for another type of mental disorder.

Categorical Stability

Findings regarding the categorical stability of PDs from baseline to follow-up are presented in **Table 4**.

Mean-Level Stability

The number of enduring cases from baseline to follow-up could only be calculated for PDs diagnosed at baseline. Since no participants met the criteria for a schizotypal PD at baseline, mean-level stability could not be calculated for this disorder. Of the 23 participants who met the criteria for one or more PDs at baseline, 11 still met the criteria for a PD diagnosis at follow-up, resulting in a categorical mean-level stability of 47.8%. Overall, 12 of these 23 participants improved from baseline to follow-up by no longer meeting the criteria for a PD, while 24 of 92 participants with no PD at baseline met the criteria for a PD at follow-up. With only one participant out of 10 meeting the criteria

TABLE 2 | Social benefits at follow-up (t2) ($N = 115$).

	Follow-up (t2)			χ^2	<i>p</i> -value
	Total sample	No PDs	PDs		
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		
Social welfare ^a	29 (25.2)	18 (22.5)	11 (31.4)	0.610	0.354
Unemployment insurance ^a	8 (7.0)	5 (6.2)	3 (8.6)	0.003	0.698
Disability insurance ^a	17 (14.8)	7 (8.8)	10 (28.6)	6.102	0.010*

^aOnly available at follow-up. * $p < 0.05$.

TABLE 4 | Categorical stability of personality disorders from baseline (t1) to follow-up (t2) ($N = 115$).

Personality disorders (PDs)	Absent t1 and t2	Present t1/absent t2	Absent t1/present t2 (new cases)	Present t1 and t2 (enduring cases)	Mean-level stability	Rank-order stability	
					Proportion enduring ^a	Cohen's κ	Tetrachoric correlation coefficient
	n (%)	n (%)	n (%)	n (%)	%	κ	r_{tet}
Any full-syndrome PD	68 (59.1)	12 (10.4)	24 (20.9)	11 (9.6)	47.8	0.18	0.33***
Cluster A	104 (90.4)	3 (2.6)	6 (5.2)	2 (1.7)	40.0	0.27	0.60***
Paranoid	109 (94.9)	3 (2.6)	3 (2.6)	0 (0.0)	0.0	-0.03	0.38***
Schizotypal	113 (98.3)	0 (0.0)	2 (1.7)	0 (0.0)	—	—	—
Schizoid	109 (94.8)	1 (0.9)	3 (2.6)	2 (1.7)	66.7	0.48	0.85***
Cluster B	81 (70.4)	11 (9.6)	18 (15.6)	5 (4.3)	31.2	0.11	0.23*
Histrionic	113 (98.3)	2 (1.7)	0 (0.0)	0 (0.0)	0.0	—	—
Narcissistic	109 (94.8)	4 (3.5)	2 (1.7)	0 (0.0)	0.0	-0.02	0.40***
Borderline	97 (84.4)	9 (7.8)	8 (7.0)	1 (0.9)	10.0	0.02	0.08
Antisocial ^b	92 (80.0)	4 (3.5)	16 (13.9)	3 (2.6)	42.9	0.16	0.41***
Cluster C	95 (82.6)	7 (6.0)	12 (10.4)	1 (0.9)	12.5	0.01	0.03
Avoidant	107 (93.0)	3 (2.6)	5 (4.3)	0 (0.0)	0.0	-0.03	0.28**
Dependent	113 (98.3)	1 (0.9)	1 (0.9)	0 (0.0)	0.0	-0.01	0.72***
Obsessive compulsive	104 (90.4)	3 (2.6)	7 (6.0)	1 (0.9)	25.0	0.13	0.38***
PD NOS ^c	107 (93.0)	3 (2.6)	5 (4.3)	0 (0.0)	0.0	-0.03	0.28**
Passive aggressive	105 (91.3)	5 (4.3)	5 (4.3)	0 (0.0)	0.0	-0.04	0.17
Depressive	105 (91.3)	3 (2.6)	6 (5.2)	1 (0.9)	25.0	0.14	0.42***

^aCalculated by the number of enduring cases divided by the total number of participants meeting a PD at baseline. ^bIncluding participants younger than 18 years at baseline. ^cPD not otherwise specified (NOS). — measures not available, as either baseline or follow-up PD criteria were not met. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The sample size is sufficient to achieve a power ≥ 0.8 if $r_{tet} \geq 0.42$.

for borderline PD at both assessments, the categorical mean-level stability of borderline PD was low (10.0%). For schizotypal, histrionic, narcissistic, antisocial, avoidant, dependent, PD NOS, and passive-aggressive PDs, none of the participants met the criteria at baseline or at follow-up.

Rank-Order Stability

Cohen's κ and tetrachoric correlations (r_{tet}) could only be calculated for PDs for which there were participants who met the criteria at baseline or at follow-up or at both measurement points. Since no participants met the criteria for a schizotypal PD at baseline, and no participants met the criteria for a histrionic PD at follow-up, Cohen's κ and tetrachoric correlations (r_{tet}) could not be calculated for either of these disorders. With a Cohen's κ of 0.18 for any PD, the concordance between baseline and follow-up assessments was low. For individual diagnoses, κ was likewise low, except for schizoid PD ($\kappa = 0.48$). The tetrachoric correlation coefficient (r_{tet}) from baseline to follow-up for any PD was 0.33, which indicates a moderate rank-order stability. For individual PDs, rank-order stability ranged from low (borderline, avoidant, PD NOS, and passive-aggressive PDs) to moderate (paranoid, narcissistic, antisocial, obsessive-compulsive, and depressive PDs) to high (schizoid, dependent PDs). With a tetrachoric correlation coefficient (r_{tet}) of 0.60, rank-order stability was by far the highest for cluster A disorders.

Dimensional Stability

Findings regarding the dimensional stability of PDs from baseline to follow-up are presented in **Table 5**.

Mean-Level Stability

Overall, the mean-level scores of dimensional ratings increased for most disorders. The total score significantly increased from baseline to follow-up, although the effect size was small ($d = 0.23$; $p = 0.016$). Significant increases were found for paranoid ($d = 0.22$; $p = 0.017$), schizoid ($d = 0.36$; $p < 0.001$), antisocial ($d = 0.57$; $p < 0.001$), obsessive-compulsive ($d = 0.42$; $p < 0.001$), and depressive PDs ($d = 0.26$; $p = 0.005$). Findings regarding the mean-level scores for schizotypal, narcissistic, borderline, dependent, and depressive traits revealed no significant change. A significant decrease was found only for histrionic traits, although the effect size was small ($d = 0.24$; $p = 0.010$).

Rank-Order Stability

The pattern of rank-order stability of the dimensional scores from baseline to follow-up ranged from low (paranoid, schizoid, schizotypal, histrionic, narcissistic, avoidant, dependent, obsessive-compulsive, passive-aggressive, and depressive) to moderate (borderline, antisocial). Correlations were significant, except for paranoid ($r_s = 0.13$, $p = 0.153$), schizotypal ($r_s = 0.11$, $p = 0.264$), obsessive-compulsive ($r_s = -0.08$, $p = 0.412$), and passive-aggressive traits ($r_s = 0.08$, $p = 0.423$).

DISCUSSION

The aim of the current study was to examine the prevalence rates as well as the mean-level and rank-order stability of PDs over a 10-year follow-up in adolescents placed in residential care and

TABLE 5 | Dimensional stability of personality disorders from baseline to follow-up ($N = 115$).

Personality disorder traits	Mean-level stability					Rank-order stability
	Baseline	Follow-up	Mean difference	Cohen's d	p -value	Spearman's ρ
	M (SD)	M (SD)				
Total score	99.27 (19.63)	104.1 (18.52)	4.89	0.23	0.016*	0.24**
Cluster A	29.1 (6.94)	31.23 (6.96)	2.13	0.26	0.006**	0.18
Paranoid	9.08 (2.83)	9.90 (2.90)	0.82	0.22	0.017*	0.13
Schizotypal	10.20 (1.93)	10.65 (2.16)	0.44	0.14	0.123	0.11
Schizoid	8.19 (1.92)	9.36 (2.95)	1.17	0.36	<0.001***	0.22*
Cluster B	42.70 (10.11)	43.44 (8.93)	0.74	0.07	0.462	0.28**
Histrionic	9.79 (2.56)	9.20 (1.51)	-0.69	0.24	0.010*	0.28**
Narcissistic	10.82 (2.78)	10.66 (2.41)	-0.15	0.04	0.649	0.23*
Borderline	13.36 (5.05)	12.83 (3.92)	-0.53	0.11	0.236	0.36***
Antisocial	8.73 (2.56)	10.81 (3.70)	2.06	0.57	<0.001***	0.31***
Cluster C	27.47 (5.80)	29.73 (6.34)	2.26	0.30	0.001**	0.20*
Avoidant	9.13 (2.89)	9.18 (2.69)	0.05	0.01	0.864	0.31***
Dependent	9.82 (2.64)	10.14 (2.72)	0.33	0.10	0.289	0.27**
Obsessive compulsive	10.17 (3.05)	11.91 (3.31)	1.75	0.42	<0.001***	-0.08
Passive aggressive	9.17 (3.01)	9.43 (2.64)	0.25	0.06	0.470	0.08
Depressive	9.35 (3.14)	10.41 (3.73)	1.06	0.26	0.005**	0.25**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The sample size is sufficient to achieve a power of ≥ 0.8 if $d \geq 0.24$ and $\rho \geq 0.23$.

juvenile-justice institutions. Both the stability of PD categories and the stability of dimensional PD traits were analyzed from adolescence to adulthood. The present findings indicated high PD prevalence rates in young adults with a history of child welfare and juvenile-justice placements, while PD diagnoses and PD traits exhibited only low to moderate stability over the 10-year follow-up.

At least three findings have to be discussed in more detail. First, PD prevalence rates substantially increased from adolescence to adulthood in this high-risk sample. While the normative course of BPD during adolescence is described as an increase of BPD pathology from puberty to young adulthood (57), most previous findings indicate a general decline in PDs and PD traits beginning in young adulthood (17). On the other hand, the prevalence rates of any PD as well as of specific PDs are consistent with the existing literature; the prevalence rates of PDs in institutionalized youth and young adults with a history of out-of-home care have been found to range between 18 and 40% across studies (43–45). A recent meta-analysis on mental disorders in incarcerated youth, which included 30 studies of 8,000 participants, indicated that antisocial and borderline PDs were relatively common in both males and females, while the prevalence of narcissistic and schizotypal PDs was comparably low (58). The current study seems to confirm this pattern, as antisocial and borderline PDs were among the most frequently diagnosed disorders, both at baseline and at follow-up. An increase in PD diagnoses from adolescence to adulthood in this sample, may, thus, be explained by the fact that many adolescents in residential care and juvenile-justice institutions have experienced severe childhood adversities (e.g., child abuse and neglect), which are shown to significantly contribute to the development of PDs (59, 60).

For instance, the meta-analysis by Porter et al. (37) found that patients with borderline PD were over 13 times more likely to report childhood adversity than non-clinical controls. In addition, participants in this high-risk sample were likely to have experienced a range of other critical risk factors, such as unfavorable parenting practices, low socioeconomic status, childhood psychopathology, including high substance use, self-harming behavior, and youth delinquency, which have also been shown to be significantly associated with the development of PDs over time (38–42). Given the multifaceted nature of problems faced by juveniles in child welfare care and juvenile-justice institutions, the institutions often lack the professional and financial means to detect personality problems at an early stage, leading to delays in diagnoses and appropriate treatment. Delaying appropriate diagnoses, in turn, carries clinical risk, as evidence is accumulating that many of the harms associated with PDs occur early in the course of the disorder (61), and delay tends to lead toward greater impairments and poorer outcomes (62).

Second, on the categorical level, the mean-level stability of any PD was only moderate, and the mean-level stabilities of specific PDs were low to moderate, except for schizoid PD (high). The concordance between baseline and follow-up assessments (i.e., Cohen's κ) was low, both for any PD and for individual PDs, except for schizoid PD (moderate). The rank-order stability (i.e., tetrachoric correlation (r_{tet}) of any PD category was moderate. For individual diagnoses, the rank-order stability ranged from low (i.e., borderline, avoidant, PD NOS, passive-aggressive PDs) to moderate (i.e., paranoid, narcissistic, antisocial, obsessive-compulsive, depressive PDs) to high (schizoid, dependent PDs). Regarding categorical mean-level stability, Chanen et al. (36) found a higher proportion of enduring cases (74%) compared to our findings (47%), which may be due to the shorter

follow-up interval (2 years), the clinical status of participants (outpatients), and the narrower age range (15–18 years old) in their study. Indeed, the explorative age-sensitive analyses in the **Supplementary Material** revealed a higher categorical mean-level stability for the participants who were 15–18 years old than for the participants who were 12–14 years old, although the stability still seems to be lower than that found by Chanen et al. (36). Categorical mean-level stabilities for individual PDs, however, were similar to those found by Chanen et al. (36). As such, participants may have changed specific PDs (from one PD category to another category) but did not discard the general diagnosis of a PD over time. Noteworthy, however, is that 24 (20.9%) participants first developed a PD in young adulthood. As the explorative age-sensitive analyses revealed, older adolescents (15–18 years) were more likely to meet a PD diagnosis first at follow-up than younger adolescents (12–14 years). This suggests that the onset of a PD indeed lies in later adolescence and that some of the present sample had not yet passed the critical age. Another explanation might be that PDs in (young) adolescence are more difficult to detect (63). In addition, older adolescents with a PD diagnosis between 15 and 18 years may have already had longer and more stable patterns of personality pathology, which, therefore, may be more predictive of unfavorable long-term outcomes. Nevertheless, a total of 12 (10.4%) participants improved from baseline to follow-up and no longer met the criteria for a PD in adulthood. While this could have been due to several factors (e.g., treatment or spontaneous remission), it is also possible that these participants no longer met the diagnosis of a PD but still exhibited PD symptoms. This, in turn, is a major concern of the categorical classification system, as it is based on an arbitrary diagnostic threshold that can be easily met (PD diagnosis) or not met (no PD diagnosis) by an increase or decrease in a single criterion.

Regarding categorical rank-order stability, the poor concordances between the baseline and follow-up assessments (i.e., Cohen's κ) for any PD and for individual PD diagnoses are consistent with those found by Chanen et al. (36). Findings regarding rank-order stability measured with tetrachoric correlations (r_{tet}) are difficult to compare across studies, since Cohen's κ remains the most common statistical measure for assessing the rank-order stability of categorical data. Overall, rank-order stability nevertheless seemed to be higher for specific PD diagnoses (i.e., paranoid, narcissistic, avoidant, dependent, PD NOS, and passive-aggressive PDs) than mean-level stability for these PD diagnoses, which suggests that even if the specific diagnoses did not remain the same over time, the rank ordering of participants with such a disorder appeared to be more or less the same. Both the rank-order stability and the mean-level stability of borderline PD were particularly weak, which indicates that on average, neither the category nor the rank ordering of participants with a borderline PD remained the same over time. While this may seem somewhat surprising, it is consistent with the narrative review from Bondurant et al. (64), which suggests that there is only little diagnostic borderline PD stability in adolescence. Interestingly, both Cohen's κ and tetrachoric correlation coefficients (r_{tet}) were considerably higher for older adolescents at baseline (15–18 years) compared to younger

adolescents (12–14 years old) at baseline (see **Supplementary Table 2**), which suggests that diagnoses in early adolescence should be treated with caution.

Third, on the dimensional level, PD scores significantly increased for most of the disorders, except for schizotypal, avoidant, narcissistic, borderline, dependent, and passive-aggressive traits. Histrionic traits significantly decreased from baseline to follow-up. Effect sizes were generally low, except for antisocial and obsessive-compulsive traits. In contrast to our findings, Johnson et al. (34) found a significant mean-level decline in dimensional ratings from adolescence to adulthood, and Chanen et al. (36) found neither a significant increase nor a decrease in PD traits, except for paranoid (increase), antisocial (increase), and depressive PDs (decrease). One explanation is that the study by Johnson et al. (34) was conducted in a community-based sample, while the study by Chanen et al. (36) was conducted with older adolescent outpatients. The overall low to moderate dimensional rank-order stability in the present study was, however, consistent with the rank-order stability found in the studies by Johnson et al. (34) and Chanen et al. (36). This indicates that although mean-level PD traits tended to increase among adolescents in residential care and juvenile-justice institutions through adulthood, their individual rank ordering seemed to be less stable, emphasizing interindividual differences among participants. The additional explorative age-sensitive analyses revealed higher dimensional mean-level and rank-order stability estimates regarding older participants (15–18 years old) than younger participants (12–14 years old). On the one hand, this highlights the presence of PD traits in early adolescence but on the other hand, suggests that PD diagnoses before the age of 15 should be interpreted with caution.

Strengths

The current study fills an important gap in the existing literature on the stability of PDs by explicitly presenting findings from adolescence to adulthood in a high-risk sample. Indeed, only a few studies have investigated the stability of PDs from adolescence to adulthood, and to the best of our knowledge, none have yet investigated the stability of PDs from adolescence to adulthood in adolescents in residential care and juvenile-justice institutions. Yet these adolescents have a particularly high risk of developing a PD due to a cumulation of risk factors. Considering the apparent role of developmental tasks in the transition from adolescence to adulthood in the development of PDs, this study is particularly valuable. Another strength of the current study is the long follow-up interval of 10 years. This is noteworthy given that young-adult care leavers (i.e., juveniles who left residential care or juvenile-justice institutions) are often difficult to locate, since many live in rather unstable and changing circumstances (65) or suffer from severe mental-health disorders (66).

Limitations

Nonetheless, the findings of this study must be interpreted under the consideration of some limitations. First, the relatively small sample size of 115 participants must be emphasized. As a result, the number of cases for categorical PDs were small, which made it difficult to adequately assess categorical stability and, therefore,

the results must be interpreted with caution and replications including larger sample sizes are highly needed. Second, although no significant differences were found in the sociodemographic baseline data between included and excluded participants, a selection bias cannot be completely ruled out. Indeed, positive self-selection may occur in longitudinally followed-up high-risk samples, as participants with severe PDs may have declined to participate at follow-up or could not be located due to difficult life circumstances. On the other hand, it may be that participants who remained connected to mental health care were more likely to participate in the current follow-up study, which could explain the high prevalence rates of PDs. Third, the current study only allowed PDs to be assessed using a two-measurement-point design. The amount of change between two measurement points is, however, not fully informative about the shape of each person's individual growth trajectory. In addition, a two-wave design cannot distinguish true change from measurement error (67) and is unable to evaluate the impact of regression-to-the-mean effects; that is, a statistical artifact making naturally occurring variations look like true changes when particularly large or small scores are followed by scores closer to the mean (68). Fourth, the dimensional approach taken within this study does not precisely correspond to the dimensions within the ICD-11, as the latter go beyond a mere sum of features within a categorical diagnosis. However, the dimensional approach adopted in the current study can be considered as a proxy, as no empirical evidence was yet available for the dimensional approach proposed by the ICD-11 at the time of the baseline study. Finally, while the present study explicitly focused on the stability of PDs from adolescence to adulthood, the cutoff age of 18 years at baseline is somewhat arbitrary, although adulthood is traditionally described as beginning at the age of 18 years. Indeed, based on psychosocial characteristics, recent studies have suggested that emerging adulthood is a period between adolescence (18 years) and full-fledged adulthood (25 years) (69). Specifically, with regard to etiological influences on the development of personality traits, Hopwood et al. (70) defined late adolescence at age 17, emerging adulthood at age 24, and young adulthood at age 29. Future studies should consider the prolongation of adolescence or emerging adulthood, which is currently taking place, especially in Western societies (69), in order to adequately assess the stability of PDs from adolescence to adulthood.

CONCLUSION

Three main findings can be drawn from the current study. First, the prevalence rates of PDs in young adults with a history of child welfare and juvenile-justice placements are high. Second, most categorical PD diagnoses and dimensional PD traits increased from adolescence to adulthood in our sample. Third, overall, the findings indicate low to moderate stability of PDs and PD traits from adolescence to adulthood, although the extent of stability differed according to the PD construct (i.e., categorical diagnoses or dimensional traits), the type of stability (i.e., mean-level or rank-order stability) and the specific PD and PD trait being

assessed. As a result, the current findings are in accordance with the growing evidence, that PDs are not that stable. This in turn, emphasizes the current shift to a more dimensional model and highlights the use of the upcoming ICD-11 that acknowledges PDs as only "relatively" stable.

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 humans participants were reviewed and approved by the Ethics Committees on Research Involving Humans at the University of Basel and the University of Lausanne (Switzerland) as well as the Institutional Review Board at the University of Ulm (Germany). The follow-up study procedure was approved by the Ethics Committee Northwestern and Central Switzerland. Written informed consent to participate in this study was provided by the participants and the participants' legal guardian/next of kin, if participants were under 18 years old.

AUTHOR CONTRIBUTIONS

Dd'H, MSt, CB, and KS contributed to conceiving and designing the present manuscript. Dd'H wrote the first draft of the manuscript and analyzed the data. Dd'H, DB, SS, and CB collected the data. MSt supervised the data analyses. CB, MB, NJ, MSc, JF, and KS commented on an earlier draft of the article and supervised the entire process. All authors read and approved the final manuscript.

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Psychometric Properties of a Cultural Adapted Version of the Assessment of Identity Development in Adolescence in Panama

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The Assessment of Identity Development in Adolescence (AIDA) is a self-report instrument to detect pathological development of Identity. In Panamá, psychometric instruments for assessment of psychopathology in adolescence are lacking. Our aim was to develop a valid and reliable version of the AIDA Inventory for Panamanian Population. AIDA was adapted to Spanish considering cultural aspects of Panamanian population. Two pilot tests were performed prior to main test to assess item-total correlation at subscale, primary scale and total scale levels and internal consistency at subscale level. A mixed sample of students and PD patients ($N = 315$) completed the AIDA inventory, the “Strength and Difficulties Questionnaire” and “Defense Style Questionnaire–40.” AIDA was retested in a sub sample from school population ($n = 98$). The Structured Clinical Interview for Axis II Disorders was used for diagnosis of personality disorders in the patient sample ($n = 25$). Psychometric properties were tested to assess internal consistency, reliability, factorial validity, convergent validity, and criterion validity. AIDA Panama showed excellent internal consistency for the total scale Identity Diffusion with Cronbach’s $\alpha: 0.94$ and a retest reliability of 0.84. A Bifactorial CFA was modeled to assess the dimensionality of the inventory. The proportion between OmegaH and Omega at total scales 96% of the variance is explained by a general factor. Furthermore, the Explained Common Variance for the General Factor is 73% supporting unidimensionality. In line with theory, AIDA total scale showed a high positive correlation ($r = 0.67$) with Total Difficulties scale and high positive correlation ($r = 0.71$) with Immature Defense scale. The AIDA total score differed highly significant ($p = 0.000$) between the patient sample and the students with a large effect size ($d = 1.02$).

Conclusion: The adaptation and validation of AIDA for Panamanian adolescent population was successful with good psychometric properties and significant correlations with related psychopathological constructs. AIDA showed high clinical validity by providing a valid discrimination between the school sample and a diagnosed PD sample, in line with the assumption that impaired identity functioning is at the core of personality disorders, especially in adolescence.

Keywords: identity, Criterion A, cultural adaptation, personality, adolescence

INTRODUCTION

The Assessment of Identity Development in Adolescence (AIDA) is a self-report inventory with an integrative focus between identity development and impairment in personality functioning for adolescents aged between 12 and 18 years (1). It was developed by a Swiss-German-American research group, inspired by the alternative model of personality disorders (AMPD) from section III in DSM-5 (2), emphasizing the severity of impairments in personality functioning with other clinical concepts of identity pathology with a target on the complex relationships between identity development and the vulnerability for developing personality disorders (3). The personality functioning approach can also be found in the ICD-11, where the diagnosis of personality disorders has transitioned to a dimensional model (4) considering Self functioning as an important domain on personality with empirical support and the accessibility to diverse measures for its assessment (5). Moreover, Identity as a function is considered in assessment for treatment plans in the Operationalized Psychodynamic Diagnosis (6) and the Psychodynamic Diagnosis Manual–2 (7). The assessment of identity and Self in these diagnostic systems has advantages like the inclusion of children and adolescents if there are evidence of impairments in personality development. The early diagnose of these disorders is a priority in mental health since this pattern could become more stable in adulthood and their severity be identified with early intervention in adolescence (8, 9). Furthermore, mental health interventions assess identity as an outcome for treatment (10) specially in psychotherapy models for personality disorders as mentalization based treatment (11), transference focused psychotherapy (12), dialectical behavioral therapy (13), and identity adolescent treatment (14).

Impaired identity development is seen as one of the relevant domains of personality functioning and as a core marker of Personality Development, especially in adolescence (15–17). From a psychodynamic perspective, Otto Kernberg's Personality Organization model (18) describes Borderline Personality structured by Identity Diffusion along with Primitive Defenses and Impaired reality testing (12). Defense mechanisms in borderline personality organization are based on splitting, reflecting lack of integration in self and displaying other defenses as projection, denial, and projective identification that keeps the split mechanism on mental representations within self and significant others (14, 19). In empirical research, this concept is operationalized as defense styles and differentiates between healthy population and clinical population (20). Defense mechanisms are automatic and implicit responses with a significant role in adaptation and regulation (21, 22).

In emerging personality disorders, difficulties in psychosocial adjustment as emotional regulation (23) identification of affects and feelings (15, 24) and psychiatric symptoms from the internalizing (25) and externalizing spectrum are often found in personality and identity pathology (26) representing a significant risk in adolescence to establish personality disorders and interfering with healthy development (27).

Assessment of Identity Development in Adolescence

The construction of the inventory AIDA followed basic principles of analyzing developmental psychopathology (28) starting with defined theory-based model of identity, integrating the relevant subconstructs concerning pathological identity development regarding a broad range of theoretical descriptions and empirical results in social-cognitive and psychodynamic theories considering operationalizations of adaptive and maladaptive identity development by authors like Kernberg (18), Eriksson (29), James (30), Livesley (31), Westen (32), Akhtar and Samuel (33), and Bateman and Fonagy (34). Based on this, the basic AIDA model was formulated with the two domains "Continuity" and "Coherence," further subdivided in psychosocial areas of functioning as, self-related, social related and mental representations, building the higher order dimension "Identity Integration vs. Identity Diffusion."

The first validated test version of AIDA was in German language (1) proving sound psychometric properties on internal consistency, exploratory factor analysis and discrimination between clinical population and healthy controls. In a clinical study (35), the AIDA scores showed adequate capacity to discriminate between patients with externalizing, internalizing, and personality disorders with the latter showing the highest scores among the groups and externalizing disorders the lowest (35). Actually, the AIDA has several cultural adaptations (see <https://academic-tests.com>) with very similar results regarding reliability, intercorrelations of the scales, and factor structure according to principal component analysis as an exploratory method. Exploratory Structural Equational Modeling has been used to test factorial validity in Chilean population (36) and Italian population (37), with both studies assessing a bi factorial structure with one general factor and six specific factors regarding the subscales of the inventory, with results that support unidimensionality of the inventory with better fit than other analyses like Confirmatory Factor Analysis. Moreover, the AIDA across diverse cultures showed evidence of clinical validity by differentiation between healthy and clinical or at risk populations, as shown with the Chilean and Italian validation studies. In Mexico (38), the inventory was tested with adolescents engaged on criminal activity, finding significant results in comparison with healthy controls. In Brazilian population (39), with adolescents reporting psychiatric symptoms with the Strength and Difficulties Questionnaire and impairment on reflective functioning (34), findings were significant differences with adolescents who reports better psychological adjustment. In Austrian population, significant differences were found between adolescents with internet addiction and problematic internet use and healthy controls (40).

The adaptation and validation of measures from a dimensional model to detect emerging personality disorders in their different domains is an important task in child and adolescent mental health research (8). Tools for screening mental health issues during adolescence enables early diagnosis and treatment of psychological vulnerabilities that would, otherwise, may show transition into complex personality disorders in

adulthood (9, 27, 32). The adaptation and validation of accessible dimensional measures is necessary for prevention of pathological development (41). To our knowledge, the adaptation and validation of psychometric measures for adolescent population in Panamanian population is lacking. The cultural adaptation of the AIDA inventory for Panamanian Adolescent Population could be beneficial for researchers as well as for clinicians for diagnostic purposes.

The present study aims to test the psychometric soundness of a culture adapted Spanish version of the AIDA for Panamá. We set a special focus on testing factorial validity by using bi factor models with a general factor and six specific factors according the AIDA subscale level. Another focus is at the detailed convergent and discriminant validity, investigating the relations between Identity functioning and Defenses Styles and psychopathology.

METHODS

Participants and Procedures

The school sample assessment was selected by convenience and performed at one private school from an urban area in Panamá City. We extended an invitation to all high school students explaining the purpose and procedures of the study, enclosing informed consent, and assent forms for them and their parents. From a total of $n = 500$ sent invitations, we only included in the assesment the $n = 295$ students who returned both consent and assent forms signed. The time for the first assessment took between 20 and 30 min in which students had to respond three self-report measures: AIDA, the Defense Style Questionnaire (DSQ), and the Strength and Difficulties Questionnaire (SDQ). Two weeks later, the AIDA was retested in a 10–15-min session by $n = 98$ of the participants.

The clinical sample recruitment was performed at “*Clinica Psicológica de Terapia Familiar*,” an outpatient University treatment facility that offers psychotherapy for adolescents. The assessment was made with patients on waiting list, not receiving psychotherapy or psychopharmacology treatment, and not displaying psychotic symptoms. Reasons for consultation included low academic performance, feelings of emptiness, anger management issues, depressive feelings, suicidal thoughts, or non-suicidal self-injury, and low self-esteem. We approached adolescents and their parents to explain the purpose of the study. Those who agreed to participate were required to sign informed consent and assent forms. From the 35 families approached, a total of 20 families agreed for participation on the study. The assessment was conducted in two sessions: during first session the Structure Clinical Interview for Axis II Disorders (SCID II) was administered; at the second session, the adolescents completed three self-report measures: AIDA, DSQ, and SDQ.

The total sample of 315 participants (142 boys, 173 girls; mean age of 14.9, SD 1.7) consisted mainly of the students with $N = 295$ participants (131 boys, 164 girls; mean age of 14.9, SD 1.7). The school sample was enriched by selected $n = 20$ patients diagnosed with Personality Disorder to include also impaired participants with assumed higher levels of the targeted constructs in the analyses and being able to interpret the results toward pathology. The sample size achieved allows us to identify replications on

our results regarding the original german study (1) and Mexican study (38).

The clinical sample included 20 participants (11 boys, 9 girls) with a mean age 14.9 (SD 1.7). According to the SCID II interviews, half of participants from this sample met criteria for two personality disorders and the other half for one personality disorder. Borderline personality disorder was the most frequent diagnosis found on 75% ($n = 15$) of the clinical sample. Other diagnosis found were avoidant personality disorder ($n = 7$), narcissistic personality disorder ($n = 4$), obsessive compulsive personality disorder ($n = 2$), and antisocial personality disorder ($n = 1$).

Scale Adaptation

In the first step, the AIDA was culturally adapted for Panama in cooperation with the original authors. The cultural adaptation process on item formulation focused on content equivalence regarding appropriate language for young people and culture-appropriate disease related behaviors. Standardized procedures of culture-adapted test construction were followed, in reference to the guidelines of the International Test Commission (42), including step-by-step item optimization based on empirical beta, pilot, and main tests using mixed samples with both students and patients showing relevant features of the pathology that is supposed to be investigated with the developed assessment tool, in order to have the full variance of the targeted construct in the data. The original authors performed the statistical calculations to ensure equivalent standards in the methods.

Measures

Assessment of Identity Development in Adolescence (AIDA)

The AIDA (1, 43) has fifty-eight multiple-choice items with a five-point scale response ranging from 0 (“Strongly disagree”) to 4 (“Strongly agree”). The total scale “Identity Diffusion” consists of two primary scales “Continuity” and “Incoherence.” High scores are speaking for high impairment in identity functioning. Each primary scale has three subscales each. Original study reported high internal consistency Cronbach’s Alpha with 0.94 for the total diffusion scale 0.87 for the discontinuity scale and 0.92 for the incoherence scale and from 0.69 to 0.84 for the subscales. The inventory can be found in several translated versions on the project website <https://academic-tests.com> and can be requested for free for research studies.

Defense Style Questionnaire (DSQ 40)

The Defense Style Questionnaire (44) was developed for adults and has forty items that assesses 20 defense mechanisms grouped in two item paired scales forming major order scales of three factors: mature, neurotic, and immature defenses according to Vaillant’s model of Ego Defenses in psychoanalytic theory. The DSQ-40 on adolescent population is an appropriate measures with good psychometric properties (45). We used a Spanish version from Mexico (46). In the present study, Cronbach’s Alpha coefficients for the scales were 0.77 for immature defenses 0.38 for neurotic defenses and 0.41 for mature defenses.

Strengths and Difficulties Questionnaire—SDQ

The Strength and Difficulties Questionnaire (47) is a screening tool with 25 items grouped in four difficulty scales measuring emotional problems, peer problems, conduct problems, and hyperactivity and one strength scale measuring prosocial behavior. This questionnaire is used to differentiate normal population from clinical population in terms of emotional and behavioral symptoms in children and adolescents (47). In this study, the self-report format has been used which is appropriate for ages from 11 to 17. We used the Spanish translation of the test that can be found at the official website (www.sdqinfo.com). In the present study, Cronbach's alpha coefficient were 0.68 for total scale, 0.62 for prosocial scale, 0.60 for hyperactive scale, 0.67 for emotional problems scale, 0.46 for conduct problems scale, and 0.47 for peer problems scale.

Structured Clinical Interview for Axis II Disorders—SCID II

This Structured Interview (48) is designed to diagnose Personality Disorders according to DSM criteria. It has a self-report instrument with 119 items using a Yes/No format for responses, and 119 questions for the Interview. Items answered as Yes in the self-report instrument are explored in the Interview. The interview uses a 3-response format, 1 meaning absence of criteria, 2 subclinical criteria and 3, present criteria. Although it is developed for adults, it is frequently used also in adolescents, internationally (49).

Statistical Analysis

We used SPSS 24 (50) and R (32) with lavaan (51) and bifactorindicescalculator (52) packages for data analysis. Basic psychometric properties were evaluated with the full combined sample of $n = 315$ students and patients. Item analyses and selection was based on the following criteria: percentage of symptomatic answers (p_{it} 5–95%), percentage of missingness ($<10\%$), partial eta square as a measure of the effect size of gender- or age-related item bias ($\eta_p^2 > 0.14$), and item-total correlation $r_{it} > 0.30$. For translated inventories, the criteria can be set to $r_{it} > 0.20$ as well but mean r_{it} should at least not be <0.10 . The mean r_{it} was built of the results referring to the subscale, the primary scale, and the total scale.

Scale level analyses included internal consistency, retest reliability, and factorial, construct, and criterion validity. Internal consistencies were evaluated by Cronbach's alpha and were supposed to exceed 0.80 at total scale level, 0.70 at primary scale level, and 0.60 at subscale level as adequate for heterogeneous contents, while homogeneity coefficients $\alpha > 0.80$ would be very good and >0.90 excellent. Retest reliability was calculated with Pearson correlation and their 95% confidence interval.

Factorial Validity was assessed with bi factorial Confirmatory Factor Analysis to evaluate the model of a general factor—Identity diffusion—and six specific factors, referring to the subscales. In previous studies, Bi factor models has shown better fit than traditional CFA models (36, 37). The model parameters were computed using maximum likelihood estimation and the model fit was evaluated with traditional cut off values, expecting above 0.90 for Comparative Fit Index, above 0.90 for

Tucker Lewis Index, below 0.08 for Root Mean Square Error Approximation and below 0.06 for Standardized Root Mean Square Residual (53, 54). The bifactorial Confirmatory Factor Analysis has been criticized for overfitting models (55). However, further tests to analyze and understand the factorial validity in Bifactorial confirmatory factor analysis are suggested to avoid bias on fit criteria (56). We included assessment for reliability with McDonald's omega (57). Furthermore, to find if the general factor identified accounts for the majority of variance we tested the proportion of Omega and Omega Hierarchical expecting values over 0.80 (58–60) and the explained common variance (ECV) on the general factor and the specific factors expecting to be over 60% (61). At last, we calculated the Proportion of uncontaminated correlations (PUC) and relative bias (58, 59).

Construct validity in terms of convergent and discriminant validity was checked by correlation analysis with Pearson r coefficient relating the AIDA scores with SDQ scores and the DSQ—40 scores.

Criterion validity was analyzed by means of a Welch's t -test (62) comparing the AIDA scores between the clinical and the school sample. We calculated Cohen's d as a standardized measure of effect size to deal with big differences in sample size and for a better intuitive interpretation of the results, as $d = 1$ corresponds to the familiar unit “1 standard deviation” to describe a difference (63). We expected to reach a large difference ($d > 0.80$) to avoid over-interpretation and artificial establishing of developmental differences.

To test for systematic differences on gender and age in the levels of identity diffusion we compared the AIDA scores between boys and girls and between different age groups of the school sample. Differences concerning age were tested for the full factor age and additionally divided into the age groups of early-to-middle (12–14 years) and middle-to-late (15–18 years) adolescence in accordance with the procedure used for the original version of AIDA. All group comparisons were performed with the raw scores using MANOVA (multivariate analysis of variance). Score differences were examined concerning significance (1% level) and effect size. The relevant statistical parameter for the evaluation of meaningful group differences in MANOVA is the effect size “partial eta square” (η_p^2) with $\eta_p^2 > 0.01$ (small effect), $\eta_p^2 > 0.06$ (medium effect), and $\eta_p^2 > 0.14$ (large effect).

This study was conducted with approval by the ethics committee of Hospital Santo Tomás in Ciudad de Panamá. All participants and their parents were informed about the purpose of the research, data confidentiality and anonymization via an explanatory document signed—upon agreement—informed assent and consent forms for the study.

RESULTS

Reliability

All 58 items matched the criteria for percentage of symptomatic answers as a sign of a balanced response pattern. No item showed a high rate of missingness and therefore no sign of systematic problems to answer the item. All 58 items showed “item fairness” as no systematic differences with remarkable effect

sizes in the responses according to gender and age were detected. Calculations of the mean for item-total correlation was between 0.3 and 0.6 for 56 items and between 0.2 and 0.3 for two items.

Internal consistencies met the criteria with Cronbach's Alpha for the total scale Identity-Diffusion with 0.94, for the two primary scales Discontinuity with 0.85 and Incoherence with 0.91, as for the subscales scores were ranging from 0.65 to 0.80. The 2-week retest reliabilities analyzed with Pearson correlation coefficient were good with 0.84 for the total scale Identity-Diffusion, for the two primary scales Discontinuity with 0.73 and Incoherence with 0.77, as for the subscales scores were ranging from 0.63 to 0.77 (see **Table 1**).

Factorial Validity

The fit indices for the confirmatory bi-factor model (a general scale and six sub-scales) showed a mixed picture (see **Table 2**). The incremental fit indices, Comparative Fit Index and Tucker Lewis Index, and one of the absolute fit indices, Standardized Root Mean Square Residual, did not meet the established criteria, while Root Mean Square Error Approximation did (53).

In the ECV analysis, several bi-factorial indices for the general scale and the subscales were compared (see **Table 3**). Coefficient Omega was high for the general factor. When we compare the Omega hierarchical ($\omega_H = 0.91$) with the omega ($\omega = 0.95$), most of the variance in total scores ($\omega_H/\omega = 95.8\%$) is attributed to the general factor. The ECV for the general factor was strong (0.73) and the PUC was high (0.84), thus indicating that one can reliably conclude that the common variance is essentially unidimensional. All subscales showed high omega scores. However, when controlling for the variance attributed to the other subscales in omega hierarchical, none of the subscales showed adequate results. Consistency subscale explained the least percentage of variance in total scores ($\omega_H/\omega = 21.0\%$); while Perspective subscale, the largest ($\omega_H/\omega = 43.0\%$). On the other hand, the general factor can explain a large percentage of the variance of items in each subscale (ECV gs): ranging from 0.40 for the Perspective subscale to up to 0.89 for the Consistency subscale. The Consistency scale has the lowest ECVs (proportion of common variance of the items in a factor which is due to that factor). All but two of the subscales (Perspective and Consistency) showed adequate factor determinacy scores. As such, we cannot be confident that the individual differences on the factor score estimates for these subscales are good representations of true individual differences on the factor. Construct replicability (H) was low in all but two of the subscales (Perspective and Autonomy). This means that caution must be exerted when interpreting regression paths between these factors and other latent variables. Taken together, this results show the Perspective and Autonomy subscales have better properties than the rest (58, 59).

Convergent and Discriminant Validity

The AIDA total score showed a high positive correlation of 0.67 with the SDQ total score (see **Table 4**), both assumed to represent psychopathology. The AIDA primary scales and subscales showed very similar patterns, also concerning the SDQ primary scales of emotional problems, conduct problems,

and peer problems. Moreover, the AIDA total score showed a high positive correlation of 0.71 with the DSQ-40 Immature Defenses scale, which is supposed to denote pathological defense mechanisms. Again, the AIDA primary scales and subscales showed very similar patterns. The further DSQ-40 scales Mature Defenses and Neurotic Defenses had low correlations with the AIDA scores showing coefficients of -0.11 and 0.03 , respectively.

Criterion Validity

To analyze the criterion validity of AIDA, which is the central psychometric criteria for a pathology-related instrument, we compared the AIDA scale and subscale scores between the school sample and the clinical PD patient sample (**Table 5**). The AIDA total score differed highly significant ($p < 0.001$) between the PD-group and the students with a large effect size of $d = 1.02$ standard deviations (>0.80 = large effect). The AIDA subscales showed similar patterns except subscale 1.1 "Discontinuity concerning attributes, talents, perspectives" which showed no significant discrimination between the healthy and the impaired sample.

Systematic Differences According to Gender and Age

Data showed a sufficient normal distribution of the scores with values for skewness and kurtosis around 1 in the full sample. We compared the AIDA Panama scores between boys and girls and between different ages in the school sample to establish population norms. No significant group differences were found for the factors gender and age on 1% level in their levels of identity diffusion (see **Table 6**) on total and primary scale level.

DISCUSSION

Our goal was to provide a culture-adequate and age-adequate assessment tool to support early detection of personality disorders in adolescence. Following strict guidelines of test construction, we adapted the AIDA original version for Panama. The AIDA is a self-report questionnaire for adolescents from 12 years up (± 2 years) to assess impaired identity functioning in line with the new dimensional severity models to diagnose personality disorders in the AMPD / DSM-5 and ICD-11 (Criterion A). The version AIDA Panama showed good scale reliability and construct validity, reasonable factorial validity, and excellent clinical validity. Nation specific population T-norms enable the use for individual diagnostics.

Cultural Adaptation

Our first aim in this study was the cultural adaptation of the AIDA inventory to Panamanian Spanish language for adolescents. In a step-by-step process with two pilot tests the items were checked empirically and the wording was improved to have the final version for the main test. In the main test, most items had moderate levels of item total correlation, at total scale, primary scale, and subscales, suggesting sufficient associations between the content of the items in order to justify the use of sum scores on the different levels. We also found excellent levels of internal consistency with Cronbach's alpha that supports the

TABLE 1 | Internal consistency Cronbach's α for the total scale, the primary scales, and the subscales of AIDA Panama in the mixed sample $n = 315$.

Scale	No. items	Main test Cronbach's α $n = 315$	Retest reliability $n = 98$	95% Confidence interval
Identity diffusion	58	0.94	0.84	0.78–0.90
Discontinuity	27	0.85	0.73	0.65–0.83
Perspectives	9	0.65	0.73	0.63–0.82
Relationships	11	0.77	0.63	0.54 –0.77
Emotional self-experience	7	0.75	0.67	0.60–0.80
Incoherence	31	0.91	0.82	0.80–0.91
Consistency	11	0.80	0.77	0.69–0.85
Autonomy	12	0.80	0.77	0.75–0.88
Cognitive self-experience	8	0.75	0.69	0.60–0.80

Retest reliability in a school subsample ($n = 98$). Bold letters and numbers were put to distinct the total scale (Diffusion) and primary scales (Incoherence, Discontinuity) and their correspondent coefficients values.

TABLE 2 | Descriptive fit indices of bifactorial confirmatory analyses.

Model	Parameters	χ^2	df	CFI	TLI	RMSEA	RMSEA 90% confidence interval	SRMR
Bi factorial CFA (1g + 6s)	231	2965.31	1,538	0.77	0.752	0.051	0.048–0.054	0.098

df, degrees of freedom; CFI, Comparative Fit Index; TLI, Tucker–Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual.

thorough adaptation process with comparable results to other versions in Latin American adaptations (36, 38) as well as in other languages (37, 64). Inventories for countries with related cultures and similar languages, as happen in Latin America where Spanish is the dominant language, requires versions that are comprehensible for population and their cultural expressions (65). The AIDA inventory has different versions in Hispanic countries to avoid cultural bias since expressions have different meanings (66). Moreover, cultural adaptations with equivalent versions regarding the conceptualization of construct enables more reliable comparisons for analysis as measurement invariance (67, 68).

The short retest reliability (interval was 2 weeks) in the school sample shows a good stability of the assessed scales, justifying the use in terms of traits. However, the formulations of the AIDA items are focusing on the present (the last weeks) in order to enable the measurement of changes over time, e.g., for using the instrument as an outcome measure in therapy studies or developmental longitudinal studies (1).

Factorial Validity

We analyzed the factorial validity of the AIDA considering a bifactor model with one general, Identity diffusion factor, and six specific factors corresponding to the sub-scales. The fit indices on the bifactorial confirmatory analysis were below the expected considering the traditional cut off points (53). However, conditions as the sample size, degrees of freedom, number of items, factors reliability, and the complexity of the model in study are influences over the fit indices that doesn't correspond to the fixed cut off fit indices (69–71). A closer look to the factor loadings (see **Supplementary Table 1**) shows that the general

factor had higher loadings and fewer negative, insignificant estimates, than the sub—scales factors. The proportion of Hierarchical Omega and Omega from the subscales shows that Diffusion factor accounts for most variance and ECV coefficients support this, following a cautious suggestion for percentage above 70% (61). The Proportion of uncontaminated correlations of 84% indicates that bias of introducing a unidimensional models is trivial (58). Finally, the absolute relative bias in factor loadings between the general factor of a bifactor model and a unidimensional model is 0.05, supporting a unidimensional structure (59).

This result remarks the complexity of the Identity concept, in studies with a developmental background the dimensions of coherence and continuity tends to be studied separately (72) while referring to the same concept (73). For example, the factorial structure of the Inventory of Personality Organization via Exploratory Structural Equation Modeling has identified four factors approached as facets of identity (74), with a factor “Instability of Self and Others” as a general factor for self and interpersonal functioning that is not clearly interpretable despite showing consistency across studies. On the other hand, The Severity Indices of Personality Problems treats continuity and coherence dimensions from a self-related level of functioning and, from the coherence dimension, on social related functioning regarding the autonomy factor from the AIDA model (1, 75, 76). Lastly, the Identity Disturbance questionnaire (77) emphasizes on continuity on self—related functioning and, on the continuity dimension, the relationship factor from AIDA (1, 77). Most inventories, refers to these two dimensions across their distinct definitions, from a self-related level of functioning while other levels of functioning as social related, are more focused on

TABLE 3 | Reliability indices for bifactor confirmatory analysis.

Factors	Omega ω	Omega ω H	ECV ss	ECV sg	ECV gs	PUC	Relative bias	FD	H
Diffusion	0.95	0.91	0.73	0.73	0.73	0.84	0.05	0.98	0.96
Perspectives	0.72	0.41	0.60	0.08	0.40			0.68	0.68
Relationships	0.73	0.14	0.27	0.04	0.73			0.77	0.53
Emotional	0.82	0.07	0.23	0.04	0.77			0.79	0.51
Consistency	0.85	0.02	0.11	0.02	0.89			0.67	0.32
Autonomy	0.84	0.21	0.29	0.06	0.71			0.81	0.59
Cognitive	0.81	0.11	0.23	0.04	0.77			0.73	0.48

ECV ss, ECV of a specific factor with respect to itself; ECV sg, ECV of a specific factor with respect to the general factor; ECV gs, ECV of the general factor with respect to a specific factor; PUC, percentage of uncontaminated correlations; FD, factor determinacy coefficient (ρ); H, construct replicability.

TABLE 4 | AIDA scale correlations with Strength and Difficulties Questionnaire and Defense Style Questionnaire - 40.

	Strength and difficulties questionnaire						Defense style questionnaire - 40		
	Total scale	Prosocial	Hyperactive	Emotional problems	Conduct problems	Peer problems	Immature defense style	Neurotic defense style	Mature defense style
Diffusion	0.67	-0.148	0.272	0.558	0.374	0.429	0.706	0.039	-0.111
Discontinuity	0.62	-0.128	0.215	0.547	0.323	0.426	0.636	-0.016	-0.167
Perspectives	0.33	-0.160	0.106	0.313	0.159	0.221	0.365	-0.109	-0.270
Relationships	0.58	-0.165	0.183	0.488	0.344	0.420	0.596	-0.048	-0.125
Emotional self experience	0.53	0.029	0.218	0.487	0.243	0.352	0.531	0.120	-0.015
Incoherence	0.642	-0.149	0.288	0.518	0.377	0.394	0.693	0.076	-0.062
Consistency	0.589	-0.77	0.244	0.454	0.379	0.380	0.646	0.023	-0.028
Autonomy	0.547	-0.058	0.273	0.466	0.285	0.304	0.569	0.119	-0.084
Cognitive self experience	0.575	-0.174	0.248	0.457	0.342	0.369	0.630	0.056	-0.050

$r > 0.10$ low correlation; $r > 0.30$ – 0.50 moderate correlation; $r > 0.50$ high correlation. Bold letters and numbers were put to distinct the total scale (Diffusion) and primary scales (Incoherence, Discontinuity) and their correspondent coefficients values.

a coherence dimension on the Severity Indices of Personality Problems and continuity dimension on Identity Disturbance Questionnaire. However, our findings suggest that, regardless of the definitions, the construct is the same. Nevertheless, the consideration of distinct facets of this construct is important for clinical descriptions (78).

Construct Validity

Altogether, the AIDA Panama scales showed covariations with related constructs matching the expected assumptions.

The AIDA scales showed high correlation with Emotional problems referring to internalizing symptoms as worries, sadness, anxiety, and somatic complains. As show in previous studies, emotional difficulties like identifying affects within oneself, from narrative identity perspective (15), and being able to regulate emotions (23) are evidenced in personality and identity pathology. A similar pattern was found in peer problems scale related to interpersonal difficulties, which was expected since personality pathology is characterized for impairment in interpersonal functioning with difficulties on developing healthy

and stables relationship, due to unavailability to understand oneself and understanding others (34).

In our study, Conduct problems and hyperactive scales had positive associations with lower pearson correlations coefficients than the internalizing scales. In a study performed in swiss psychiatric sample, patients with internalizing symptomatology showed higher scores (T value Diffusion scale = 69) than patients with externalizing symptoms (T value Diffusion scale = 49) (35). Our findings suggests that Identity diffusion has more association with internalizing symptoms that externalizing symptoms. In the Hungarian version of the inventory similar results were found (64) and in Turkish version of the Levels of Personality Functioning (79). The SDQ is based on a traditional symptom model and these associations are an indicator that assessing personality functioning with the AIDA inventory, for diagnosis of personality disorders, it is also related to traditional psychiatric symptoms. Moreover, this indicate that the culturally adapted version of AIDA identifies these psychiatric symptoms from new dimensional perspective that allows clinicians to have a more functional

TABLE 5 | Differences in AIDA mean scores (mean) and standard deviations (SD) between students and PD patients; significance (p) and effect size Cohen's d.

	Students <i>N</i> = 295		PD patient sample <i>N</i> = 20		<i>P</i> -value	Effect size Cohen's <i>d</i>
	Mean	SD	Mean	SD		
Diffusion	88.2	33.3	121.6	26.0	0.000	1.02
Discontinuity	37.5	14.6	50.3	13.1	0.000	0.88
Perspectives	12.8	5.5	13.5	4.1	0.626	0.13
Relationships	11.5	6.9	18.5	9.2	0.000	0.99
Emotional Self Experience	13.1	5.8	18.4	4.7	0.000	0.93
Incoherence	50.7	20.5	71.3	16.6	0.000	1.02
Consistency	18.7	8.4	26.6	6.7	0.000	0.95
Autonomy	18.2	8.5	24.8	8.2	0.001	0.78
Cognitive Self Experience	13.8	6.3	19.9	6.1	0.000	0.97

Effect size: $d > 0.20$ small, > 0.50 medium, > 0.80 large. Bold letters and numbers were put to distinct the total scale (Diffusion) and primary scales (Incoherence, Discontinuity) and their correspondent coefficients values.

TABLE 6 | Differences in AIDA mean scores (mean) and standard deviations (SD) between younger and older adolescents and between boys and girls in the school sample significance (p) and effect size partial eta-square (η_p^2) of the differences.

	Gender				P	η^2_p	Age				p	η^2_p
	Male <i>n</i> = 131		Female <i>n</i> = 164				12–14 years <i>n</i> = 122		15–18 years <i>n</i> = 173			
	Mean	SD	Mean	SD			Mean	SD	Mean	SD		
Diffusion	86.9	31.6	89.3	34.7	0.536	0.001	87.5	35.4	88.7	31.9	0.746	0.000
Discontinuity	35.9	13.2	38.8	15.6	0.090	0.010	37.1	14.8	37.8	14.5	0.682	0.001
Perspectives	12.1	5.3	13.4	5.5	0.048	0.013	12.5	5.2	13.1	5.7	0.393	0.002
Relationships	11.0	6.2	11.9	7.5	0.230	0.005	11.5	7.5	11.5	6.6	0.995	0.000
Emotional self experience	12.8	5.4	13.4	6.1	0.335	0.003	13.0	6.0	13.2	5.6	0.814	0.000
Incoherence	51.0	20.1	50.5	20.9	0.844	0.000	50.4	22.2	51.0	19.3	0.815	0.000
Consistency	18.9	7.8	18.5	8.9	0.709	0.000	17.9	8.7	19.2	8.2	0.215	0.005
Autonomy	18.3	8.8	18.2	8.2	0.868	0.000	18.5	9.0	18.1	8.1	0.643	0.001
Cognitive self experience	13.8	6.3	13.9	6.3	0.937	0.000	14.0	6.9	13.8	5.9	0.789	0.000

Effect size $\eta_p^2 > 0.01$ small, > 0.06 medium, > 0.14 large. Bold letters and numbers were put to distinct the total scale (Diffusion) and primary scales (Incoherence, Discontinuity) and their correspondent coefficients values.

understanding of adolescents with impairments in personality development (27).

On the other hand, prosocial scale showed low negative correlations, showing a weak and inverted association with empathic and social sensitive behaviors suggesting that is a distinct construct with identity diffusion. In the German study, the AIDA scales had low negative correlations with Cooperativeness, sharing similar contents in their definitions (1).

In Otto Kernberg's theory (12, 18), borderline personality organization displays Identity Diffusion with primitive defenses mechanisms. In this study, identity diffusion scale showed high significant correlations with immature defense style as projection, acting out, and somatization. This suggests that immature defenses are present with different identity related constructs that are not present in Kernberg's personality organization model. Furthermore, the two factors called Instability of self and others and Instability of behaviors identified on the Inventory of Personality Organization displays how identity diffusion and immature defenses tends to merge (74).

This result was consistent in Italian population (80), German population (81), and adolescent population (82, 83). Mature defenses as, humor and anticipation, and neurotic defenses styles as, idealization and reactive formation, had low correlations with the AIDA scales. These group of defenses in Kernberg's model correspond to neurotic and healthy level of organization (12) with complex and unconscious processes, as repression from traditional psychoanalytic theory, which might not be observable, neither to the subject or a rater, through a self-report measure (84).

Clinical Validity

We examined differences between school population and clinical population interviewed with Structure Clinical Interview for Axis II Disorders to evaluate the ability of the AIDA version in Panama for diagnosis of Identity Diffusion. The school sample and the clinical sample differed between their total scores with a large effect size. In earlier studies, the size effect with clinical sample were higher in Mexican population with $d = 0.84$ (38) and

German population with $d = 2.17$ (1) while our results are more similar to Italian population with $d = 1.5$ (37).

The AIDA subscales showed similar patterns except for subscale “Discontinuity concerning attributes, talents, perspectives” which, against our assumptions, showed no significant discrimination between the healthy and the clinical sample. The pathological impact of this aspect concerning an impaired identity development does not replicate with the version AIDA Panama. The theoretical foundations of this subscale are related to Livesley “lack of continuity” (85, 86) and Eriksson “subjective self-sameness” (29) where adolescents present a diversity of roles and activities while being able to recognize themselves in distinct roles and activities. In other translated AIDA inventories this scale showed the lowest internal consistency among the subscales (1, 38). Also, this subscale has the most inverted items referring to healthy development in their wording, that might prevent bias in subjects responses but raises probability of error in measurement (87). Moreover, in other inventories like, e.g., the Inventory of Personality Organization, this construct is represented with fewer items, which makes its assessment more scarce (74). In observant rated inventories, alpha coefficients are higher in scales with related contents as stabilizing goals, perspective on future and stabilizing values (32). Self-reports and informant reports measures have discrepancies (88), part of measurement error calculated on internal consistency could be attributed on the difficulty to observe own behaviors from the outside as a failure on mentalizing capacities (34). Self-reports instruments are an economic resource for assessment, especially in complex pathology in personality disorders. It is important to approach this assessment from different resources in an integrative way combining clinical observation, self-report, and third-party information to perform valid diagnosis.

According to the results on scores’ distributions, differentiated population norms according to gender and age are not necessary for Panama, matching the results for all other international AIDA versions. Pathological identity development does not seem to vary linear with gender or age (32).

Limitations

This study has important limitations. First, our data is not perfectly representative of Panamanian population since the assessment consisted of participants from an urban area in Panama City. We consider that sociodemographic variables as ethnicity, gender identity and migration status should be included in further studies since these are relevant to the development of identity. Second, the assessment of identity in longitudinal studies is necessary to explore the stability of the scores in the long term, as well as how identity can change throughout time. In our study, we performed a 2-week retest within the school population but did not include participants from the clinical sample. Third, our school sample did not have an assessment on personality functioning to check their health status any more than the internalizing/externalizing symptoms on the Strength and Difficulties Questionnaire. Moreover, the assessment of our clinical sample needs to be studied in more detail, involving more participants and different diagnoses. The

clinical sample was assessed solely based on the Structured Clinical Interview for Axis II Disorders in an outpatient service. Further studies in Panamanian population should involve the assessment of internalizing/externalizing dimensions and other personality inventories to confirm the diagnosis in clinical sample. A larger and more diverse sample with different diagnoses will enable to perform ROC analysis and set up a cut off score for clinical use. At last, further studies with robust methods are necessary to confirm the unidimensionality of the AIDA inventory adapted for Panamanian population and the replicability of these results in other adapted versions of the inventory, since Bifactor analyses can ignore cross loadings and inflate variance to general factor, in favor of these results.

CONCLUSION

Method of culture-adapted translation and step-by-step test construction was successful. It was possible to build a version AIDA Panama with 58 items with excellent psychometric properties, equivalent to the original version of AIDA and other translated versions. Moreover, an inventory using a dimensional model as AIDA is relevant to study identity diffusion as a component of personality functioning across culture (89, 90). In this study we found that diffusion scale accounts for the majority of variance, indicating an unidimensional measure. The inventory shows convergent validity with relevant constructs as primitive defenses and psychiatric symptoms. The AIDA is a valid inventory to assess Identity functioning in Panamanian adolescent population in clinical and mental health research.

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 Comité de Bioética—Hospital Santo Tomás. Written informed consent to participate in this study was provided by the participants’ legal guardian/next of kin. Written informed consent was obtained from the individual(s) and minor(s)’ legal guardian/next of kin, for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

SG designed the study, collected the data, and wrote the first draft. KG contributed to the study design, inputs and revisions on the draft, and performed statistical analyses. RD-H collaborated with statistical analyses and supplied on the draft. All authors contributed to and have approved the final manuscript.

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Criteria A and B of the Alternative DSM-5 Model for Personality Disorders (AMPD) Capture Borderline Personality Features Among Adolescents

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The recent development of a dimensional view toward personality disorder opens up the field of personality research based on the constructs of personality functioning (Criterion A) and maladaptive personality traits (Criterion B) as core components of personality pathology. However, little is known about the roles of these aspects in relation to borderline personality features during adolescence. The current study aimed at exploring the associations of Criterion A and B and their contribution in predicting borderline personality features in adolescence. A sample of 568 adolescents aged 11–17 ($M = 14.38$, $SD = 1.57$; 42.4% males) from different backgrounds (community-based, psychiatric inpatients, and youth forensic care) completed a set of questionnaires among which were measures of personality functioning, maladaptive personality traits, and borderline personality features. The findings reveal that Criterion A and B are strongly interrelated and both are significant in predicting borderline personality features in adolescents. Further, the results showed the incremental value of Criterion A beyond the level of underlying psychopathology and maladaptive personality traits suggesting the distinctive function of Criterion A to capture the features of borderline personality. These findings extend the knowledge about the dimensional aspects of personality pathology in adolescence. The implications in relation to the new personality disorder model in the ICD-11 are highlighted.

Keywords: level of personality functioning, maladaptive personality traits, Alternative Model for Personality Disorders (AMPD), LoPF-Q 12–18, borderline personality features, adolescence, ICD-11

INTRODUCTION

During the last decade, the field of personality disorder (PD) research and practice has been moving to adopt a dimensional approach. The major classification systems—the publication of the Alternative Model for Personality Disorders (AMPD) in the 5th revision of the Diagnostic and Statistical Manual of Mental Disorders [DSM-5; (1)] and the 11th edition of the International Classification of Diseases [ICD-11; (2)] introduce a two-step dimensional conceptualization of personality pathology which emphasizes two different aspects that contribute to the maladaptive personality: the level of impairment in personality functioning and maladaptive personality traits.

In the AMPD model, the first component—Criterion A referred to as the Level of Personality Functioning (LPF)—defines deficits in self-functioning and interpersonal relatedness as a core and unidimensional severity mark of personality pathology. LPF includes disturbances of self-function in identity and self-direction domains and dysfunctions of empathy and intimacy as indicators of impaired interpersonal function. The second component of the dimensional model—Criterion B or maladaptive personality traits—is intended to represent a stylistic manifestation of PD by assessing five major domains of traits—namely, negative affectivity, detachment, antagonism, disinhibition, and psychoticism (3). These two constructs, required in operationalizing and determining PD, are separate facets of personality pathology (4). Whilst the diagnostic criteria A and B stem from distinct scholarly traditions (5, 6) and are intended to serve different functions in the dimensional model, a number of studies have demonstrated a considerable overlap between severity (Criterion A) and trait (Criterion B) ratings with traits accounting for considerable and incremental variance in personality impairments (7, 8). In a search for the unique role of both components in diagnosing PD, some research also revealed the added value of Criterion A over B in support of LPF as a severity measure of personality pathology and a unique predictor of specific PDs in adult samples (9).

Although adolescence is acknowledged to be a sensitive period for the development of personality disorder and the validity of the latter has been supported by numerous studies (10–12), empirical investigations evaluating Criterion A and B simultaneously, especially their interconnection during this period, lag behind those with adults (13). We think that research findings regarding the specificity of Criterion A and B for adult personality pathology cannot be directly transferred to the adolescent population when personality pathology is emerging (14). According to the theoretical integrated developmental view of personality pathology, Criterion A has been suggested to account for the onset of PD in adolescence, while Criterion B is observable before adolescence and reflects continuous aspects of maladaptive personality traits (15, 16). Thus, during adolescence, the manifestation and function of Criterion A are proposed to emerge (14). To date, the roles of Criterion A and B for personality pathology in adolescents have been examined separately (3, 17, 18). Namely, Goth et al. (17) developed a specifically AMPD tailored instrument—the Level of Personality Functioning Questionnaire [LoPF-Q 12–18]—to study Criterion A in adolescence and showed substantial differences between adolescents with and without PDs. Similarly, Weekers et al. (19) using the Semi-Structured Interview for Personality Functioning according to DSM-5 found that personality functioning impairment (Criterion A) is a sensitive indicator of personality pathology, especially borderline PD (BPD), which is the earliest to emerge in adolescence. Furthermore, empirical findings revealed disturbances in identity and self-direction (self-dysfunction) as well as intimacy (interpersonal dysfunction) to be the most prominent in adolescents with borderline personality pathology (17). As it comes to the second component, the developmental view of PD posits Criterion B as being already evident in childhood personality traits that continue into

adolescence (16). Existing longitudinal evidence supports early maladaptive personality traits as an overall vulnerability factor for later PDs (20). For example, De Clercq et al. (21) findings suggested that children with a severe onset level of oddity-related characteristics were more at risk for developing personality pathology as described in the AMPD (based on compound scores of PID-5 maladaptive personality traits facets), especially schizotypal and borderline PDs. Another study showed that BPD can be predicted from childhood personality difficulties, with irritable-aggressive traits and affective lability being the core components (22). This briefly mentioned empirical evidence maps a trajectory of maladaptive traits (Criterion B) starting in childhood and continuing into adolescence (20). Taken together, while the studies of Criterion A and B suggest both being evident in adolescent personality pathology, their unique role is yet to be singled out, especially that of Criterion A. Beside this, a context of mental disorders should be considered as psychopathological symptoms have been established to be a risk factor for personality pathology (23), its severity (24), and course over adolescence (25).

Although Criterion A has been considered a core aspect for PDs, its interplay with maladaptive traits when investigating personality dysfunctions during adolescence has been scarcely studied so far (26, 27). Moreover, to our knowledge, no study to date has linked these two components in relation to adolescent personality pathology in general and to borderline personality features in particular. The change in the conceptualization of PD in both DSM-5 AMPD, as well as ICD-11, motivates understanding its link with categorically established BPD among adolescents which has been supported by extant research to date (11, 12, 20). So, a notable feature of the current study is that it is the first to examine the link between Criterion A and B and how they account for borderline features in a large sample of adolescents. We build our main hypothesis within the developmental framework of personality pathology (15, 16) by focusing on Criterion A to expect that it would be potent in predicting BP features among adolescents above and beyond the level of maladaptive personality traits and underlying (comorbid) psychopathological symptoms. Given a paucity of empirical findings related to the specificity of self and interpersonal dysfunctions, we had no specific hypothesis regarding their separate roles in predicting borderline features in adolescence. Further exploratory goals of the study were to shed more light on the interrelations of Criteria A and B as well as the association of Criterion B with borderline features among adolescents.

METHOD

Participants and Procedure

Participants were 568 adolescents aged 11–17 ($M = 14.38$, $SD = 1.57$; 42.4% males) recruited from public schools ($n = 502$; 40.6% males), a psychiatry inpatient unit ($n = 41$; 29.3% males), and a forensic unit for delinquent youth ($n = 25$; 100% males). Most adolescents were from urban areas (61.8%) and 33.5% were living in rural areas. Sixty percent of participants reported that their parents were married, 21%—divorced, and 19% indicated other family status.

Invitations to participate in the study along with informed written parent consent forms were distributed via schools, psychiatric and forensic adolescent care units. Adolescents who voluntarily agreed to participate in the study and whose parents gave written informed consent were asked to fill out the questionnaires. The study was administered by researchers or trained research assistants in small groups during school hours in the school sample and individually in both clinical and forensic samples. The study protocol was approved by the Psychological Research Ethics Committee at Vilnius University.

Measures

The level of personality functioning (Criterion A) was assessed with the culturally adapted Lithuanian version of the Levels of Personality Functioning Questionnaire [LoPF-Q 12–18; (17, 28)]. It is a 97 item self-report instrument with a 5-step response format (0 = no to 4 = yes) with higher scores indicating a more severe level of impairment in personality functioning and a higher risk for a current personality disorder. The questionnaire allows to dimensionally assess the total score of personality dysfunction as well as adaptive function or disturbances in the self and interpersonal domains. The original questionnaire was developed by a research group in Basel University clinics, Switzerland. The adaptation procedure for the Lithuanian version of the LoPF-Q 12–18 (28) included the translation and back-translation of the items, the pilot, and main empirical studies to ensure the necessary psychometric qualities of the questionnaire. The main empirical study for the development of the Lithuanian version involved 362 adolescents (83% school-based sample; 17% clinical sample). The total score of the LoPF-Q 12–18 differentiated the subgroup of clinical adolescents (those with 5 or more BPD symptoms) from the school-based sample (Cohen's $d = 1.2$). The effect sizes on the subscale level were similar: identity (Cohen's $d = 1.1$), self-direction (Cohen's $d = 1.1$), empathy (Cohen's $d = 0.5$), and intimacy (Cohen's $d = 1.0$). The effect sizes of medium to large proved clinical validity of the LoPF-Q 12–18. In the current study, the internal consistency score was excellent for the total scale ($\alpha = 0.90$). Cronbach's α on the subscale level was also high, accordingly identity ($\alpha = 0.90$), self-direction ($\alpha = 0.94$), empathy ($\alpha = 0.84$), and intimacy ($\alpha = 0.87$).

The short version of the Personality Inventory for DSM-5 for children aged 11–17 [PID-5-BF; (1)] was used to measure maladaptive personality traits (Criterion B). It comprises the 25 items rated on a 4-point scale (0 = very false to 3 = very true) and is categorized into 5 domains of maladaptive personality traits. A higher score indicates higher expression in the personality trait domain. To prepare the Lithuanian version of the PID-5-BF, two independent translations from English to Lithuanian were compared and the items were corrected to build the final version which was back-translated to English. The internal consistency was high for the total score ($\alpha = 0.91$) and moderate for the following subscales: negative affectivity ($\alpha = 0.80$), detachment ($\alpha = 0.70$), antagonism ($\alpha = 0.68$), disinhibition ($\alpha = 0.79$), and psychoticism ($\alpha = 0.82$).

The Borderline Personality Features Scale for Children [BPFSC-11; (29)] is an 11-item self-report questionnaire that

was used to assess borderline personality features in adolescence. Participants' responses are rated on a 5-point Likert-type scale from “not true at all” to “always true” where higher scores indicate the higher expression of borderline features. The questionnaire captures the difficulties associated with emotional instability and interpersonal problems as core aspects of borderline personality disorder. In the inpatient sample of adolescents, BPFSC-11 performed well in identifying those who met the criteria for BPD according to the categorical approach to PD (29). To prepare the Lithuanian version of the BPFSC-11, two independent translations from English to Lithuanian were compared and the items were corrected to build the final version which was back-translated to English and approved by its authors (C. Sharp). In the current sample, Cronbach's α for the total scale was 0.88.

Youth Self-Report Form [YSR 11–18; (30)] was used to measure the level of psychopathological symptoms in adolescents. The total score is constituted of the items ($n = 98$) covering both the externalizing and internalizing spectrum difficulties, attention, social, thought, and other problems. The questionnaire has been fully adapted and standardized for use in the Lithuanian population (31). In this study, Cronbach's α for the total score of psychopathological symptoms was very high ($\alpha = 0.97$).

Statistical Analyses

Statistical Package for Social Sciences (SPSS) version 27 was used for statistical analyses (32). Testing the normality of the analyzed data demonstrated the sufficient normal distribution of all the questionnaires' scores on the total and subscale levels, with skewness and kurtosis values being in the range of -1 to 1 (except for antagonism which did not exceed 2). Thus, further analyses were conducted using parametric statistics. First, we computed descriptive statistics in the whole sample and its groups. Statistical significance of mean differences between groups was tested via one-way Analysis of Variance (ANOVA) and *post-hoc* tests. Next, we calculated the Pearson correlation coefficients to examine which dimensions of LoPF-Q 12–18 and PID-5-BF were related to the BPFSC-11 score. Finally, to examine the distinctive features of Criterion A, we explored a hierarchical linear regression model to test whether the level of personality functioning contributes to the prediction of borderline features when controlling for demographic variables (age and gender), psychopathological symptoms, and maladaptive personality traits.

RESULTS

Means and standard deviations for each subgroup (school, inpatient, and forensic) and the full sample are presented in **Table 1**. One-way ANOVA revealed significant differences between groups regarding the values of LoPF-Q 12–18 [$F_{(2,531)} = 10.66, p < 0.01$], PID-5-BF [$F_{(2,508)} = 5.99, p < 0.01$], and BPFSC-11 [$F_{(2,529)} = 5.83, p < 0.01$]. *Post-hoc* analyses (Bonferroni or Games-Howell) were conducted depending on the estimated equality of the variance in each subscale. Psychiatric inpatients were characterized by the most severe disruptions in personality

functioning as well as the highest levels of maladaptive and borderline personality traits when compared to the forensic and school-based groups. Next, bivariate associations analysis using Pearson correlation coefficients (Table 2) showed that gender in the total sample significantly correlated with LoPF-Q 12–18 ($r = -0.20, p < 0.01$), PID-5-BF ($r = -0.22, p < 0.01$), and BPFSC-11 ($r = -0.27, p < 0.01$) scores such that girls had more disrupted personality functioning and presented more maladaptive personality traits and borderline features than boys. Also, older age was positively related to higher scores on PID-5-BF ($r = 0.14, p < 0.01$) and BPFSC-11 ($r = 0.14, p < 0.01$). Further correlational analysis revealed strong associations of BPFSC-11 with total scores of LoPF-Q 12–18 ($r = 0.75, p < 0.01$) and PID-5-BF ($r = 0.80, p < 0.01$) indicating that higher levels of disruptions in personality functioning or more prominent maladaptive personality traits were associated with higher levels of borderline features. Bivariate relations between Criterion A (LoPF-Q 12–18 total score and subscales) and Criterion B (PID-5-BF total score and subscales) had a robust pattern, with moderate to large in magnitude (see Table 2).

At the final step, a hierarchical linear regression model was tested to analyze the variance accounted by Criteria A and B on borderline personality features in the studied sample. The examination of multicollinearity revealed that variance inflation factor (VIF) for all variables was not larger than 5.37 (LoPF-Q 12–18 self-direction subscale) and tolerance values were not smaller than 0.19 (LoPF-Q 12–18 self-direction subscale). It is suggested that VIF values not larger than 10 (33) and tolerance values not smaller than 0.10 (34) are not indicative of problematic multicollinearity, so we proceeded with further analysis. In this model BPFSC-11 score was regressed on age, gender (Step 1), total problems score of YSR 11–18 (Step 2), following PID-5-BF five trait domains (Step 3), and LoPF-Q 12–18 four functioning dimensions (Step 4).

The results of regression analysis are presented in Table 3. It was found that PID-5-BF domains captured a significant amount of unique variance (25.6%) in the prediction of the BPFSC-11 scores when controlling for age, gender, and total score of psychopathological symptoms (Step 3). At this step, negative affectivity ($\beta = 0.32, p < 0.01$), disinhibition ($\beta = 0.20, p < 0.01$), and psychoticism ($\beta = 0.27, p < 0.01$) along with total score of YSR ($\beta = 0.19, p < 0.01$) were significant predictors. A few interesting findings emerged in Step 4. First, the LoPF-Q 12–18 domains incrementally contributed an additional 4.2% of the variance. In detail, identity ($\beta = 0.10, p < 0.05$), self-direction ($\beta = 0.33, p < 0.01$), and intimacy ($\beta = -0.10, p < 0.05$) were statistically significantly associated with borderline personality features. Second, an unexpected finding here has been the change in the direction of association between LoPF-Q 12–18 intimacy domain (LoPF-Q 12–18) and borderline personality features from positive zero-order correlation into negative beta weight. This indicates a manifestation of negative statistical suppression in which the relationship between a predictor and the outcome variable reverses after adjusting for additional predictors (35). The suppression has likely appeared because of strong correlations of the intimacy domain with other predictors and the dependent variable (BPFSC-11). When entered into the

regression equation Intimacy subscale increased the predictive power of other predictors by removing irrelevant variance from them and gaining negative weight. Third, the association between borderline features and psychopathological symptoms was no longer significant at this step (Step 4) when controlling for Criterion A domains. However, negative affectivity ($\beta = 0.22, p < 0.01$), disinhibition ($\beta = 0.13, p < 0.01$), and psychoticism ($\beta = 0.21, p < 0.01$) continued to be statistically significant predictors.

DISCUSSION

The current study aimed to analyze the associations of Criterion A and B—the components of the contemporary dimensional model of personality disorder—with borderline personality features among adolescents. In line with the described developmental trajectory of personality pathology in adolescence (16), we were particularly interested in the unique role of Criterion A to account for borderline personality features after adjusting for the maladaptive personality traits (as defined in Criterion B) and underlying psychopathological symptoms. To examine this, we used a large sample covering a spectrum from typical to problematic development (school-based sample, psychiatric inpatients, and delinquent youth) and a broad adolescence age span along with the measure of LPF—LoPF-Q 12–18—specifically developed for adolescents under the frame of the AMPD in DSM-5 and entry criterion for PDs diagnostic model in ICD-11 (17).

Several findings emerge from this study. First, consistent with our main hypothesis, the findings of the present study suggest the importance of Criterion A for borderline personality features in adolescents. Specifically, the results of our regression model showed the statistically significant unique association between Criterion A and borderline features beyond the context of underlying psychopathology and maladaptive personality traits. This allows us to maintain and strengthen the arguments that Criterion A should have its distinctive function in capturing the features of adolescent personality pathology (15, 36). Research with adults has already shown that personality dysfunction taps a core of personality disorder (37), its specific aspects (7, 38), or outcomes (39). The results of our study extend at least some of these findings into the period of adolescence by pointing to the necessity to consider the level of personality functioning in understanding early borderline personality features. This is particularly important with regard to the new ICD-11 approach which bases assessments of PD on a patient's personality functioning. Accordingly, such dysfunction should also explain the borderline pattern qualifier traditionally called BPD (2). Our findings confirm that this approach is essential in evaluating personality pathology in adolescence too. Furthermore, results from the present study support that the self-functions—identity and self-direction—contribute significantly to the variance of borderline features among adolescents. However, the presence of statistical suppression found in our study doesn't allow us to interpret the role of intimacy in the understanding of borderline features when these are explained simultaneously using other variables of the study. Although the likelihood of suppressor

TABLE 1 | Descriptive statistics by group for observed variables.

	Score interval	School (<i>n</i> = 467) ^a <i>M</i> (<i>SD</i>)	Inpatient (<i>n</i> = 40) ^b <i>M</i> (<i>SD</i>)	Forensic (<i>n</i> = 25) ^c <i>M</i> (<i>SD</i>)	Whole group (<i>n</i> = 568) <i>M</i> (<i>SD</i>)	<i>F</i>
BPFSC-11	11–55	28.87 (9.30) ^b	34.00 (9.05) ^a	30.44 (9.00)	29.33 (9.35)	5.83**
LoPF-Q total score	0–388	140.07 (59.78) ^b	184.99 (64.93) ^{a,c}	143.32 (48.72) ^b	143.67 (60.80)	10.66***
LoPF-Q identity	0–92	34.27 (17.02) ^b	48.73 (18.84) ^{a,c}	34.35 (11.27) ^b	35.38 (17.35)	13.77***
LoPF-Q self-direction	0–100	39.10 (21.17) ^b	58.96 (23.50) ^{a,c}	37.32 (21.57) ^b	40.52 (21.98)	16.60***
LoPF-Q empathy	0–104	33.52 (14.22)	36.66 (15.06)	39.20 (12.79)	34.02 (14.27)	2.66
LoPF-Q intimacy	0–92	32.49 (14.98) ^b	40.63 (15.93) ^{a,c}	32.45 (10.03) ^b	33.10 (14.50)	5.69**
PID-5-BF total score	0–75	24.25 (13.92) ^b	32.20 (13.73) ^a	25.90 (15.75)	24.94 (14.11)	5.99**
PID-5-BF negative affectivity	0–15	6.10 (4.03) ^b	8.35 (4.33) ^{a,c}	5.04 (3.98) ^b	6.22 (4.09)	6.76**
PID-5-BF detachment	0–15	4.58 (3.28)	5.76 (3.56)	3.87 (3.25)	4.64 (3.31)	3.04*
PID-5-BF antagonism	0–15	2.89 (2.76)	3.17 (2.70)	3.92 (3.95)	2.96 (2.83)	1.69
PID-5-BF disinhibition	0–15	4.85 (3.52) ^{b,c}	7.22 (3.37) ^a	6.83 (3.69) ^a	5.12 (3.59)	11.41***
PID-5-BF psychoticism	0–15	5.83 (3.99) ^b	8.12 (4.37) ^{a,c}	5.24 (4.05) ^b	5.98 (4.06)	6.58**
YSR 11–18 total score	0–196	48.94 (31.77) ^{b,c}	81.02 (39.23) ^a	70.32 (33.72) ^a	52.63 (33.87)	22.12***

p* < 0.001, *p* < 0.01, and ****p* < 0.001. ^{a,b,c}Significant differences between groups.**TABLE 2** | Correlations among study variables.

	1	2	3	4	5	6	7	8	9	10	11	12
BPFSC-11	–											
LoPF-Q total score	0.75											
LoPF-Q identity	0.73	0.92										
LoPF-Q self-direction	0.79	0.93	0.85									
LoPF-Q empathy	0.56	0.81	0.61	0.64								
LoPF-Q intimacy	0.52	0.87	0.74	0.71	0.68							
PID-5-BF total score	0.81	0.80	0.74	0.77	0.67	0.62						
PID-5-BF negative affectivity	0.74	0.63	0.63	0.69	0.45	0.40	0.81					
PID-5-BF detachment	0.52	0.67	0.59	0.59	0.54	0.67	0.78	0.48				
PID-5-BF antagonism	0.42	0.42	0.33	0.34	0.55	0.30	0.61	0.37	0.40			
PID-5-BF disinhibition	0.67	0.67	0.64	0.64	0.55	0.50	0.83	0.60	0.59	0.40		
PID-5-BF psychoticism	0.72	0.69	0.63	0.68	0.55	0.56	0.86	0.63	0.60	0.41	0.63	
YSR 11–18 total score	0.64	0.71	0.66	0.70	0.56	0.52	0.67	0.56	0.47	0.40	0.57	0.58

All values are significant at *p* < 0.001.

effects can be attributed to a mere statistical artifact (35), it may also be a replicable phenomenon as has been the case in other research fields, e.g., personality traits (40), coping (41), or developmental links between anxiety and depression (42). Our results point at the need for further elaboration on the association of the LoPF-Q 12–18 with borderline personality features. In another sample of Lithuanian adolescents (*N* = 362, unpublished data available from the first author upon a request) the same type of statistical suppression appears. It is not clear yet it is a culture-specific or a general phenomenon, but it waits to be tested in other populations.

Next, the regression model revealed further that Criterion B domains retained their significance when predicting borderline personality features together with Criterion A dimensions. As of note, negative affectivity is postulated to be the most consistent correlate of borderline pathology, along with disinhibition and antagonism (43–45). Differently

than explained, the results of the current study revealed a significant contribution of psychoticism which along with negative affectivity had the strongest correlations with, and in conjunction with disinhibition explained the variance of borderline personality features. Although the association of negative affectivity and disinhibition with borderline pathology is in line with the dimensional model of BPD, psychoticism is not among its diagnostic criteria in DSM-5 (1). Nevertheless, psychoticism has been found to map borderline pathology in adults in terms of cognitive and perceptual dysregulation, including proneness to dissociation (46, 47). Notable, the ICD-11 captures such reality testing features in terms of global severity thus aligning them with functioning (1, 48, 49). In other studies, psychoticism has been found to overlap with internalizing and externalizing components that mark a general tendency of dysfunction in young individuals (50).

TABLE 3 | Hierarchical linear regression analysis for predicting BPFSC-11 scores.

Predictor variables	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>t</i>	<i>p</i>	<i>R</i> ²	<i>R</i> ² change	<i>F</i>
Step 1						0.10	0.10	23.92*
Age	0.92	0.27	0.16	3.44	0.00			
Gender	−5.38	0.85	−0.28	−6.30	0.00			
Step 2						0.44	0.35	282.34*
Age	−0.09	0.22	−0.02	−0.43	0.67			
Gender	−2.80	0.69	−0.15	−4.08	0.00			
YSR 11–18 total problems	0.17	0.01	0.63	16.80	0.00			
Step 3						0.70	0.26	75.80*
Age	−0.19	0.16	−0.03	−1.16	0.25			
Gender	−1.08	0.54	−0.06	−2.01	0.05			
YSR 11–18 total problems	0.05	0.01	0.19	5.25	0.00			
PID-5-BF negative affectivity	0.74	0.09	0.32	8.46	0.00			
PID-5-BF detachment	−0.07	0.10	−0.03	−0.73	0.47			
PID-5-BF antagonism	0.15	0.10	0.04	1.47	0.14			
PID-5-BF disinhibition	0.52	0.10	0.20	5.17	0.00			
PID-5-BF psychoticism	0.60	0.09	0.27	6.61	0.00			
Step 4						0.74	0.04	18.08*
Age	−0.03	0.15	0.00	−0.18	0.85			
Gender	−0.46	0.52	−0.02	−0.90	0.37			
YSR 11–18 total problems	0.01	0.01	0.05	1.34	0.18			
PID-5-BF negative affectivity	0.51	0.09	0.22	5.87	0.00			
PID-5-BF detachment	−0.14	0.10	−0.05	−1.33	0.18			
PID-5-BF antagonism	0.20	0.10	0.06	1.89	0.06			
PID-5-BF disinhibition	0.34	0.10	0.13	3.47	0.00			
PID-5-BF psychoticism	0.48	0.09	0.21	5.55	0.00			
LoPF-Q identity	0.06	0.03	0.10	2.01	0.04			
LoPF-Q self-direction	0.14	0.02	0.33	5.92	0.00			
LoPF-Q empathy	0.02	0.03	0.03	0.84	0.40			
LoPF-Q intimacy	−0.06	0.03	−0.10	−2.28	0.02			

**p* < 0.05.

To the best of our knowledge, the present study is the first to shed light on the functions of Criteria A and B relative to personality disturbances among adolescents. Overall, it provides evidence that both criteria supplement in indicating borderline personality features in adolescence and might benefit from aspects of one another. These two aspects of the dimensional model—Criterion A, as measured by the LoPF-Q 12–18, and Criterion B, as measured by the PID-5-BF—were highly interrelated in the current study. The associations between Criterion A and B might be anchored and interpreted from a developmental perspective on personality pathology (20). The recent study evidenced a longitudinal prediction of personality traits on personality (self)functioning over the period of 10 years (51). Thus, the cross-sectional interconnection between Criterion A and B could also mark the potential contribution of maladaptive traits to personality dysfunction.

Overall, the findings of our study endorse the relevance of the dimensional model to capture (borderline) personality problems during adolescence. The level of personality functioning is a necessary entry criterion for PD diagnostics in both classification

systems—DSM-5 (1) and ICD-11 (2). For the latter, it is the only one required. The present study can shed some light on the implications for ICD-11. First, it reaffirms that BPD in adolescence is a matter of personality functioning, just as studies with adults have shown: rather than being distinct psychopathology, BPD is the strongest marker of the general PD factor (52) and “disappears” into it (37). As such, understanding borderline PD once again brings us closer to the level of personality organization as defined by Kernberg (53) and suggests that BPD criteria reflect the core features of PD severity (37, 54). Secondly, the retention of the borderline qualifier in the ICD-11 raises the question of its possible redundancy with the PD severity criterion (54). The high correlations between personality functioning, maladaptive traits, and borderline features found in the current study suggest that it is a relevant question in adolescence too. Finally, the use of ICD-11 requires assessment tools. Some studies have shown that measures originally developed for Criterion A in the AMPD can be reliably used to classify the severity of PD in the ICD-11 (55). In light of these results, the operationalization of

personality functioning used in the current study, the Level of Personality Functioning Questionnaire for adolescents (LoPF-Q 12–18), uniquely captures adolescents' (borderline) personality difficulties (17, 18), and might be considered a proxy measure for PD severity in the ICD-11.

Despite these contributions, the current results are subject to several limitations. First, as the study included only self-report measures only, this could lead to method-inherent pitfalls in each sample. Empirical studies have shown that self-report scores on personality functioning should be interpreted cautiously in forensic settings (56). Secondly, it used a specific measure of BPFSC-11 which limits the results to the current measure of borderline personality. Third, although we used a large sample of adolescents inclusive of clinical and risk groups to maximize the variance in the assessed outcome, studies with larger clinical samples are needed. Fourth, other criterion variables, e.g., psychosocial functioning might help to shed light on the further delineation of the specificity and difference in functions of Criterion A and B as it has been shown in the studies with adults (38). Finally, the study employed the cross-sectional, not longitudinal design which as we note in the above text could specify better the value of Criterion A and B in relation to personality pathology during adolescence as a sensitive period (36).

In sum, the current research provides an important step in understanding how the main components of the dimensional model work together to indicate and describe borderline personality features that are the earliest maladaptive personality indicator to emerge in development (19).

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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 Vilnius University Psychological Research Ethics Committee. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

RB: conceptualization, data analysis, and writing the initial draft. EG: data collection, contribution to the introduction section of the paper, and writing. AA: data collection and writing. LG-P: contribution to the results section of the paper and writing. AL: data collection, contribution to the data analysis, results, discussion sections of the paper, and writing. GS-N: data collection and curation, contribution to the data analysis, methods, results sections of the paper, and writing. All authors contributed to the article and approved the submitted version.

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Defense Mechanisms Reloaded in the Light of Impaired Personality Functioning: An Attempt of Clarification and Simplification Resulting in the DSQ-22-A for Adolescents

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With the upcoming ICD-11, the diagnostic guidelines for personality disorders will change fundamentally to a dimensional severity concept, including the evaluation of several domains of personality functioning. Moreover, the lifetime perspective will allow this diagnosis even in early adolescence, providing the opportunity for early detection and intervention. In psychodynamic understanding, defense mechanisms are considered to be a part of the “personality structure”, which is one axis in the related diagnostic system (OPD) and showed great similarities to the concept of personality functioning. The most common inventory to assess defense mechanisms is the Defense Style Questionnaire, especially the DSQ-40, which has unfortunately not been specifically adapted to younger ages yet. Using an age-adapted version of the DSQ-40 with simplified formulations, a thorough empirical item analyses and selection was performed, including a face-validity check of the items by experienced therapists and assessments for item correlations, factor structure, reliability, construct and clinical validity in a German clinical and school sample containing 396 adolescents. Though several improvements, similar problems as reported for the adult DSQ versions concerning face-validity and coherence of the item pairs (2-item-method) to represent the single defense mechanisms were obtained. Thus, not all item pairs could be kept and a shortened version DSQ-22-A for adolescents with good psychometric properties was built. The three resulting defense categories adaptive, neurotic and maladaptive showed acceptable scale reliabilities (0.63, 0.56, 0.68), sound factor structure and convincing convergent and clinical validity in terms of highly significant correlations with impaired personality structure according to the OPD-CA2-SQ as well as with PHQ-D depression and somatic symptoms, especially for the maladaptive defense category (0.75, 0.44, 0.34). Likewise, the maladaptive defense category differed highly significant ($p = 0.000$) and with a large effect size of $d = 0.9$ standard deviations between adolescents from the school and the clinical sample. The DSQ-22-A can be recommended for use in

adolescents for research, diagnostics and therapy planning, especially with regard to personality functioning and structure. Possible fundamental changes concerning some basic operationalization's of the defense mechanisms and the 2-item-method were suggested for international discussion.

Keywords: Defense Style Questionnaire, defense mechanisms, personality functioning, adolescents, psychometric properties

INTRODUCTION

The definition and diagnosis of personality disorders (PD) is currently in a state of transition (1, 2). With the upcoming 11th version of the International Statistical Classification of Diseases and Related Health Problems [ICD-11; (3)] diagnostic guidelines for PD will change fundamentally. PD are then viewed as a continuum of “no” to “severe” impairment in basic levels of functioning, expressed by a summary severity score independent from any former type of PD. Whether impairment is present is assessed on the basis of problems in functioning related to aspects of self and interpersonal dysfunction, further weighted with regard to specific socio-psychological aspects. The changes correspond to the Alternative Model of Personality Disorders (AMPD) in the research section of the 5th version of the Diagnostic and Statistical Manual of Mental Disorders [DSM-5; (4)], recommending a dimensional diagnostic of PD by using a severity approach (Criterion A). In addition, the age restriction for PD is abolished in the ICD-11 (3) following a general lifetime perspective and a unified system of psychopathology for all ages. Thus, the diagnose PD can be assigned even in early adolescence, provided that the criteria are fully met. Clinicians and researchers, in support of an early diagnosis of PD, argue that early detection and early intervention are crucial to prevent severe impairment of the developing personality. They also argue in favor of dimensional models of PD to identify at-risk individuals who may profit from interventions that lead back to a path of less severely impaired, respectively healthy personality development (5).

There is also a psychodynamically based multiaxial diagnostic classification system for adults [Operationalized Psychodynamic Diagnosis System; OPD; (6)] and – in an age-specific version – for children children and adolescents [OPD-CA-2; (7)] that complements symptom-oriented diagnostics according to DSM or ICD. Within the OPD-CA-2 (7), four axes (treatment demands, relationships, conflicts and structure) are described. The axis personality structure is especially related to PD and contains four different domains (control, identity, interpersonality and attachment) which correspond exceedingly clearly to the concept of personality functioning denoted in the DSM-5 AMPD (with the domains identity, self-direction, empathy and intimacy) to describe the core impairments common to all PD (4, 7). Personality structure is defined as the availability of psychological functions to regulate the self and its relation to internal and external objects (6, 7). This refers to the acquired tools for regulating and processing conflict situations, stresses and strains or development tasks. A careful diagnosis

of structural difficulties and competences is indispensable for indication and therapy planning within the psychotherapeutic practice. The assessment of the level of personality structure is usually done by trained OPD experts using an OPD interview (6, 7).

Empirical findings using the OPD-CA-2 interview (7) indicated that adolescents with mental disorders show deficits in personality structure (8–10). However, the use of these interviews require a large amount of time, limiting the possibility to be used in research. Thus, OPD Structure Questionnaires [for adults OPD-SQ (11); for adolescents OPD-CA2-SQ (12)] were developed to assess personality structure in self report. Recent studies with the OPD-CA2-SQ (12) supported the applicability of the questionnaire in adolescents from school (13, 14) as well as clinical samples (15). Schrobildgen et al. (15) reported for the OPD-CA2-SQ (12) a highly significant discrimination between school population and patients with PD using the total score with a large effect size of $d = 1.6$ standard deviations (see below) and – compared to that – a likewise discrimination of students and patients with PD according to the Levels of Personality Functioning Questionnaire [LoPF-Q 12-18; (16)] at a very similar level with a very large effect size of $d = 2.1$ standard deviations. Thus, it could be argued that the structural concept according to OPD is nearly equivalent to the personality functioning concept according to the DSM-5 AMPD (4) and ICD-11 (3) in terms of clinical utility, as with both specifically derived self-report questionnaires a valid clinical discrimination could be reached.

Defense mechanisms (DM) are another central psychodynamic concept and are considered to be fundamental to the organization and functioning of personality (6, 7, 17). They can be understood as part of the personality structure and it is assumed that a low integrated structural level is associated with the use of immature DM (7). The description of DM is based on the assumptions of A. Freud (18). They are considered to be an unconscious ego function, used to protect the conscious mind from feelings of anxiety (19). Vaillant (20) proposed a model of ego defense in which the DM can be arranged on a continuum of ego maturity from mature to immature, judged by their flexibility, functionality, variability, continuity as well as reality distortion. Even though it is postulated that DMs function unconsciously, there is evidence that people may be aware of certain parts (21).

There had been attempts to provide conclusive models on how many relevant DM exist [DSM-IV; (6, 7, 17)] and efforts to quantitatively measure those, which has led to the development of several versions of self-report inventories gathered under the name Defense Style Questionnaire (DSQ). After an extensive

literature search (for a selection of DSQ studies see supplement), we found 12 different versions of the DSQ (as far as access was possible). However, many of these versions are not well described, so we will focus on the most essential ones in the following.

Initially, an 81-item version of the DSQ assessing 24 different DM and providing four higher-order defense categories — based on an exploratory factor analysis — was introduced by Bond et al. (22) with the categories: adaptive (mature), image-distorting, self-sacrificing (neurotic) and maladaptive (immature). Bond et al. (23) modified the 81-item version by changing to a 2-item system per DM and published the according 88-item version, also providing the above mentioned 4-factor solution. From then on, the DSQ was revised several times, both in terms of the number of items, the content of the items and the factor structure. For example, a 72-item DSM-III-R-labeled version of the DSQ (24) was developed with a 3-factor solution, interpreted as mature, neurotic and immature defense category.

Finally, the most common and prominent 40-item version of the DSQ (25) was published. Following the DSQ-88 (23), a 2 item system assessing now 20 DM using a 9-point Likert-type scale with three higher-order defense categories (mature: $\alpha = 0.68$, neurotic: $\alpha = 0.58$, immature: $\alpha = 0.80$) was chosen. Andrews et al. (25) showed that the DSQ-40 was able to discriminate significantly between patient (anxiety disorders, child-abusing parents) and healthy samples ($p < 0.05$). Today, the DSQ-40 is a widely used self-assessment tool that has been translated into numerous languages [e.g., French: (26); Italian: (27); German: (28)]. Nevertheless, the DSQ-40 has some psychometric difficulties, as shown by various studies. Schauenburg et al. (28) reported insufficient pairwise intercorrelations for some items. Chabrol et al. (29) and Schauenburg et al. (28) revealed unsatisfactory face validity of the original English and the German version of the DSQ-40 and, therefore, deleted several items. Both studies (28, 29) reported, in agreement with the original DSQ-40 version (25), a 3-factor solution.

Also modified DSQ versions for adolescence exist. In particular, the research group around Steiner et al. has been very active in this regard. In several studies (30–33), they used a 78-item modification of Bond's original DSQ-81 (22), in which 19 DM were assessed by one to nine items on a 9-point scale in adolescents 12 years of age and older. Unfortunately, the item modifications were not described in more detail. However, the studies showed that the DSQ concept is applicable in principle for adolescents. Comparable to Andrews et al. (25), but in contrast to Bond et al. (22), Steiner and Feldman (31) found a 3-factor solution matching the defense categories mature ($\alpha = 0.52$), neurotic (no statement of α) and immature ($\alpha = 0.81$) category. Some of the category scores were able to discriminate significantly between healthy samples and specific pathological groups (immature and mature defense category for boys between a delinquent and healthy sample with $p < 0.01$; neurotic and mature defense category for girls between a psychosomatic and healthy sample with $p < 0.05$). Subsequently, there have been attempts (34, 35) at shortening the adolescent version of the DSQ (30). However, none of the youth-specific versions has been widely popular.

In several studies (21, 36) the original DSQ-40 version for adults (25) had been used in adolescent samples, starting at ages 10 (36) and 13 years, respectively (21). Ruuttu et al. (21) used a Finnish translation of the DSQ-40 and found a 4-factor solution explaining 49% of the total variance with mature ($\alpha = 0.62$), image-distorting ($\alpha = 0.62$), neurotic ($\alpha = 0.60$) and immature ($\alpha = 0.78$) defense category. Furthermore, they demonstrated that all four scales were able to discriminate significantly between an adolescent healthy and patient sample with mood disorders (immature, image-distorting and mature with $p < 0.001$, neurotic with $p = 0.002$). Moreover, they reported reasonable and significant correlations between the DM categories and psychiatric symptoms for immature (0.65), neurotic (0.15), image-distorting (0.20) and mature (−0.45). Likewise, reasonable correlations with adaption for the category immature (−0.54), neurotic (−0.10), image-distorting (−0.25) and mature (−0.35). In addition, they postulated to have confirmed the face validity of the original DSQ-40 (25) in adolescent samples, however, without giving any further details. Another study (36) used a Greek translation of the DSQ-40 and also postulated satisfactory internal consistency for four defense categories (mature: $\alpha = 0.58$, image-distorting: $\alpha = 0.61$, neurotic: $\alpha = 0.60$, immature $\alpha = 0.75$). Moreover, they assumed that the DSQ-40 is a valid instrument for use in childhood and adolescence. They indicated the construct validity in terms of significant intercorrelations between each of the 4 defense categories with ranges from 0.20 (image-distorting and neurotic category) to 0.62 (immature and image-distorting category). Convergent validity was reported by e.g., significant positive associations between mature (0.20) and significant negative associations between immature defense category (−0.22) and psychological wellbeing, while neurotic defense category (0.17) correlated positive with psychological wellbeing, thus, not corresponding to the assumed relation. Moreover they reported, that the immature defense category predicted psychological wellbeing, bullying behavior, as well as the experience of victimization ($p < 0.001$; $OR = 0.95–1.07$), the neurotic defense category predicted psychological wellbeing ($p < 0.05$; $OR = 1.05$) as well as bullying behavior ($p < 0.01$; $OR = 0.96$), and finally, the mature defense category predicted psychological well-being ($p < 0.01$; $OR = 1.06$) as well as the experience of victimization ($p < 0.001$; $OR = 0.09$).

The current body of research suggests that while the defense concept can be usefully applied in adolescence, there is no age-specific version of the most current and widely used DSQ inventory for adolescents: the DSQ-40 (25). In addition, it can be noted that the problems with face validity and psychometric properties have not been resolved for any of the current DSQ-40 versions.

In the light of the new dimensional assessment of PD also in younger ages and the obvious suitability of psychodynamic concepts in this context, the consideration of DM seems to be highly topic. DM, despite the ambiguities and partly problematic quality criteria of previous operationalization's as questionnaires, showed clear relationships to psychopathology. In order to be able to investigate the possibility that DM can elucidate specific pathological developments in adolescence, the first step

requires the development of a reliable and valid assessment tool for that age group. Thus, the present study aims to take a close look at the concept of DM based on the most recent operationalization for adults and to develop an optimized and age-specific assessment tool for adolescents from 12 years up (+/- 2 years).

Development of an Age-Specific Research Version DSQ-40-A for Adolescent Self-Report

In consultation with Mr. Schauenburg, a specific version with adapted wording for adolescents was developed on the basis of the German version DSQ-40 for adults (28). Almost all items were slightly changed and simplified in order to be easier to understand and to better fit into the everyday world of young people. In doing so, we drew on the extensive experience with age-adapted test construction gained both in the development of the Junior Temperament and Character Inventory test family [JTTCI-R; (37)] with content-equivalent test versions for 3–6 year-olds, 7–11 year-olds, 12–18 year-olds and adults to elicit Cloninger's personality model and in the development of youth-adapted assessments of the level of personality functioning concept [LoPF-Q 12–18; (12)]. The main goal was easy linguistic comprehensibility, unambiguity of the core content and avoidance of socially desirable responses (e.g., by leaving out terms or examples that young people typically find “embarrassing”). A special attempt was made to find new formulations for those items that had shown very unsatisfactory face validity and reliability in the original DSQ-40 adult versions (28, 29) in order to not lose the affected DM “Deevaluation”, “Dissociation” and “Displacement” in the new test version. **Table 2** shows all item formulations of the adult version and the youth version in comparison.

In our view, three items in particular have undergone major changes in wording that are intended to sharpen the core of the concept and thus may have changed it somewhat (see **Table 1**).

Using this German age-specific research version of the DSQ-40 for adolescents, the validation steps that had been taken for the adult versions had been replicated and extended in order to investigate the possibility of a reliable and valid assessment of the 20 DM in adolescence. The main focus lied on the clinical validity—especially on the relation with impairments in personality structure according to the OPD-CA2-SQ (12) – in order to incorporate a tool directly relatable to personality functioning (Criterion A) as an external criterion of validity.

MATERIALS AND METHODS

Participants and Procedure

Clinical and School Sample

The clinical sample consists of 135 psychotherapeutic patients of six youth care facilities, four psychotherapeutic practices as well as a clinic for child and adolescent psychiatry ($M_{age} = 17.8$; $SD = 1.7$; 67% female, 30% male and 3% diverse sex). These patients

were recruited since 2020. Inclusion criteria was the existence of a clinical diagnose according to the Patient Health Questionnaire [PHQ-D; (38)]. 55.9% of the adolescents met the criteria for only one syndrome. Among these, alcohol-related syndromes were found in 40.0%, depressive in 36.2%, somatoform in 16.3%, anxiety-related in 6.2% and eating disorder syndromes in 1.3% of the adolescents. Two syndromes were present in 27.3% of the adolescents, three in 15.4% and four or five each in 0.7%. Within the patient group there were significant differences regarding sex [$\chi^2(2) = 89.47, p < 0.001$].

The school sample consists of 261 adolescents ($M_{age} = 17.2$; $SD = 2.1$; 57% female, 42% male and 1% diverse sex) assessed at four schools and five out-of-school facilities since 2019. Initially, in-person group testing was conducted. Since the start of the Covid pandemic, participants completed questionnaires at home and surveys were conducted by post (since March 2020). Inclusion criterion for the control group was the presence of mental health according to PHQ-D (38) in terms of no syndrome being fulfilled. Significant differences in sex also emerged within the school sample [$\chi^2(2) = 136.44, p < 0.001$].

The total combined sample is composed of 396 adolescents ($M_{age} = 17.4$; $SD = 2.0$; range 12–21; 58,7% female, 39,7% male and 1,5% diverse sex) and reported very low (9.1%/6.1%), low (14.7%/13.7%), medium (33.6%/36.1%) or high (37.1%/35.0%) socioeconomic status. 8 adolescents in the clinical sample and 13 adolescents in the school sample did not report socioeconomic status. There were no statistically significant differences in socioeconomic status between the two groups. However, both groups differed significantly with respect to age [$t(343.49) = 3.32, p = 0.001$].

All participants were informed about the use of their data and the compliance with data protection regulations. All participants provided written informed consent. For adolescents under the age of 16, the written consent was also given by their legal guardians. The project was approved by the Research Ethic Board at the MSB Medical School Berlin (approval number: MSB-2020/30).

Expert Sample

Analogous to the study design of Chabrol et al. (29) and Schauenburg et al. (28), the first step was to check the face validity of each item in an expert test by assessing the degree of agreement among analytically oriented clinicians as to which DM an item is supposed to be representative for. Similar to Chabrol's et al. (29) approach, experts were presented with a combined list of the 30 DM and coping styles listed in the DSM-IV (17) and OPD-CA-2 (7) in order to facilitate attribution. However, raters were informed that also other categories than those listed could be attributed. In addition, it was asked to indicate for each item which level of maturity is represented (adaptive, neurotic, maladaptive) in order to be able to analyze this higher-level aspect of construct validity as well. The group of psychoanalytic or psychodynamic oriented experts was composed of five women and five men, most of them working at university clinics in Germany or Switzerland, seven of them were therapists with over 10 years of work experience. The list of all 40 age-adapted DSQ-40-A items were given in running order as a

TABLE 1 | Examples and explanations for major changes of item formulations from adult to adolescent version of DSQ.

Original for adults	Changed for adolescents	Content
Item 1: "I get satisfaction from helping others and if this were taken away from me I would get depressed." (29) "It is important for me to help others. When I am no longer able to do that, I get depressed." [(28), translated from German into English]	Leaving out the signal word "depression" to avoid pathological misinterpretation. Avoiding two separated sentences. "It is so fulfilling and important for me to help others that I need such a task in my life."	Formulated to capture the neurotic defense mechanism "Pseudoaltruism".
Item 9: "I ignore danger as if I was Superman." (29) "I don't pay attention to danger as if I was invulnerable." [(28), translated from German into English]	Leaving out the signal word "invulnerable" or "superman" to avoid socially desired responses. "I rather don't pay attention to dangers because I have a strong and secure feeling that nothing will happen to me."	Formulated to capture the maladaptive defense mechanism "Dissociation". Whether this item content fits the concept of Dissociation could be discussed (Glossary DSM-IV: individual deals with emotional conflict or internal or external stressors with a breakdown in the usually integrated functions of consciousness, memory, perception of self or the environment, or sensory/motor behavior)
Item 16: "There are always good reasons when things don't work out for me." (29) "I always find excuses when something doesn't go well." [(28), translated from German into English]	Leaving out the negative phrase "finding excuses" to sharpen the content where "saying yes" clearly stands for a healthy and mature defense mechanism. "If something is not going well in my life, I analyze exactly what the reasons are until I understand it."	Formulated to capture the adaptive defense mechanism "Rationalization". The phrase "finding excuses" has a negative connotation. This probably does not fit to the targeted content "positive mature defense"

table without explaining that each mechanism was represented by only two items or giving information on the underlying DSQ concept.

Measures

The *DSQ-40-A pilot version* is an age-adapted version of the DSQ-40 for adults in German language introduced by Schauenburg et al. (28). It was designed to assess Defense Mechanisms (DM) in adolescents from 12 to 18 years (+/- 2 years) in self-report following the approach of the original authors of the DSQ-40 (25). Accordingly, 20 DM, represented by two items each, are assessed on a 9-point Likert scale varying from 0 = "not true" at all to 8 = "completely true". Based on factor analytic results, three higher-order categories are formed from the 20 DM, which correspond in content to the three different maturity categories adaptive, neurotic and maladaptive. In the current study, the psychometric properties of this pilot version are analyzed. Our aim is to create a reliable and valid final version of the DSQ-A based on empirical item selection.

The *OPD-CA2-SQ* (12) is a self-report questionnaire for adolescents between 12 and 18 years (+/- 2 years) to assess the dimensions of personality structure: control, identity, interpersonality and attachment. The development was based on the descriptions of the axis "structure" in the multiaxial diagnostic and classification system OPD-CA-2 (7). The concept of structure is similar to the new dimensional severity approach in the DSM-5 (4) and ICD-11 (3) to describe PD in terms of impairments in personality functioning, varying from a healthy to an impaired functioning. The test contains 81 items with a 5-step answering format (0 = "no" to 4 = "yes"), high scores suggest

a high level of impairment. The four resulting primary scales are each composed of several subscales, matching the OPD-CA-2 (7) concept. A total score is obtained from all items to quantify a general severity level of structural impairment. Good scale reliabilities are reported with Cronbach's alpha 0.98 on total, 0.91, 0.93, 0.87 and 0.90 on primary and 0.61 to 0.85 on subscale level. Good clinical validity is reported with the total score differentiating between adolescents from a general population and a subsample of $n = 70$ patients diagnosed with PD at a highly significant level and with a large effect size of $d = 1.6$ standard deviations. The test can be requested for free for research purposes and is also available in electronic format at the project website (academic-tests.com).

The *PHQ-D* (38) detects the presence of most common mental disorders on syndrome levels. Based on 58 items, 16 diseases in five different categories (somatoform, depressive, anxiety, eating and alcohol-related disorders) are assessed. Even if the PHQ-D (38) is not capable of capturing all the information necessary for a complete diagnosis, the instrument has proven to be feasible in terms of the screening of mental disorders in previous studies [e.g., (39)]. Psychometric analyses by Gräfe et al. (40) demonstrated a high level of construct and criterion validity. The calculation of internal consistencies is considered useless, as these are only evaluated categorically and with specified jump rules [see (40)].

Data Analytic Strategy

We used SPSS 26 for statistical analyses. In order to be able to compare the results directly, the same methods and criteria were

TABLE 2 | DSQ 40 item formulations for adolescents and results for (A) face validity by expert assignments ($N = 10$, therapists) and for (B) construct validity and reliability by empirical survey ($N = 403$, adolescents). Comparison to the original item formulations for adults (28) and to results of expert assignments for adults (28, 29).**2.1 For the defense mechanisms of the adaptive defense category.**

Item	Defense mechanism/item formulation	Face validity/correct expert assignment	Correlation with patholog			r_{inter}	f_{mal}
			Structure	Depress	Somat		
X 30	1. Anticipation Adult: same Adolesc.: When I have to face a difficult situation I try to imagine what it will be like and plan ways to cope with it.	✓ 7/10 DM - 9/10 CAT				0.12*	0.36
35	Adult: same Adolesc.: If I can foresee that things are going to get bad for me, I can deal with it better.	✓ 10/10 DM - 9/10 CAT					
✓ 4	2. Humor Adult: It's not hard for me to laugh at myself. Adolesc.: It's easy for me to laugh at myself.	✓ 9/10 DM - 10/10 CAT	−0.25***	−0.17***		0.37***	0.60
26	Adult: same Adolesc.: I can usually also see the funny side of an otherwise painful situation.	✓ 8/10 DM - 8/10 CAT	−0.10*				
X 5	3. Rationalization Adult: I am able to find good reasons for everything I do. Adolesc.: I try to be clear about the reasons for everything I do.	✓ 9/10 DM - 3/10 CAT				0.45***	0.29
16	Adult: I always find excuses when something doesn't go well. Adolesc.: If something is not going well in my life, I analyze exactly what the reasons are until I understand it.	✓ 10/10 DM - 3/10 CAT					
✓ 3	4. Sublimation Adult: I work out my anxiety through doing something constructive and creative like painting or woodwork. Adolesc.: I get rid of bad feelings like sadness or anxiety by doing something creative or meaningful (like painting, sports, music, fixing something).	✓ 7/10 DM - 8/10 CAT	−0.28***	−0.26***	−0.20***	0.33***	0.49
38	Adult: Sticking to my current task helps me to keep away from feelings of sadness or anxiety. Adolesc.: If I focus on my tasks, it helps me against feelings of sadness or anxiety.	✓ 3/10 DM - 5/10 CAT		−0.15**			
✓ 2	5. Suppression Adult: I'm able to keep a problem out of my mind until I have time to deal with it. Adolesc.: I can block out my worries and problems when I have something important to do until I have time to deal with it.	✓ 6/10 DM - 7/10 CAT	−0.22***	−0.15**		0.44***	0.60
25	Adult: I can put my feelings on the back burner if they would hinder me in my current activity. Adolesc.: I can suppress my feelings if they would interrupt or hinder what I am currently doing.	✓ 5/10 DM - 2/10 CAT					

2.2 For the defense mechanisms of the neurotic defense category.

X 11	6. Acting Out Adult: I often act quite suddenly and impulsively when something worries me.	✓				0.32***	0.05
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(Continued)

TABLE 2 | Continued

Item	Defense mechanism/item formulation	Face validity/correct expert assignment	Correlation with patholog			r_{inter}	f_{mal}
			Structure	Depress	Somat		
20	Adolesc: When something worries me a lot or burdens me, I often act quite suddenly and without thinking.	7/10 DM–2/10 CAT	0.34***	0.18***			
	Adult: I get openly angry and aggressive when I feel hurt.	✓					
	Adolesc: When I feel hurt or offended, I also directly do something hurtful or aggressive.	7/10 DM–3/10 CAT	0.36***	0.17***	0.10*		
X	7. Pseudoaltruism					0.21***	0.68
39	Adult: If I were in a crisis, I would talk to someone who had a similar problem.	1/8 (Chabrol) Elimin. (Sch.)					
	Adolesc: If I were in a crisis, I would look for people who have similar problems to find solutions together and let others benefit from my experience.	3/10 DM–2/10 CAT					
1	Adult: It is important for me to help others. When I am no longer able to do that, I get depressed.	✓					
✓	Adolesc: It is so fulfilling and important for me to help others that I need such a task in my life.	10/10 DM–6/10 CAT					
	8. Idealization					0.24***	0.36
21	Adult: I always know someone who I see as flawless and ideal.	✓					
24	Adolesc: I have often had the feeling that someone I know is like a guardian angel.	8/10 DM–6/10 CAT	0.12*				
	Adult: I know someone who can achieve anything and who is 100% fair and just.	✓					
✓	Adolesc: I know someone who I am sure can achieve anything and is 100% fair and just.	8/10 DM–5/10 CAT					
	9. Reactive Formation					0.24***	0.55
7	Adult: If someone were to mug me and rob me, I would be more in favor of helping him than punishing him.	Below criteria (Sch.)					
28	Adolesc: If someone, for example, mugs me and robs me, I would like it better if they got help instead of being punished for it.	4/10 DM 9/10 CAT					
	Adult: I often find myself being very nice to people who by all rights I should be angry at.	Below criteria (Sch.)					
✓	Adolesc: I've realized many times that I'm very nice to people who I should be perfectly angry at.	7/10 DM–9/10 CAT	0.31***	0.14**	0.18***		
	10. Undoing					0.29***	0.64
32	Adult: After I fight for my rights, I tend to apologize for my assertiveness.	2/8 (Chabrol)					
40	Adolesc: When I've had to clearly stand up for my needs or rights, I tend to apologize for my harshness afterwards.	7/10 DM–10/10 CAT	0.25***		0.15**		
	Adult: When I have an aggressive-angry thought, I feel the need to do something to compensate for it.	✓					
	Adolesc: Whenever I had an aggressive thought, I immediately feel the need to do something to make up for it.	6/10 DM–9/10 CAT	0.11*				

(Continued)

TABLE 2 | Continued

Item	Defense mechanism/item formulation	Face validity/correct expert assignment	Correlation with pathology			r _{inter}	f _{mal}
			Structure	Depress	Somat		
2.3 For the defense mechanisms of the maladaptive defense category.							
✓	11. Autistic Fantasy					0.53***	0.53
14	Adult: I get more satisfaction from my fantasies than from my real life.	✓					
	Adolesc: I experience more fulfillment and joy in my fantasies than in reality	9/10 DM–6/10 CAT	0.45***	0.33***	0.10*		
17	Adult: I work more things out in my daydreams than in my real life.	✓					
	Adolesc: I often live my life in daydreams.	2/10 DM–5/10 CAT	0.41***	0.25***	0.19***		
X	12. Denial					0.09	0.43
8	Adult: People say I often bury my head in the sand. They say, I tend to ignore unpleasant facts as if they didn't exist.	✓					
	Adolesc: I've been told many times that I would ignore unpleasant facts as if they didn't exist.	7/10 DM–2/10 CAT	0.31***	0.15**	0.14**		
18	Adult: I fear almost nothing.	✓					
	Adolesc: I am not afraid of whatever.	6/10 DM–5/10 CAT		–0.11*	–0.10*		
X	13. Dissociation					0.23***	0.03
9	Adult: I don't pay attention to danger as if I was invulnerable.	1/8 (Chabrol), Elimin. (Sch.)					
	Adolesc: I rather don't pay attention to dangers because I have a strong and secure feeling that nothing will happen to me.	0/10 DM– 2/10CAT					
15	Adult: I've special talents that allow me to go through life with no problems.	0/8 (Chabrol), Elimin. (Sch.)					
	Adolesc: I feel I can go through life without much trouble because I am gifted or protected in a special way.	0/10 DM–3/10 CAT	–0.24***	–0.25***	–0.14**		
✓	14. Isolation					0.31***	0.46
34	Adult: I'm often told that I don't show my feelings.	3/8 (Chabrol)					
	Adolesc: I've been told many times that I don't show my feelings or that I have a "poker face.	7/10 DM– 1/10 CAT	0.34***	0.21***	0.13*		
37	Adult: Often I don't feel much in a situation where strong feelings arise in others.	✓					
	Adolesc: Most of the time, I don't feel very much in "emotional" situations that would bring up strong feelings in others	6/10 DM–4/10 CAT	0.23***	0.16***			
X	15. Deevaluation					–0.05	0.58
10	Adult: I pride myself on my ability to cut people down to size.	0/8 (Chabrol), Elimin. (Sch.)					
	Adolesc: I am able to really take someone down when I think it is appropriate.	4/10 DM–6/10 CAT	0.12*				
13	Adult: am very restrained when I approach other people.	0/8 (Chabrol), Elimin. (Sch.)					
	Adolesc: I am a very inhibited person.	1/10 DM–2/10 CAT	0.40***	0.18***			
X	16. Displacement					0.13**	0.57
31	Adult: Doctors never really understand what is wrong with me.	0/8 (Chabrol), Elimin. (Sch.)					
	Adolesc: Even when I go to doctors, their advice or therapies do not help me.	0/10 DM–5/10 CAT	0.45***	0.29***	0.16**		
33	Adult: When I'm depressed or anxious, eating makes me feel better.	1/8 (Chabrol), Elimin. (Sch.)					
	Adolesc: When I'm sad or anxious, I start eating.	5/10 DM–3/10 CAT	0.23***	0.19***	0.17***		
X	17. Passive Aggression					0.15**	0.66

(Continued)

TABLE 2 | Continued

Item	Defense mechanism/item formulation	Face validity/correct expert assignment	Correlation with patholog			r_{inter}	f_{mal}
			Structure	Depress	Somat		
23	Adult: When my boss annoys and rebukes me, I make a mistake in my work or work slower to get back at him. Adolesc: If my teacher or supervisor has annoyed me, I may be more likely to make mistakes or work more slowly, like as "compensatory justice".	✓ 7/10 DM–1/10 CAT	17***				
36	Adult: No matter how much I describe my concerns, I never get a reasonable answer. Adolesc: Even when I can accurately describe my concerns, I usually feel like I don't get a reasonable or satisfying answer from the person I'm talking to	3/8 (Chabrol) 0/10 DM–4/10 CAT	0.54***	0.29***	0.22***		
✓	18. Projection					0.41***	0.70
6	Adult: Everyone is against me. Adolesc: People often behave unfairly toward me or treat me badly.	2/8 (Chabrol) 7/10 DM–1/10 CAT	0.52***	0.28***	0.23***		
29	Adult: I always get treated unfairly. Adolesc: I know from experience that somehow there will always be obstacles or arguments for me, as if "kick me" were written on my forehead.	3/8 (Chabrol) 7/10 DM–4/10 CAT	0.53***	0.33***	0.21***		
✓	19. Somatization					0.48***	0.54
12	Adult: I get physically ill when things aren't going well for me. Adolesc: I tend to get physically ill when things are not going well for me.	✓ 10/10 DM–4/10 CAT	0.40***	0.22***	0.25***		
27	Adult: I get a headache when I have to do something I don't like. Adolesc: I automatically get a headache (or similar) when I have to do things I don't like.	✓ 10/10 DM–4/10 CAT	0.44***	0.22***	0.28***		
✓	20. Splitting					0.20***	0.54
19	Adult: same Adolesc: Sometimes I think I am good like an angel and other times I think I am bad and evil like a devil.	✓ 7/10 DM–10/10 CAT	0.42***	0.21***	0.20***		
22	Adult: As far as I'm concerned, people are either good or bad. Adolesc: I am convinced that people are either good or bad.	✓ 9/10 DM–10/10 CAT	0.15**		0.13*		

Defense mechanism with both items was X = not selected or ✓ = selected for the final test version

Adult = english translation of the item formulations in DSQ 40 German version (28) Adolesc. = age-adapted formulations of the items for adolescents

DM = Defense Mechanism – CAT = Defense Category

✓ = no problems with face validity were reported in Chabrol et al. (29) or Schauenburg et al. (28)

e.g., 5/10 = number of correct classifications in relation to the number of experts.

Structure = OPD-CA2-SQ total score of structural impairment; Depress = PHQ-D depression score; Somat = PHQ-D somatic symptoms score

r_{inter} = intercorrelation of the two items assigned to the same defense mechanism; f_{xy} = factor loading on the theoretically assigned factor; ad = adaptive; neur = neurotic; mal = maladaptive; red = below criteria. significance $p^* = 5\%$, $** = 1\%$, and $*** = 0.1\%$ level.

used as in the studies on the adult versions DSQ-40 by Chabrol et al. (29) and Schauenburg et al. (28).

For each item it was counted how often a) the mechanism and b) the maturity category were correctly assigned by the experts. Based on the criteria in Chabrol et al. (29) and Schauenburg et al. (28), the face validity should be at least 40%, 70% correct classification should be aimed for. Pearson correlations were calculated for the item pairs per mechanism as indicators of shared content and reliability, following the 2-item method of the

original authors. Going beyond the criteria of Schauenburg et al. (28), the correlations should be not only significant but highly significant (0.01% level) and around 0.30 or higher in order to denote a substantial relationship (medium effect size $r > 0.30$). Accordingly, factor loadings should be at least > 0.30 (better > 0.40) on the theoretically assigned factor (adaptive, neurotic, maladaptive) in Exploratory Factor Analyses (PCA, Varimax rotation) restricted to three components, matching Schauenburgs et al. (28) approach. In order to set an additional and new focus in

the assessment of the quality and the final selection of the items, the reference to pathology was directly included. Each item was supposed to ideally have a significant correlation with the total score of structural impairments [OPD-CA2-SQ; (12)] or with the score for depression or somatic symptoms [PHQ-D; (38)] in order to meet the actual purpose of assessing DM in the context of e.g., expert opinions or therapy planning, namely to derive a reference to pathological or healthy behavior.

The final selection of item pairs was based on a synopsis of all the above criteria. The resulting scales were analyzed concerning their scale reliability Cronbach's Alpha, their convergent and clinical validity by Pearson correlations with all scales and subscales of personality structure and pathology as well as their potential to discriminate between adolescents with and without pathology according to the PHQ-D (38), evaluated by using the effect size measure of Cohen's *d*.

RESULTS

Face Validity of the Items in the Expert Test

To enable a thorough discussion on construct validity, **Table 2** shows the formulations and detailed results for all items in contrast to the original formulations for adults. To facilitate result interpretation, mean correct attributions of the items to the DM and categories by the experts are reported in the following.

All ten items to assess adaptive DM in adolescence showed a good (70% correct attributions, reached by 4/10 items) or sufficient (> 40% correct attributions, 6/10 items) face validity in the expert rating. This matched with the results for the original items for adults reported in Chabrol et al. (29) and Schauenburg et al. (28). However, both items to represent the mechanism "Rationalization" (items 5, 16) and one item of "Suppression" (item 25) had been misjudged as neurotic by the majority of the experts (70–80%) and were, thus, regarded as maladaptive instead of adaptive.

From the ten items representing neurotic DM, only one item showed insufficient face validity (< 40% correct attributions): item 39 from the mechanism "Pseudoaltruism" was only correctly attributed by 30% of the experts, 60% even attributed it to the category adaptive instead of maladaptive. This matched with the face validity in the adult samples, Chabrol et al. (29) as well as Schauenburg et al. (28) had eliminated this item because of weak face validity. From the remaining nine items, five items showed good and four items showed sufficient face validity, while both items of the mechanism "Reactive Formation" (items 7, 28) and one item of "Undoing" (item 32) showed improved coefficients compared to the study on the adult formulations. Concerning the higher-level category, both items to represent the mechanism "Acting Out" (items 11, 20) had been misjudged as maladaptive instead of neurotic, i.e. were attributed to a higher level of immaturity.

From the twenty items representing maladaptive DM, only five items showed a good face validity and eight items showed a sufficient face validity in the expert rating. Highly similar to the adult version, both items of the mechanism "Dissociation" (items 9, 15) had never been attributed correctly (0/10 experts). For both the mechanisms "Devaluation" and "Displacement",

one of the each two items showed substantially improved face validity, going together with strong reformulations of the items in order to suit adolescent self-report. Likewise, both items of the mechanism "Projection" (items 6, 29) showed improved face validity compared to the Chabrol et al. (29) study, going along with strong reformulations.

Reliability and Construct Validity of the Items in the Adolescent Sample and Final Item Selection

In order to evaluate the total psychometric quality of an item and decide on its final rejection or selection, all four established quality criteria were evaluated in a synopsis. Ideally, an item should show both good face validity in the expert test and a highly significant and substantial intercorrelation with the partner item and a significant correlation with an external criterion for psychopathology in the assessments with adolescents in the school and clinic study. In addition, the DM formed by using the each item should show a substantial factor loading on the theoretically assigned factor (adaptive, neurotic, maladaptive). **Table 2** shows all coefficients for all items and defense mechanisms. In the following, summarized results per defense category are reported.

From the ten items representing adaptive DM, which are assumed to speak for healthy development, only five items showed significant negative correlations with at least one score denoting pathological development, i.e., impaired structure [OPD-CA2-SQ; (12)], depression [PHQ-D; (38)], or somatic symptoms [PHQ-D; (38)]. Four of five item pairs showed sufficient intercorrelation (except Anticipation), four of five item pairs produced a sufficient loading of the DM on the assigned higher-order factor adaptive (except Rationalization).

From the ten items to assess neurotic DM in adolescence, six showed significant positive correlations with the external pathological variables. Only one of five item pairs met the criteria for sufficient intercorrelation. However, the remaining four at least reached highly significant intercorrelations above 0.20. Four of the five built DM showed a sufficient loading on the assigned higher-order factor neurotic (except Acting Out).

From the twenty items representing maladaptive DM, seventeen showed positive correlations with psychopathology, most of them even highly significant. However, two items showed negative correlations with impaired structure, depression and/or somatic symptoms and, thus, do not match the attempt to capture a dysfunctional construct. Only four of ten item pairs met the criteria for sufficient intercorrelation. Two more item pairs reached at least highly significant intercorrelations above 0.20. However, the remaining four item pairs showed insufficient intercorrelations between -0.05 and 0.15 . In contrast, nine of the ten built DM showed a sufficient loading on the assigned higher-order factor maladaptive (except Dissociation).

Altogether, only for two DM and their items all criteria were met perfectly (Humor, Somatization). Thus, for the selection of the items to establish the final version of the test, we allowed minor shortfalls in one of the criteria if all other criteria were met (see **Table 2**). For example, two items (27, 40) of the category

TABLE 3 | *DSQ-22-A* factor loadings >0.30 of the selected 11 defense mechanisms.

	1 = adaptive	2 = neurotic	3 = maladaptive
Humor	0.61		
Sublimation	0.66		
Suppression	0.75		
Idealization		0.72	
Reactive Formation		0.56	0.32
Undoing		0.71	
Autistic Fantasy			0.73
Affect Isolation	0.42		0.60
Projection			0.68
Somatization		0.36	0.51
Splitting		0.39	0.33

Bold: considered defense mechanisms for the respective defense category.

adaptive showed a face validity in the expert test below the criteria of 40% correct assignment, but only either in the concrete DM or in the higher-order defense category, while all other criteria concerning item intercorrelation, relation to pathology and factor loading were met. Similarly in the category neurotic, three intercorrelations of item-pairs to represent a joint DM were highly significant but slightly below the criteria > 0.30 (0.24, 0.24, 0.29) while all other criteria were met.

The result was a final version *DSQ-22-A* for adolescents, capturing 11 DM with 22 Items with sufficient psychometric quality.

Scale Reliability, Construct and Clinical Validity of the Selected Version *DSQ-22-A*

The finally selected version *DSQ-22-A* contains each three DM to cover adaptive and neurotic defenses and five DM to cover maladaptive defenses. In an exploratory factor analysis matching the approaches taken with the adult versions (PCA, Varimax, restricted to 3 components), the 11 DM explained 48.4% of the variance, the factor loadings matched the theoretically assigned scale structure of adaptive, neurotic and maladaptive to a great extent (see **Table 3**).

The higher-order scales adaptive, neurotic and maladaptive – as a sum of the each assigned items – showed sufficient scale reliabilities Cronbach's Alpha with 0.63, 0.56 and 0.68, respectively (see **Table 4**). No significant score differences were obtained according to sex in the scales neurotic and maladaptive. For the scale adaptive the differences were significant on 1% level but with only a small effect size, thus, sex was not incorporated as potential factor in the further analyses. In terms of a reasonable convergent and clinical validity, the defense scale adaptive showed negative correlations with the external variables denoting psychopathology “impaired structure” [OPD-CA2-SQ; (12)], “depression” [PHQ-D; (38)] and “somatic symptoms” [PHQ-D; (38)] in the mixed sample from schools and clinics of $n = 396$ adolescents. The correlations were highly significant but reached only small effect sizes. Similarly, the defense scale neurotic showed positive significant correlations with

pathology but only between 0.10 and 0.25. In contrast, the defense scale maladaptive showed not only highly significant but also remarkable correlations with psychopathology, especially with impaired structural impairment (0.75) assessed using the psychodynamic OPD-CA-2 concept [OPD-CA2-SQ; (12)]. When contrasting the scale scores between the school sample ($n = 261$) and the clinic sample of patients ($n = 135$), the defense scale maladaptive showed the highest clinical validity in terms of differentiating the two given groups highly significant and with a large effect size of $d = 0.9$ standard deviations. The defense scale adaptive was able to discriminate between the school and clinical sample highly significant with a medium effect size, while the defense scale neurotic showed no sufficient result in this analysis on clinical validity.

To analyze the covariation between the defense scales and the psychodynamic concept of personality structure assessed with the OPD-CA2-SQ (12) in more detail, correlations were calculated for all primary scales and subscales of the OPD-CA-2 (7) concept (see **Table 5**). The result pattern was stable on primary and subscale level: adaptive defense correlated negative with the scales denoting impairment in structure, whereas neurotic and maladaptive defenses showed positive correlations with impairments. However, on subscale level interesting differences were obtained. For example, adaptive DM showed the least covariation with the structural concepts of coherence (−0.06), emotional contact (−0.07), empathy (−0.07) and attachment relationships (−0.05), originating from different primary scales. Similarly, the correlational pattern showed a range from 0.00 to 0.27 between the defense category neurotic and the subscale level of structural impairment. The defense category maladaptive consistently showed highly significant correlations with all subscales that mostly reached large effect sizes.

DISCUSSION

The attempt to adapt the traditional concept of DM to adolescents as young as 12 years of age in self-report with similar psychometric properties compared to adults can be considered successful. This applies to both the face validity in an expert test as to the reliability of the items and higher-order factors and their clear references to psychopathology. Based on an age-adapted version of the *DSQ-40* with simplified formulations, a reliable and valid test version for adolescents with 22 items (*DSQ-22-A*) assessing 11 DM could be built as a result of a thorough empirical item analyses and selection.

The expert test to evaluate the *face validity* of the items showed very similar results for the German adolescent version compared to the results for the adult versions in English (29) and in German language (28), to which we referred in detail. Out of the 40 items of the research version that had been reformulated to be easier to understand for adolescents, only seven items showed a substantially different result concerning being correctly attributed to the theoretically assigned DM. Of those, six items showed improved face validity. Thus, a little improvement in face validity could be reached by using simplified formulations. However, altogether only fourteen of the 40 items showed a

TABLE 4 | Basic psychometric properties of the *DSQ-22-A* scales, reliabilities Cronbach's Alpha (α), Pearson correlation (r) with related scales, effect size Cohen's d of group differences in ANOVA.

DSQ-22-A Scale	No items	α	Correlation r with related concepts			Difference according to PHQ-D health status				
			Structure	Depress	Somat	Healthy $n = 261$		Impaired $n = 135$		
						M (SD)		M (SD)	F	p
adaptive	6	0.63	−0.28***	−0.25***	−0.14**	31.1 (7.6)		27.2 (8.8)	21.888	0.000***
neurotic	6	0.56	0.25***	0.10*	0.14**	21.2 (8.7)		23.0 (8.4)	3.618	0.058
maladaptive	10	0.68	0.75***	0.44***	0.34***	22.2 (10.4)		32.8 (13.8)	73.707	0.000***

n , sample size; M , Mean; SD , standard deviation; F , statistical test variable.

effect size: $r > 0.10$ small, > 0.30 medium, > 0.50 strong; effect size: $d > 0.20$ small, > 0.50 medium, > 0.80 large.

significance $p^* = 5\%$, $** = 1\%$, $*** = 0.1\%$ level.

very good face validity with at least 70% correct attributions by the experts. This consistency in result patterns concerning face validity across different languages and age groups could be taken as an opportunity to intensively re-discuss the theoretical foundations of the DSQ questionnaire family.

Based on an assessment at 396 adolescents we analyzed further psychometric properties in detail to perform an empirical *item selection* considering several coefficients in a synopsis: (a) good face validity in the expert test with at least 4/10 correct assignments of items to DM or defense category by the experts, (b) highly significant and substantial intercorrelation with the partner item, (c) significant correlation with an external criterion for psychopathology and d) substantial and highest factor loading > 0.30 on the theoretically assigned factor (adaptive, neurotic, maladaptive). Based on this, a total of 22 items forming 11 DM with sufficient psychometric quality could be selected.

Giving up the 2-item-method per DM, more items could have been selected in total to build the higher-order scales adaptive, neurotic and maladaptive. At least six items with sufficient psychometric properties, when evaluated without regard to the intercorrelation with the paired item, could have been additionally integrated. Thus, six further DM could have been represented with at least one item in the final assessment tool (Anticipation, Pseudoaltruism, Denial, Deevaluation, Displacement, Passive Aggression) that now are eliminated. Vice versa, already in the original version of Andrews et al. (25), according to Schauenburg et al. (28), some items showed insufficient content validity but were kept in the test just in order to match the 2-item-method per DM, weakening the reliability of the scales in total.

In line with Schauenburg et al. (28) and Chabrol et al. (29) we tested the adequateness of a 3-factor solution as postulated for the DSQ-40 by the original authors. The 11 DM – build of the selected item pairs – showed factor loadings that matched the theoretically assigned scale structure of adaptive, neurotic and maladaptive to a great extent and met the criteria (> 0.30). Except one (Splitting with 0.33), all DM showed their highest loading (between 0.51 and 0.71) at the assigned factor, together 48.4% of the variance was explained.

The *scale reliabilities* of the finally selected *DSQ-22 A* can be considered as adequate to good, compared to the other DSQ versions also using the 2-item-method for building the

single DM (21, 25, 36). For the defense category adaptive (six Items) we obtained a Cronbachs Alpha of 0.63, for neurotic (six Items) of 0.56 and for maladaptive (ten items) of 0.68. Although it is possible to consider using Spearman-Brown instead of Cronbach's alpha to calculate the scale reliabilities (41) for those 2-item-method DM, we kept to the methods used by other authors in order to compare the results directly. Other studies also found the highest scale reliability for the maladaptive defense category, followed by the adaptive and neurotic defense category. For the maladaptive defense category, the scale reliability of the *DSQ-22-A* is slightly below the values of other studies [(25): 0.80; (21): 0.78; (36): 0.75], however, meeting the criteria. Concerning the neurotic defense category, other studies also only achieved values < 0.60 [(25): 0.58; (21): 0.60; (36): 0.60]. For the adaptive defense category, the *DSQ-22-A* actually showed similar coefficients compared to the other studies on adolescent samples [(21): 0.62; (36): 0.58]. A modified version of the DSQ for adolescents with a different number of items per DM (31) did show mostly lower scale reliabilities compared to the *DSQ-22-A* (mature: 0.52, neurotic: not reported, immature: 0.81).

Convergent validity of the *DSQ-22-A* could be shown by significant correlations between the defense scales and related scales of psychopathology in terms of “impaired structure” [OPD-CA2-SQ; (12)], “depression” and “somatic symptoms” [PHQ-D; (38)]. The defense categories correlated with impairments in personality structure according to the theoretical expectation (the adaptive defense category correlated negative with impairments, the neurotic and maladaptive defense categories correlated positive). Especially the maladaptive defense category showed high relations to the three measures of psychopathology, highest with impaired structure (0.75, 0.44, 0.34). This is in line with theory, as it is assumed that that a low integrated structural level is associated with the use of immature DM (7). Also these findings are in concordance with the results by Ruutu et al. (21), who found the strongest associations between the immature defense category and psychopathology (psychiatric symptoms: 0.65; adaptation: −0.54), whereas the associations to the other defense categories showed only small to medium effect sizes. Compared to the results of Giovazolias et al. (36), who used the DSQ-40 in their adolescent sample and found only small effect sizes for convergent validity, the *DSQ-22-A* showed

TABLE 5 | Pearson correlation (*r*) of the *DSQ-22-A* scales with all scales and subscales of *OPD-CA2-SQ*.

OPD-CA2-SQ scales	DSQ-22-A scales		
	adaptive	neurotic	maladaptive
Total score: impairment in personality structure	−0.28***	0.25***	0.75***
1. Control	−0.31***	0.24***	0.67***
1.1 Impulse control	−0.18***	0.17***	0.53***
1.2 Affect tolerance	−0.34***	0.26***	0.55***
1.3 Conscience formation	−0.21***	0.13**	0.50***
1.4 Self-worth regulation	−0.27***	0.21***	0.60***
2. Identity	−0.22***	0.24***	0.72***
2.1 Coherence	−0.06	0.18***	0.60***
2.2 Self-experience	−0.26***	0.20***	0.58***
2.3 Self-object differentiation	−0.22***	0.24***	0.57***
2.4 Object experience	−0.14**	0.24***	0.55***
2.5 Belonging	−0.17***	0.09	0.54***
3. Interpersonality	−0.24***	0.23***	0.72***
3.1 Fantasies	−0.34***	0.20***	0.57***
3.2 Emotional contact	−0.07	−0.00	0.45***
3.3 Reciprocity	−0.12*	0.10*	0.57***
3.4 Affective experience	−0.18***	0.24***	0.58***
3.5 Empathy	−0.07	0.21***	0.59***
3.6 Ability to detach oneself	−0.25***	0.26***	0.34***
4. Attachment	−0.32***	0.21***	0.67***
4.1 Access to attachm. represent.	−0.22***	0.16***	0.58***
4.2 Secure internal basis	−0.33***	0.27***	0.58***
4.3 Capacity to be alone	−0.33***	0.15**	0.30***
4.4 Use of attachment relationships	−0.05	0.02	0.47***

Effect size: $r > 0.10$ small, > 0.30 medium, > 0.50 strong; significance $p^* = 5\%$, $** = 1\%$, $*** = 0.1\%$ level.

medium to strong effect sizes for the defense scale maladaptive in the adolescent sample.

To our knowledge, this is the first study to use personality structure as an external criterion for evaluating the convergent validity of a *DSQ* version. Such an analysis was urgently needed against the background of the described close connection of the psychodynamic construct “personality structure” and the concept “personality functioning” and its relevance in the new dimensional diagnosis of PD [ICD-11; (3)]. Thus, we analyzed the correlational patterns in detail not only on total scale but also on primary and subscale level. Interestingly, the DM of the adaptive and neurotic defense categories showed very diverse

correlational pattern with the subdimensions of personality structure. For example, it seems controversial in terms of content that the adaptive defense category is little (small effect sizes) correlated with empathy (−0.07) and emotional contact (−0.12) (both subdimensions of the dimension interpersonal) and use of attachment relationship (−0.05) (subdimension of the dimension attachment), but more clearly (medium effect sizes) with affect tolerance (−0.34) (subdimension of the dimension control), fantasies (−0.34) (subdimension of the dimension interpersonal) as well as with secure internal basis (−0.33) and capacity to be alone (−0.33) (both subdimensions of the dimension attachment). These detailed covariations might inform the discussion of a revised formulation of some items to represent the core of healthy vs. problematic DM. However, the maladaptive defense category consistently showed highly significant correlations with mostly large effect sizes with all subscales of personality structure. This indicates a high covariation between the two psychodynamic concepts in terms of impaired personality functioning.

Regarding the *convergent validity*, the maladaptive defense category in particular was able to differentiate highly significant between the school and clinical sample with a large effect size of $d = 0.9$ standard deviations. The adaptive defense category discriminated between the both groups highly significant with a medium effect size of $d = 0.5$ standard deviations, while the neurotic defense category showed no sufficient clinical validity. This finding is consistent with similar studies, e.g., in the original publication by Andrews et al. (25) the mature and immature defense categories showed higher effect sizes than the neurotic defense category according the discrimination between a clinical and a healthy sample. Studies focusing on adolescent samples also reported less differentiation between clinical and school samples by the neurotic defense category compared to the other defense categories (21, 31). Giovazolias et al. (36) also showed in a logistic regression analysis that only the immature and mature defense categories predicted wellbeing, bullying behavior and victimization in a nonclinical sample in a statistically significant manner, albeit with small effect sizes.

There are several considerations how psychometric properties of assessment tools to capture DM might be improved in general. First, for those DM with consistently weak face validity, completely new formulations might be discussed. E.g., the two items representing the clinically important DM Dissociation do not seem to capture the theoretically described content of this aspect at all (in the adult as well as in the adolescent version). Likewise, all DM that were rejected because of their insufficient face validity (e.g., Devaluation, Displacement, Passive Aggression) might be openly discussed and reformulated in a way that would fit better to the underlying descriptions focusing related pathological behavior. Second, a reasonable consideration for improving the psychometric properties of the *DSQ* family of questionnaires might be whether the 2-item method should be abandoned. It could be analyzed to what extent an increase in the number of items per DM would improve the questionnaire. In this context it would also be reasonable to consider whether only the power DM with good reliability should be included and operationalized at all in order to provide a shorter questionnaire.

Most importantly, it would be reasonable to make a restriction to those DM that are clearly related to psychopathology. Thus, it should be considered to omit the neurotic defense category, as this showed the poorest results concerning reliability and especially clinical validity. This would lead to retaining only the adaptive and the maladaptive category. In principle, it would be possible to derive a different version of the DSQ-A from the current study that contains all reliable and valid items of only these categories. However, with the DSQ-22-A we provide a youth-specific version of the DSQ with sufficient psychometric quality.

Some *limitations* should be noted with respect to the present study. First, it is a cross-sectional study. In the future, longitudinal studies should be performed to test clinical validity in terms of predictability of specific symptomatology, especially in interaction with impairments in personality functioning in adolescents. Moreover, the present study used a German sample. It is possible that culture-specific aspects influence the applicability of certain DM. However, this seems unlikely given the numerous translations of the DSQ with very similar result patterns. Since the clinical group consists of adolescents with a variety of psychiatric symptomatology, homogeneity is limited and generalization to specific groups of patients is not possible. On the other hand, mixed forms and multiple diagnoses in relation to mental disorders correspond to clinical reality [e.g., (42)]. Moreover, it must be taken into account that both groups in the present study included more girls than boys. In addition, there were significant age differences between the two groups, so that representativeness might be limited. Future studies might therefore cross-validate the obtained score levels, for example by assign all adolescents of a representative school. Finally, the use of the PHQ-D (38) as a self-assessment tool to assess mental health is not optimal but was chosen due to economic reasons. Future studies should include, at least for the clinical sample, the use of clinical structured interviews as the gold standard of clinical diagnosis (38). However, the PHQ-D (38) already proved its worth in other studies concerning the screening of mental disorders in adolescents [e.g., (42)].

Overall, the DSQ-22-A comprises reliable and valid item pairs and shows adequate covariations with psychopathology in adolescents comparable to the DSQ-40 (25) or the DSQ of Schauenburg et al. (28) for adults. In its current design, it can be used in adolescent samples in German-speaking countries with preliminary population norms. In the light of the new

diagnostic guidelines for PD in the upcoming ICD-11, following a dimensional severity concept which allows the assessment of several domains of personality functioning already from early adolescence, the assessment of DM may inform clinical decision making and therapy planning. Especially immature defense mechanisms assessed with the DSQ-22-A may help to understand specific aspects of impaired personality structure which can be regarded as “the psychodynamic twin” of the concept of personality functioning.

All 11 DM assessed by the DSQ-22-A can be used for research on defense mechanisms with adolescent samples from 12 years up. For future developments, however, the basic operationalization's and the number of relevant DM should be discussed internationally. The detailed information regarding the psychometric properties of the item pool used for building the DSQ-20-A in this publication might be a good basis for this purpose.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the participants of this study did not agree for their data to be shared publicly. Requests to access the datasets should be directed to lea.sarrar@medschool-berlin.de.

ETHICS STATEMENT

The study involved human participants and was reviewed and approved by Research Ethic Board at the MSB Medical School Berlin. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

LS and KG contributed to conception and design of the study and wrote sections of the manuscript. LS organized the database. KG performed the statistical analysis. All authors contributed to manuscript revision, read, and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsy.2022.866837/full#supplementary-material>

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Preschool Temperament as a Factor of Risk and Protection for Later Childhood Psychopathology

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Background: Temperament might be considered as a risk factor as well as a resilience factor for later externalizing and internalizing disorders. Therefore, this study examines different dimensions of temperament in preschool age with regard to their predictive value for psychopathology later in childhood.

Methods: A total of 76 patients (63.2% male) were assessed in a special psychiatric consultation for preschool age at measuring point time t1 ($x = 4.2$) and measuring point time t2 ($x = 9.2$). At t1, the Integrative Child Temperament Inventory (ICTI) was used for assessment. At t2, parents completed the Strengths and Difficulties Questionnaire SDQ. Multiple regression analyses were used to test if the temperament factors of the ICTI predicted clinical abnormalities in the SDQ subscales or total difficulties score.

Results: SDQ total difficulties score as an indicator of total psychiatric disturbance in childhood appears to be good predicted by the temperament factor frustration/anger. Sensory sensitivity in preschoolers serves as a risk factor for later emotional symptoms, whereas high activity levels appear to prevent later emotional symptoms. Behavioral inhibition appears to protect against hyperactivity/inattention.

Conclusion: Our data suggests that preschool temperament contributes differently to the development of externalizing and internalizing problems in childhood. The temperament factor frustration/anger in preschool children might be a strong predictor of the general mental condition in childhood at nine years of age and can therefore be used as a target for prevention of psychopathology in children. On one hand, high sensory sensitivity can be a predictor to identify preschool children at risk for later emotional symptoms, on the other hand, activity level acts as a protective factor against later emotional symptoms. An increased level of behavioral inhibition might be protective against the development of hyperactivity/inattention symptoms. Overall, this study illustrates the complexity and ambiguity of temperament in child development.

Keywords: temperament, risk factor, resilience factor, mental health, psychopathology

INTRODUCTION

Definitions and Theories

Temperament conceptualizes individual differences in affective, motor, attentional, and sensory reactivity that have a biological basis and provide the foundation for later personality (1). Numerous approaches to child temperament have been proposed (2–6). Thomas and Chess (6) argued that “temperament can be equated with the term *behavioral style*.” Thus, it refers to the *how* rather than the *what* of behavior. In their longitudinal study, Thomas and Chess (7) identified three fundamental temperament types: the “difficult temperament,” the “easy temperament,” and the “slow-to-warm-up temperament.” Goldsmith and Campos (3) defined temperament as individual differences in the emotional domain, thereby including not only emotion but also emotion regulation. Rothbart and Derryberry (8) emphasized the role of neurobiological factors in child temperament. Following this statement, temperament involves constitutional differences in reactivity and self-regulation. While reactivity describes the biological arousability in response to changes in the environment, self-regulation describes processes that modulate this reactivity. On a behavioral level, self-regulation displays tendencies such as approach, avoidance, inhibition, and attentional self-regulation (8).

Summarizing and further developing these approaches, Zentner and Bates (9) proposed an integrative account of child temperament, according to which temperament comprises five components: frustration/anger, behavioral inhibition, activity, attention/persistence, and sensory sensitivity. Frustration/anger is defined as “negative affect in reaction to interruption of ongoing tasks or blocking of behaviors related to approach and goal attainment” [(9), p. 18]. Behavioral inhibition characterizes fear or distress responses that occur automatically in novel situations. Activity level refers to the amount of movement. Attention/persistence can also be subsumed under the term of effortful control, which refers to the “ability to inhibit a dominant response and/or activate a subdominant response, to play, and to detect errors” [(10), p. 129]. Finally, sensory sensitivity refers to the sensitivity to aversive stimuli as well as the ability to react to sensory stimuli of low stimulative value (9).

Although possible overlaps are not denied by the authors, they assume that these temperament dimensions are distinct and each of them is connected to different neural circuits.

Beyond this dimensional view of temperament, the authors also postulate a typological approach to the organization of temperament dimensions [(9), p. 23]. The three distinctive types can be described as the “undercontrolled child” (willful, restless, inattentive, impulsive), the “overcontrolled child” (shy, obedient, self-critical, liked by adults), and the “resilient child” (self-confident, able to concentrate, self-reliant and open). Considering the attributes (in brackets) related to these three types, it appears as though some temperament components are stronger associated than others. However, given the extent of possible linkages between the different components, the authors also point out that little research

has been conducted in respect of moderation between the different components.

Based on their integrative account, Zentner and Bates (9) proposed the following criteria for child temperament:

- Temperament conceptualizes individual differences in affect, activity, attention and sensory sensitivity.
- Temperament is typically expressed in response intensities, latencies, durations, thresholds, and recovery times.
- Temperament develops during the first few years of life.
- Counterparts exist in primates as well as certain social mammals.
- Temperament is linked to biological mechanisms (e.g., neurochemical, neuroanatomical, genetic).
- Temperament is characterized as relatively enduring and as the foundation for later personality as well as psychopathological outcomes, such as externalizing or internalizing problems.

Temperament and Later Psychopathology

Empirical evidence for the long-lasting stability in temperament and personality traits is provided by a longitudinal study by Caspi (11), who investigated cohorts of children ranging from 3 to 21 years. In this study, children were assigned to one of three temperament groups at age three: the well-adjusted group, the undercontrolled group and the inhibited group, which resemble the “easy temperament,” the “difficult temperament,” and the “slow-to-warm up temperament” proposed by Thomas and Chess (6), respectively. The former type is characterized by demonstrating self-control and the absence of upset when confronted with strangers or new situations; the middle is characterized by acting impulsive, restless, negativistic, distractible and liable in their emotional control; the latter is characterized by behaving socially reticent, fearful, and easily upset by strangers (6). These three temperament groups predicted adult personalities at the age of 21. Children who were classified as undercontrolled at age three were described as more impulsive and aggressive at age 18 and had more employment difficulties and interpersonal conflicts at age 21. On the other hand, children who were described as inhibited at age three were found to be more unassertive and depressed later on in life. Furthermore, they had lower levels of social support. Children, who were classified as well-adjusted at age three, were described as “normal, average young adults” [(11), p. 168].

Temperament and General Psychiatric Disturbance

While child temperament provides the foundation for later personality, it might also serve as a predictor of later psychopathology [e.g., (10)]. In a recent study, Morales et al. (12) examined whether infant temperament factors, assessed at four months of age, predict general psychopathology 7–12 years later. The authors found that higher motor activity longitudinally predicted general psychopathology. Thus, infant motor activity comprises a transdiagnostic risk factor for general psychopathology. Their finding is in line with previous

work demonstrating an associative linkage between general psychopathology and parent-reported surgency, a temperament dimension that consists of activity level, high intensity pleasure, impulsivity, and shyness (13). In addition, Włodarczyk et al. (14) found a significant relation between children's difficult temperament and the probability of them having mental health disorders.

Temperament and Emotional Problems

There are divergent understandings of emotional symptoms. We use this term consistent with the description implied by Goodman (15). Considering the five items of the emotional subscale, they reflect anxiety and depressed symptoms. Furthermore, they best predict emotional disorders (16) and thus belong to the subordinate internalizing spectrum (17). Anxiety and mood disorders are common mental disorders among childhood and adolescents (18). The prevalence of anxiety disorders among preschool aged children can be estimated as 9.4% while the prevalence of emotional disorders among preschool aged children can be estimated as 10.5–14.9% (19). Among temperament factors, behavioral inhibition can be seen as a risk factor for childhood anxiety [e.g., (20)]. Behavioral inhibition has been described as signs of uncertainty and physiological arousal in reaction to novel objects, people, or events (21, 22). Specifically, behavioral inhibition provides an important predictor for social anxiety, rather than anxiety disorders in general. For example, in a longitudinal study by Hudson et al. (23), children at age four were classified as either behaviorally inhibited or behaviorally uninhibited. The authors found that behaviorally inhibited children were more likely to meet the criteria for social phobia at age six. Atypically high levels of depressive and anxious symptoms at preschool age may be predicted by a difficult temperament at 5 months of age (24). Furthermore, Schwartz et al. (25) found that adolescents who showed behavioral inhibition at age 2 were more likely to develop symptoms of social anxiety than uninhibited peers. Moreover, sensory sensitivity is associated with emotional problems, especially internalizing problems, such as anxiety, depression and withdrawal (26, 27).

Temperament and Conduct Problems

Conduct problems comprise symptoms of the diagnostic categories of oppositional defiant disorder (ODD) and conduct disorder (CD) (28). Several studies have linked several temperament factors to conduct problems in preschool age, school age and adolescence [for a review see (29)]. Referring to the temperament concept proposed by Thomas and Chess (6), children with a “difficult temperament” are at risk for developing conduct problems later in life. For example, Olson et al. (30) found that maternal ratings of “difficult temperament” at 6 months predicted maternal ratings of conduct problems at age 17. Teachers and youth reports on the other hand did not predict these outcomes. Referring to specific temperament dimensions, infant activity level predicts conduct problems during the ages 4–8 (31) as well as during the ages 4–13 (32).

Temperament and Attention Deficit Hyperactivity Disorder

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder which is characterized by ongoing patterns of inattention and hyperactivity-impulsivity (28). It has been suggested that certain temperament traits are linked to ADHD symptoms (33, 34). For example, low effortful control (EC) is associated with ADHD symptoms in 3–6 year old children [e.g., (35)]. Furthermore, high levels of activity have been shown to predict ADHD-symptoms in preschool aged children (36) as well as school-aged children (37). Additionally, high negative affect can be considered a risk factor for ADHD (35, 37). Further investigating the dimensions of negative affect, Goldsmith et al. (38) found that anger and aggression ratings in kindergarten predicted ADHD symptoms in first graders in school. However, the relation between negative affect and ADHD symptoms might not be due to a direct linkage between these dimensions but rather due to the comorbidity of ADHD with externalizing disorders (33).

Temperament as a Protective Factor

Resilience conceptualizes “age-appropriate developmental competences in spite of repeated exposure to biological and psychosocial developmental risk factors” (39). Besides individual, family and contextual influences, temperament can be considered as an additional factor that may promote resilience in children (39). In general, children who display an “easy temperament” (6) show lower levels of behavior problems, higher levels of social competence and higher levels of adaptive behavior (39). With regard to specific temperament traits, positive emotionality is associated with higher levels of social and emotional competence and thus manifests in higher resilience (39). Furthermore, children displaying high levels of approach tendencies show less behavior problems in stressful situations compared to children with low levels of approach tendencies [e.g., (40)]. Self-regulation can also be considered a resilience factor. Higher parental ratings of self-regulation are associated with lower levels of internalizing behavior problems (41).

A closer look to the literature reveals a number of shortcomings. Most conclusions are based on cross-sectional research, focusing on only one specific symptom or disorder in a non-clinical sample. Furthermore, not all studies differentiate between temperament dimensions and even fewer consider temperament as a risk and protective factor simultaneously. This study aims at addressing these issues by examining the relation between different dimensions of child temperament and later psychopathological symptoms in a clinical sample.

MATERIALS AND METHODS

The study at hand is part of a cohort named “Preschool-Child Development Trajectory Study” with the broad goal of exploring clinical outcomes related to temperament and Emotional Dysregulation (42). We aimed to investigate

how child temperament dimensions, assessed at the age of four years, predict later psychopathology at the age of nine years. Participation in the study was voluntary and there was no financial compensation. All children and their parents gave informed consent. The local ethics committee approved the study.

Participants and Design

In the present study, we used a quasi-experimental design with two measurement points. The original sample included 148 young children who were recruited in 2012–2017 (all young children who had attended the preschool special outpatient clinic; t1) in the child and adolescent psychiatry unit (Figure 1). We are therefore working with a non-representative sample, as it is compiled of a clinical population of patients presented to our outpatient clinic. These families were contacted again at measurement time t2 (at the end of 2019) with a cover letter and a questionnaire. There was no further personal patient presentation at t2. Of the 148 participants, 25 families could not be reached at t2. Ten more families expressed no interest, and 33 families did not return the questionnaires. Of the remaining 80 participants, four were excluded due to outliers in the context of multiple regression, i.e., with more than three standard deviations. Thus, the final sample consisted of $n = 76$ (51% of the original sample). Table 1 shows the sample characteristics. The mean age at t1 was 4.17 years ($SD = 1.22$, 63.2% male, min = 1.33, max = 6.50). 93.4% of the children were diagnosed with at least one disorder according to the ICD-10. The most frequent diagnoses were Oppositional Defiant Disorder (32.89%) and Attention Deficit Hyperactivity Disorder (9.21%). IQ scores were available for 67 children at t1 and were assessed *via* different instruments, mostly WPPSI and SON-R 2½–7. IQ scores ranged from 50 to 142 ($M = 100.73$, $SD = 17.58$).

The mean age at t2 was 9.22 years ($SD = 2.02$, min = 4.67, max = 13). The sample characteristics of t2 are shown in Table 2. At t2, most children attended primary school (50%), followed by high school (19.74%), community schools (11.84%), day care (10.53%) and Waldorf schools (1.32%). Most children (68.42%) lived with their biological parents, 19.74% lived with their biological mother, 1.32% lived with their biological father (and partner), and 2.63% lived in foster care. 14.47% of the children were taking medication, including Methylphenidate (3.95%), or other (10.53%) medication (e.g., Methotrexate, Asthma spray, Melatonin).

Instruments and Procedure

Assessment of Temperament

We used the Integrative Child Temperament Inventory [ICTI; (43); German version: “Inventar zur integrativen Erfassung des Kind Temperaments”; IKT, (44)] to assess child temperament in preschool aged children at t1. Children between the age of two and eight can be assessed by parents using a six-point Likert scale. The ICTI measures five temperament dimensions using 30 items: activity level (e.g., item 23 “Is constantly moving.”), behavioral inhibition (e.g., item 22 “Is shy when meeting unfamiliar children.”), frustration/anger (e.g., item 25 “Cries or yells when asked to stop favorite occupation”), attention/persistence (e.g.,

item 28 “Is easily distracted from his/her projects”), and sensory sensitivity (e.g., item 30 “Is sensitive to noise.”). Psychometric properties can be summarized as good (45). Cronbach's alpha of the five subscales ranges from 0.70 to 0.85 (44). The test-retest reliabilities range from 0.76 to 0.86. The interrater reliability between mothers and fathers ranges from 0.50 to 0.73. Furthermore, convergent and discriminant validities were assessed by comparing the ICTI with the EAS for children (2) and the Child Behavior Questionnaire [CBQ; (46)]. With only one exception (the sensory sensitivity scale showed only a weak convergence to the CBQ scale; $r = 0.34$), these comparisons yielded high correlations.

Assessment of Psychopathology

At t2, psychopathology was assessed via the Strengths and Difficulties Questionnaire [SDQ; (15)]. The SDQ is an international screening instrument for assessing various behavioral aspects in children and adolescents aged 2–17 years. It is available free of charge on the internet in over 50 languages. The German parent version of the SDQ was used in the present work. The questionnaire consists of 25 items, which are equally divided into 5 subscales. Four of them are problem scales: emotional symptoms (e.g., item 24 “Many fears, easily scared”), conduct problems (e.g., item 5 “Often has temper tantrums or hot tempers”), hyperactivity/inattention (e.g., item 2 “Restless, overactive, cannot stay still for long”), and peer relationship problems (e.g., item 6 “Rather solitary, tends to play alone”) that can be summed up as one total problem score (total difficulties score). The remaining subscale measures prosocial behavior (e.g., item 1 “Considerate of other people's feelings”). All items are rated using a three-point Likert scale. For scoring, Goodman used a classification into inconspicuous (80%), borderline (10%), and conspicuous (10%) categories based on a British norming sample. The five scales have been proven by factor analysis in many studies (47–49). The SDQ is a well-suited instrument for assessing children's problem and prosocial behavior. The psychometric properties of the subscales have mostly satisfactory reliability and validity (15, 50–55).

Statistical Analysis

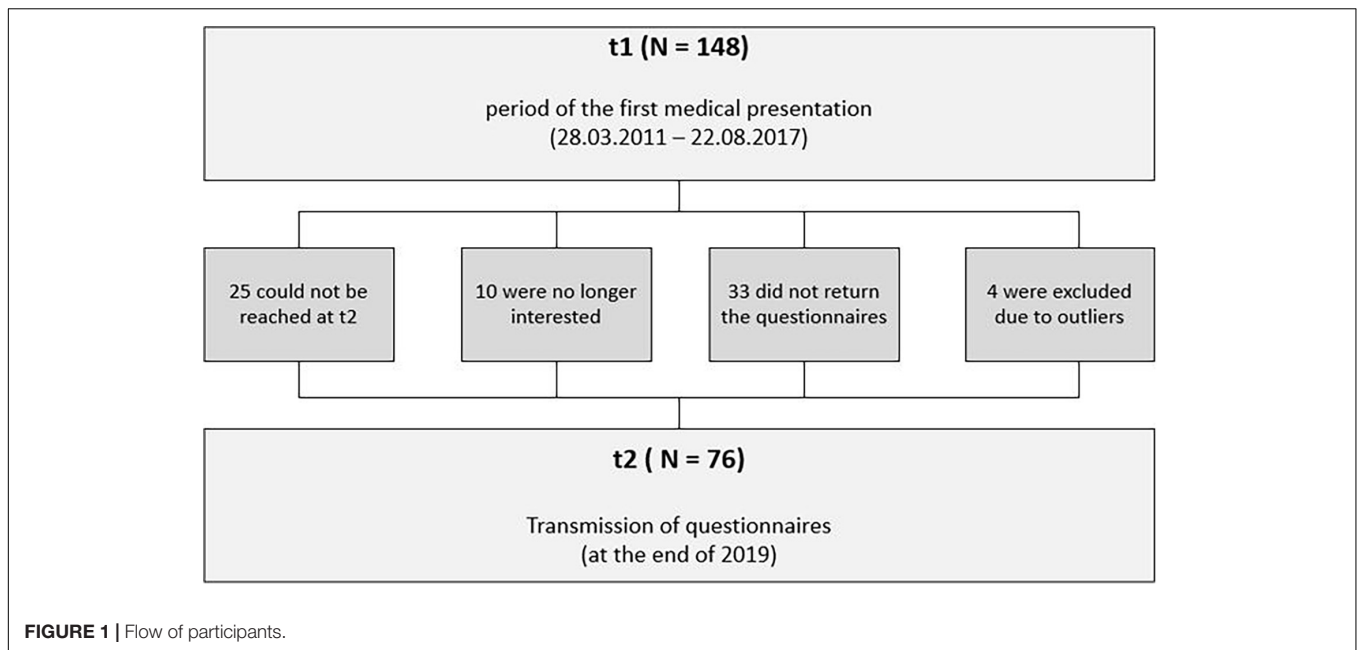
The data was analyzed with IBM SPSS Statistics, version 25. Several multiple linear regression analyses were used to develop a model for predicting SDQ total and subscale scores from temperament traits represented by ICTI's 5 subscales. A significance level of 0.05 was used for all statistical tests and all data were rounded to 2 decimal places. In case of a single missing value in a questionnaire, the rounded individual subscale mean of the respective test was used. This was necessary in 14 cases.

RESULTS

Descriptive Analysis

Integrative Child Temperament Inventory

Table 3 shows the distribution of the data of the final sample in the ICTI. It is noticeable that most children exceeded the cut off, i.e., are in the 4th quartile, in the subscale activity level ($M = 23.75$, $SD = 8.21$) (39.47%). Almost every third



child (32.89%) exceeded the cut off for the subscale frustration ($M = 22.83$, $SD = 7.18$). The values (22.37% and 21.05%) for the subscales behavioral inhibition ($M = 18.55$, $SD = 6.85$) and sensory sensitivity ($M = 18.22$, $SD = 7.34$) were somewhat lower. In between was the subscale attention/persistence ($M = 20.50$, $SD = 6.59$) with 28.95% of conspicuous children.

To control the influence of psychopathology at t1, we calculated correlations between temperament factors and internal or external diagnosis. For this purpose, a division into internal ($n = 20$) and external diagnosis ($n = 38$) had to be made. The other cases were excluded from these calculations because they were developmental ($n = 10$), unclassifiable ($n = 3$) or without diagnosis ($n = 5$). There was no correlation between internal/external diagnosis and ICT frustration [$r_{pbis}(56) = 0.21$, $p = 0.11$], between internal/external diagnosis and ICT attention/persistence [$r_{pbis}(56) = -0.16$, $p = 0.22$] and between internal/external diagnosis and sensory sensitivity [$r_{pbis}(56) = -0.12$, $p = 0.38$]. A correlation was found between internal diagnosis and behavioral inhibition [$r_{pbis}(56) = -0.30$, $p = 0.02$] and between external diagnosis and activity level [$r_{pbis}(56) = 0.36$, $p = 0.01$]. Out of five possible correlations, three were not significant, including frustration with total difficulties score, which is our main finding. Two temperament traits show a correlation that is in line with expectations.

Strengths and Difficulties Questionnaire

There were also anomalies found in the subscales and the total difficulties score of the SDQ (Table 4). It stands out that 75% of the children in the subscale peer relationship problems ($M = 4.26$, $SD = 1.16$) exceeded the cut off. In contrast, only 6.58% fell below the cut off in prosocial behavior ($M = 7.63$, $SD = 1.81$). 30.26% were conspicuous with regard to conduct problems ($M = 2.86$, $SD = 1.25$). The values for the subscales emotional symptoms ($M = 2.16$, $SD = 2.07$)

and hyperactivity/inattention ($M = 4.79$, $SD = 1.42$) were comparatively low at 15.79% and 14.47%, respectively. Overall, i.e., in relation to the total difficulties score ($M = 14.07$, $SD = 3.99$), 22.37% proved conspicuous.

Multiple Regression Analysis

Several multiple regression analysis (method enter) were used to test if child temperament traits of the ICTI and time between t1 and t2 (interim) significantly predict clinical abnormalities in the SDQ. Only the significant models are reported here. However, all results are shown in Table 5.

Integrative Child Temperament Inventory Temperament Traits Predict Strengths and Difficulties Questionnaire Total Difficulties Score

Regarding SDQ total difficulties score the five ICTI predictors explained a significant proportion of variance [$R^2 = 0.19$, $F(6, 69) = 2.71$, $p = 0.02$]. It was found that only frustration/anger significantly predicted SDQ total difficulties score [$\beta = 0.28$, $t(69) = 2.02$, $p = 0.047$]. Therefore, the final predictive model was: SDQ total difficulties score = $33.83 + (0.16 \times \text{frustration})$. The R^2 for the overall model indicates a moderate goodness-of-fit according to Cohen (56), $f^2 = 0.49$ (strong effect).

Integrative Child Temperament Inventory Temperament Traits Predict Strengths and Difficulties Questionnaire Emotional Symptoms

In addition, activity level [$\beta = -0.27$, $t(69) = -2.02$, $p = 0.048$] and sensory sensitivity [$\beta = 0.30$, $t(69) = 2.57$, $p = 0.01$] could predict SDQ emotional symptoms and explain a significant proportion of variance in SDQ emotional symptoms [$R^2 = 0.20$, $F(6, 69) = 2.88$, $p = 0.02$]. The final predictive model was here accordingly: SDQ emotional symptoms = $7.44 - (0.07 \times \text{activity level}) + (0.08 \times \text{sensory sensitivity})$. The R^2 for the overall model

TABLE 1 | Characteristics of sample at t1 ($n = 76$).

Characteristic	<i>M</i>	<i>SD</i>	Min.	Max.	<i>n</i> no medical examination/testing
Age of child at t1 in years	4.17	1.22	1.33	6.50	
Body height in cm	105.56	9.58	82.00	125.00	13
Weight child in grams	17606.15	3548.32	10,000	26,500	11
IQ score	100.73	17.58	50	142	9
IQ Test	<i>n</i>	%			
None	9	11.84			
WPPSI-III	45	59.21			
SON-R 2½-7	9	11.84			
KABC-II	9	11.84			
IDS-P	4	5.26			
Newborn gender	<i>n</i>	%			
Male	48	63.16			
Female	28	36.84			
Main diagnosis	<i>n</i>	%			
None	5	6.58			
Dysthymia	1	1.32			
Obsessive-compulsive disorder	1	1.32			
Adjustment disorder	2	2.63			
Non-organic sleep disorders	6	7.89			
Trichotillomania	1	1.32			
Mild mental retardation	1	1.32			
Speech and language development disorders	5	6.58			
Developmental coordination disorder	1	1.32			
Combined specific developmental disorders	1	1.32			
Autism spectrum disorder	2	2.63			
Attention deficit hyperactivity disorder	7	9.21			
Hyperkinetic conduct disorder	1	1.32			
Oppositional defiant disorder	25	32.89			
Other mixed disorders of conduct and emotions	1	1.32			
Phobic anxiety disorder of childhood	2	2.63			
Social anxiety disorder of childhood	1	1.32			
Sibling rivalry disorder	1	1.32			
Other childhood emotional disorders	1	1.32			
Elective mutism	1	1.32			
Chronic motor or vocal tic disorder	1	1.32			
Non-organic encopresis	1	1.32			
Feeding disorder of infancy and childhood	4	5.26			
Stereotyped movement disorders	1	1.32			
Other specified behavioral and emotional disorders with onset usually occurring in childhood and adolescence	2	2.63			
Unspecified behavioral and emotional disorders with onset usually occurring in childhood and adolescence	1	1.32			

t1, Presentation in child and adolescent psychiatry.

indicates a moderate goodness-of-fit according to Cohen (56), $f^2 = 0.50$ (strong effect).

Integrative Child Temperament Inventory Temperament Traits Predict Strengths and Difficulties Questionnaire Hyperactivity/Inattention

Finally, behavioral inhibition [$\beta = -0.31$, $t(69) = -2.45$, $p = 0.02$] turned out to be a significant predictor for SDQ hyperactivity/inattention accounted for a significant amount of

its variance [$R^2 = 0.17$, $F(6,69) = 2.72$, $p = 0.04$]. The final predictive model here was: $10.07 - (0.07 \times \text{behavioral inhibition})$. Following Cohen (56), this is also a strong effect ($f^2 = 0.45$).

DISCUSSION

The aim of the present study was to assess the differential impact of child temperament factors on psychopathological outcomes.

TABLE 2 | Characteristics of sample at t2 ($n = 76$).

Characteristic	<i>M</i>	<i>SD</i>	Min.	Max.	<i>n</i> no medical examination/testing
Age of child at t2 in years	9.22	2.02	4.67	13	
Currently visited institution	<i>n</i>	%			
Day care center	8	10.53			
Primary school	38	50			
Community school	9	11.84			
Special school	5	6.58			
High school	15	19.74			
Waldorf school	1	1.32			
Medication	<i>n</i>	%			
None	65	85.53			
Methylphenidate	3	3.95			
Other (e.g., Asthma spray, naproxen)	8	10.53			
Child lives with	<i>n</i>	%			
Biological parents	52	68.42			
Biological mother	15	19.74			
Biological mother + partner	2	2.63			
Biological father + partner	1	1.32			
Foster family	4	5.26			
Other	2	2.63			

t2, Transmission of questionnaires.

TABLE 3 | Descriptive statistics of ICTI ($n = 76$).

	Frustration	Behavioral inhibition	Activity level	Attention/persistence	Sensory sensitivity
<i>Items</i>	6	6	6	6	6
<i>M</i>	22.83	18.55	23.75	20.50	18.22
<i>SD</i>	7.18	6.85	8.21	6.59	7.34
<i>Minimum</i>	7	6	7	8	6
<i>Maximum</i>	36	36	36	36	34
<i>Cut-off</i>	≥75% (Q4)	≥75% (Q4)	≥75% (Q4)	≥75% (Q4)	≥75% (Q4)
<i>n > cut-off</i>	25	17	30	22	16
<i>% > cut-off</i>	32.89	22.37	39.47	28.95	21.05

In a quasi-experimental study with two standardized measures, we assessed temperament factors at age four via the ICTI (43, 44). At age nine, psychopathology was assessed via the SDQ (15). Multiple regression analysis revealed that frustration/anger significantly predicted the total difficulties score in the SDQ. Furthermore, sensory sensitivity served as a significant predictor for emotional symptoms. We also obtained negative correlations between activity level and emotional symptoms as well as between behavioral inhibition and hyperactivity.

The finding, that anger/frustration predicts the total difficulties score in the SDQ tallies with prior work demonstrating that high negative affect is associated with general psychopathology (57). Thus, anger may serve as a risk factor for psychopathological disorders, mood disorders, and spanning personality (58). Further, anger shows longitudinal predictive effects (59) to depression and anxiety disorders (60, 61) and the severity of anger is positively correlated with the intensity of these disorders up to the probability of suicide (62). This finding seems particularly important as it shows that negative affect not only results from psychopathology

but can also be considered a precursor for total difficulties score and wide-ranging psychopathology. This result also points out, that temperament (and especially anger/frustration) may be considered a transdiagnostic risk factor for general psychopathology. This proposition is supported by the recent work of Klein et al. (63), who summarize multiple studies indicating irritability to be a transdiagnostic construct. The authors also highlight the prediction of multiple internalizing and externalizing problems within this finding. As they also call for a comparison between irritability and other forms of psychopathology, our approach of using a clinical sample falls in line with their considerations. In line with the finding of temperament being a transdiagnostic risk factor, Ostlund et al. (64) suggested the conceptualization of temperament as a new domain in the Research Domain Criteria (RDoC). Furthermore, the dysregulation of the temperament factor frustration/anger might be considered as part of a larger self-regulatory framework including emotional dysregulation (65). Considering the fact, that poor emotional regulation is also associated with Disruptive Mood Dysregulation Disorder (DMDD) (66), it becomes

TABLE 4 | Descriptive statistics of SDQ parent version (*n* = 76).

	Total difficulties score	Emotional symptoms	Conduct problems	Hyperactivity/Inattention	Peer relationship problems	Prosocial behavior
Items	25	5	5	5	5	5
<i>M</i>	14.07	2.16	2.86	4.79	4.26	7.63
<i>SD</i>	3.99	2.07	1.25	1.42	1.16	1.81
Minimum	7	0	1	2	2	3
Maximum	25	9	6	8	8	10
Cut-off ("abnormal")	≥17	≥5	≥4	≥7	≥4	≤4
<i>n</i> < / > cut-off	17	12	23	11	57	5
% < / > cut-off	22.37	15.79	30.26	14.47	75.00	6.58

clear how temperament factors and conduct problems might interact. Sorcher et al. (67) recently investigated the longitudinal associations between irritability in preschool-aged children and adolescent outcomes. They report irritability to predict numerous clinically relevant outcomes, such as anxiety disorders, ADHD and disruptive behavior disorders. They therefore prove irritability to effect peer functionality, physical health and non-suicidal self-Injury. They also show that irritability should be used in large-scale identification due to its incremental and extensive impact. Due to this high impact of anger on general psychopathology, it is important to have the possibility to resort to working anger management treatments. For adults, anger management interventions initiate lasting affective, cognitive, behavioral and physiological changes in reactions of anger (68). For prevention, a variety of interventions like psychotherapy, cognitive-behavioral training, progressive relaxation and skills training (69) have been described as helpful. Moreover, in high-risk children and adolescents, different forms of school-based and individual treatments have been accounted for reducing anger and associated emotional as well as behavioral problems (70–75). The particular position of the temperament factor anger/frustration is also evidenced by the phenomenologically close references to two disorder patterns from the DSM-5, one of which is classified to the domain of behavioral disorders, the other more to the domain of emotional disorders: Oppositional Defiant Disorder (ODD; listed in the DSM-5 under Disruptive, impulse-control, and conduct disorders) and Disruptive Mood Dysregulation Disorder (DMDD; listed in the DSM-5 under mood disorders). However, it will remain a challenge to distinguish between the concepts of temperament and psychopathology (76).

The finding, that sensory sensitivity serves as a risk factor for later emotional symptoms replicates prior work by Ben-Sasson et al. (26) who found, that sensory over-responsivity predicted internalizing, externalizing and dysregulation problems in children at elementary school age. On the other hand, while previous studies identified behavioral inhibition as another predictor for emotional problems [e.g., (77)], behavioral inhibition did *not* predict emotional symptoms in the present study. One reason why this might be the case is that the present study investigated temperamental factors in a clinically referred sample. This is particularly important, because most of the evidence for associations between early child temperament

and later psychopathology has been generated in general population studies. Zentner et al. (78) describe four reasons why it is important to examine temperament traits in clinically referred children. First, comparing clinically referred children with general population children allows one to disentangle temperament attributes that might be involved in mild behavior problems from those that are involved in more severe problems. Second, clinically referred children might particularly profit from an understanding of predisposing temperamental factors. Third, identifying temperamental precursors of later psychopathology might give early interventions a better chance to succeed. Fourth, as long as temperament scales cannot differentiate between normally developing children and clinically referred children, their benefits remain limited. While behavioral inhibition did not predict emotional symptoms, it served as a protective factor for hyperactivity in the present study. Identifying protective factors as well as risk factors for later psychopathology is particularly important to identify children at risk for psychopathological outcomes.

Contrary to previous work (36, 37), in the present study activity level did not serve as a risk factor for hyperactivity/inattention. This may also be due to the fact, that the present study investigated the relationship between temperament and psychopathology in a clinically referred sample. While activity level did not predict hyperactivity/inattention in the present study, it served as a protective factor for emotional symptoms. This finding is in line with prior work demonstrating the beneficial impact of activity in the treatment of mood disorders [e.g., (79)]. It might be speculated that increased activity levels lead to more extended exploratory behavior on the part of the child. More exploration behavior, in turn, may be incompatible with avoidance behavior, which is an important maintaining condition for many anxiety disorders. Generally, physical activity is inversely associated with anxiety, depression, and stress reactivity (80).

Limitations

While the results of the present study give valuable insights into the differential linkage between child temperament and later psychopathology, there are also limitations that should be noted. First, it is important to point out the limited generalizability of our sample, as we are using a non-representative sample, as it is compiled of a clinical population with very heterogeneous

TABLE 5 | Multiple Regressions results using ICTI temperament traits and interim (time between t1 and t2) as predictors of SDQ ($n = 76$).

Criterion	Predictor	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>	Fit/ <i>R</i> ²	<i>F</i>	<i>p</i>
SDQ total difficulties score	ICTI						0.19	2.71	0.02*
	Frustration/anger	0.16	0.08	0.28	2.02	0.047*			
	Behavioral inhibition	−0.13	0.07	−0.23	−1.78	0.08			
	Activity level	−0.05	0.07	−0.09	−0.68	0.50			
	Attention/persistence	−0.10	0.08	−0.17	−1.28	0.21			
	Sensory sensitivity	0.12	0.06	0.22	1.87	0.07			
	Interim	0.00	0.02	0.01	0.06	0.96			
SDQ emotional symptoms	ICTI						0.20	2.88	0.02*
	Frustration/anger	0.08	0.04	0.27	1.93	0.06			
	Behavioral inhibition	−0.05	0.04	−0.15	−1.23	0.22			
	Activity level	−0.07	0.03	−0.27	−2.02	0.048*			
	Attention/persistence	−0.05	0.04	−0.16	−1.24	0.22			
	Sensory sensitivity	0.08	0.03	0.30	2.57	0.01*			
	Interim	−0.00	0.01	−0.01	−0.07	0.94			
SDQ conduct problems	ICTI						0.13	1.70	0.14
	Frustration/anger	0.04	0.03	0.24	1.64	0.11			
	Behavioral inhibition	−0.00	0.02	−0.02	−0.15	0.88			
	Activity level	0.02	0.02	0.16	1.11	0.27			
	Attention/persistence	−0.01	0.03	−0.03	−0.25	0.81			
	Sensory sensitivity	0.01	0.02	0.04	0.29	0.77			
	Interim	0.00	0.01	0.01	0.04	0.97			
SDQ hyper-activity /inattention	ICTI						0.17	2.36	0.04*
	Frustration/anger	0.03	0.03	0.16	1.14	0.26			
	Behavioral inhibition	−0.07	0.03	−0.31	−2.45	0.02*			
	Activity level	0.01	0.02	0.08	0.56	0.58			
	Attention/persistence	−0.01	0.03	−0.06	−0.47	0.64			
	Sensory sensitivity	0.03	0.02	0.15	1.29	0.20			
	Interim	−0.01	0.01	−0.09	−0.78	0.44			
SDQ peer relation-ship problems	ICTI						0.05	0.58	0.74
	Frustration/anger	0.01	0.02	0.04	0.27	0.79			
	Behavioral inhibition	−0.02	0.02	−0.10	−0.69	0.49			
	Activity level	−0.01	0.02	−0.10	−0.66	0.51			
	Attention/persistence	−0.03	0.03	−0.17	−1.23	0.22			
	Sensory sensitivity	−0.00	0.02	−0.01	−0.06	0.95			
	Interim	0.01	0.01	0.14	1.13	0.26			
SDQ prosocial behavior	ICTI						0.15	2.06	0.07
	Frustration/anger	−0.04	0.04	−0.17	−1.23	0.23			
	BEHAVIORAL inhibition	−0.05	0.03	−0.19	−1.47	0.15			
	Activity level	−0.02	0.03	−0.10	−0.70	0.49			
	Attention/persistence	0.03	0.04	0.10	0.75	0.45			
	Sensory sensitivity	−0.01	0.03	−0.03	−0.25	0.80			
	Interim	0.01	0.01	0.12	1.10	0.28			

B represents unstandardized regression weights, *SE B* the standard error for *B*. Beta indicates the standard regression weights. * $p < 0.05$.

diagnoses of patients presented to our outpatient clinic. A clinical sample is biased when it comes to comparing it to the healthy community. It is very well conceivable that specific disorders of the children (especially pervasive developmental disorders) in a specific way and differentially influence the parents' judgment of the child's temperament.

A further limitation of the present study is the restriction to parental report measures for the assessment of temperament

as well as psychopathology. Questionnaires are subject to a variety of response biases or response errors in the sense of a systematic or unsystematic deviation of the parents' assessment of the child's temperament. Parents can certainly assess temperament differently depending on the age of the child. There are certainly additional variables not controlled that have an influence on the assessment of the child's temperament (e.g., state of the parent-child

relationship and attachment, mental disorders of the parents, SES).

Inclusion of other assessment sources such as kindergarten teachers and other methods (laboratory observational measures or structured diagnostic interviews) in the sense of a multi-method and multi-informant approach would put the results on a broader basis.

To control the influence of psychopathology at t1, we calculated correlations between temperament factors and internal or external diagnosis at t1. In summary, out of five possible correlations, three were not significant, including frustration/anger with total difficulties score, which is our main finding. Two temperament traits show a correlation that is in line with expectations. Although the questionnaire used (SDQ) allows standardized statements about the children's problem behavior at t2, we did not collect any psychiatric diagnoses at t2.

The design of the present study therefore is a quasi-experimental design. To provide further evidence for the results it would be of great value to conduct an *a priori* defined longitudinal study in the future.

CONCLUSION

We find that preschool temperament contributes to the development of externalizing and internalizing problems in childhood in a number of ways. The temperament factor frustration/anger in preschool children could be a strong predictor of the general mental condition in 9-year old children. Frustration/anger seems to play a special and prominent role in predicting later general psychopathology. Therefore, it should also play a specific role in the early prevention of emotional dysregulation: high expression of the temperament dimension Frustration/anger should therefore be used as a target for the prevention of psychopathology in children. Activity Level acts

as a protective factor against later emotional symptoms. This possibly emphasizes the helpful role of physical activity (for instance, sport) especially in internalizing mental disorders.

This study illustrates the complexity and ambiguity of temperament in child development. What seems to be necessary is the perception of the child's unique temperament and the child's unique needs that are dependent on temperament. Temperament in itself is never exclusively positive or negative. It is embedded in the complex and unique development of each person.

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 the Ethikkommission der Ärztekammer des Saarlandes Ha 147/19. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

FP: idea, conceptualization, structure of the work, data collection, literature analysis, text creation, discussion, and corrections. EM: discussion and corrections. LF: literature analysis, text creation, figure, and tables. JJ: statistical analyses and methods section. All authors contributed to the article and approved the submitted version.

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Identity Integration in Adolescents With Features of Gender Dysphoria Compared to Adolescents in General Population

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Adolescence is an important period for identity formation and identity consolidation is one of the main developmental tasks. Gender identity is an essential aspect of identity but so far little is known about its development. Neither has the identity development of adolescents with features of gender dysphoria (GD) been extensively studied so far. However, adolescents with features of GD have been shown to present extensive psychiatric psychopathology and could therefore be assumed also to have more problems with identity development. We set out to compare the identity integration of adolescents with features of GD ($n = 215$; 186 natal females, 29 natal males) and adolescents from general population ($n = 400$; 244 females, 154 males and 2 who did not report their sex) using a culture-adapted Finnish version of an assessment tool for adolescents and young adults on identity in terms of personality functioning, the Assessment of Identity Development in Adolescence (AIDA). AIDA is a 58-item self-report questionnaire enabling dimensional differentiation between healthy and impaired identity development. The continuous AIDA total score (sum score) and its subscales were analyzed using MANOVA, and dichotomized T -scores differentiating identity development in impaired and healthy range using cross-tabulations with chi-square statistics. Adolescents with features of GD showed identity development similar to adolescents in general population. The slight differences seen in AIDA scores were in favor of the GD group. The proportion scoring to identity impairment was lowest among gender-referred adolescents assigned males at birth. Identity integration of the gender-referred adolescents was further compared to that of 77 adolescents in specialist level psychiatric outpatient treatment (67 females, 10 males). The adolescent psychiatric outpatients scored much higher toward impaired identity on all AIDA scales than did the adolescents with features of GD. These results suggest that features of GD are not associated with problems in identity development in adolescents at large. Adolescents with features of GD may have been required to process their identity more, thereby advancing further in their identity consolidation process than young people on average.

Keywords: gender dysphoria, identity development, gender identity, personality disorder, adolescence

INTRODUCTION

Identity and its favorable and unfavorable development play an essential role in both psychoanalytic/psychodynamic and socio-cognitive theories on the human mind. Identity is a broad concept encompassing both intrapsychic and interpersonal aspects and could therefore be roughly defined as a “unity of being” (1) or a “balance or interaction between that considered to be self and that considered to be other” (2). In general, identity can be said to allow one to move through life with a sense of continuity and purpose toward expressing one’s goals and values.

According to many socio-cognitive theories, identity can be divided into two higher order domains “I” and “ME”, where the former emphasizes continuity, stable core, and emotional access, and the latter coherence, integrated whole, and cognitive access (1).

Within the psychodynamic tradition, Erikson (3) saw identity as a constant developmental process of ego growth. According to him, identity provides a sense of continuity within an individual and in contact with others (self-sameness) and also a means to differentiate between oneself and others (uniqueness), thereby enabling the individual to act independently from others. In this identity formation process, adolescence is a particularly important transitional period because the identifications of childhood are summed up, processed, and gradually replaced by a new form of identity. Additionally, the identities that form later in life are based on this adolescent identity to such an extent that they are perceptible as its variations (4). Hence, identity consolidation can be seen as a result of successful adolescent development.

Identity consolidation then involves, for example, experiencing oneself as consistent over time and situations, having stable values, long-term goals, and commitments [e.g., (5)]. Marcia et al. (6) elaborated on Erikson’s concepts and developed a model including three identity statuses in addition to the achieved identity (that involved commitment after exploration): foreclosure, moratorium, and diffusion. In foreclosure, role and value commitments are made without exploration or struggle. Moratorium is a transitional phase and identity issues are put on hold due to occupational or other role commitments, which nevertheless signifies an active search for identity. Identity diffusion is more pathological and involves no commitments despite or without exploration, and can be seen, for example, in reoccurring changes in careers, values, and ideologies (5, 6). Identity diffusion can also be seen as a lack of integration of the concept of self and significant others [e.g., (7)].

The developmental process would ideally advance from initial childhood foreclosure or diffusion through moratorium to eventual identity achievement, which is challenged and reformed in connection with different life events (3, 8). However, it has been reported that large proportions of late adolescents and young adults do not complete the identity formation process, but nevertheless among those undergoing identity status transitions in late adolescence and young adulthood, progressive change is more than twice as likely than regressive change (9).

Identity can also be regarded as a core construct of personality (10). Hence, identity development can be seen as essential to

personality development, with disturbances therein representing disturbances in personality development. Identity diffusion is considered to be one of the core elements of borderline personality organization (1, 7), and in the Diagnostic and Statistical Manual (DSM-5) (11), identity is classified as a central diagnostic criterion for personality disorders. In many countries, however, personality disorders are not diagnosed in adolescents. The life-span approach that promotes the diagnosing of children and adolescents and early intervention is gaining ground and is implemented in the new ICD-11 classification system (12) once it comes into effect.

Gender identity is one of the subareas of identity and refers to the person’s own inner sense of their gender, which is distinct from the sex assigned to them at birth, which is based on their biological characteristics. This inner sense of gender does not necessarily align with the sex assigned at birth or the traditional expectations associated with it (13). Gender dysphoria (GD) refers to the distress experienced in relation to one’s sex assigned at birth and the sex-discordant gender identity.

The process of gender identity consolidation is not known, but there are various theoretical perspectives on gender identity formation that view it as multi-dimensional, multi-determined, and open to change over time (2). For example, according to Bussey’s model (14), aspects of individual, behavioral, and environmental level interact to co-create gender identity and likewise affect the change in gender identity over time. In this model, developmental change in gender identity is considered to be ongoing and continuous (14).

Gender identity in adolescence is nevertheless considered so stable that to relieve GD, international guidelines recommend interventions that modify physical sexual characteristics [e.g., (15)]. So far little research has been presented on GD in the context of identity development at large, or identity development among adolescents displaying GD. Adolescents with features of GD have been shown to present with excessive psychopathology (16–18) [along with, for example, excessive involvement in bullying (19)], and psychiatric disorders have been suggested to be associated with delayed or impaired identity development in general (20). Therefore, it could be assumed that they would also have problems in identity development, psychopathology either making them vulnerable to or representing impairment of identity development. Further research into the identity development of these adolescents would serve to determine their treatment needs as a group and thus help their treatment planning.

A recent Austrian study compared the presence of identity diffusion in adolescents with GD to population youth measured with the “Assessment of Identity Development in Adolescence” [AIDA; (21)]. AIDA is a self-report inventory to assess identity in terms of personality functioning and was specifically developed for adolescents and young adults (12–18 years old) to enable a dimensional differentiation between healthy and impaired identity development. Impaired identity development is assumed to be associated with a high risk of a current personality disorder, especially borderline personality disorder. Although identity diffusion was found in slightly over a third of the adolescents with GD, the overall results of this study suggested no pathological

identity development for this group compared to same-aged population norms (21).

The tools used for the assessment of gender identity development are generally relatively one-dimensional, based on narrow concepts and do not yield information on identity development as a whole [for a recent assessment of the gender identity tools see (22)]. The assessment of overall identity development provides more reliable indications for proper individual treatment paths. AIDA is based on a broad and well-grounded theoretical framework and can offer an indicative building block in the detection of disturbances in identity development (1). It is not known whether the overall identity development of adolescents experiencing features of GD differs from the overall identity development of adolescents not experiencing these features. It seems probable that due to the significant psychopathology, adolescents with features of GD could also have more problems in their identity development, but on the other hand, they may have been required to process their identity more, which would yield them more favorable results than average.

The aim of this study was to assess the identity development of adolescents seeking treatment in a gender identity clinic due to GD and compare it to the identity development of adolescents in general population using the AIDA assessment tool. We set out to answer the following research questions:

1. Does the identity development of adolescents with features of GD requiring clinical assessment differ from that of same-aged adolescents in general population?
2. For how many of the adolescents with features of GD requiring clinical assessment are problems in identity development reaching levels indicating impairment in personality development?
3. How does the identity development of adolescents with features of GD requiring clinical assessment differ from that of adolescents requiring specialist level psychiatric care?

MATERIALS AND METHODS

This is a cross-sectional case-control study comparing 215 adolescents referred to a nationally centralized gender identity unit due to seeking gender affirming therapy and 400 population adolescents from four different schools participating in a study intended to collect data on three psychometric instruments recently translated into Finnish (23).

The data collection concerning the gender-referred adolescents comprised a retrospective chart review among adolescents with whom at least the initial assessments and interviews had been completed by the time of data collection in 2020. In Finland, mental health assessment of adolescents seeking medical gender affirming therapy is centralized to two university hospitals. A multi-disciplinary team comprising an adolescent psychiatrist, a psychologist, a social worker, and a psychiatric nurse carry out the assessments. The assessment of adolescents with features of GD takes place in an outpatient setting and comprises at minimum a review of their earlier

medical and social welfare files and an initial assessment interview with the young person and their guardian(s). The AIDA is administered during the first visit and is the first structured measure used in the assessment process. Further assessments may not follow if more urgent treatment needs related to severe psychiatric disorders are evident at this stage; in such cases the young person is referred to appropriate care. If the gender identity assessment is continued, further free format and structured interviews and assessments are carried out, including the assessment of developmental history, adolescent development and personality, and specific gender identity related measures are also applied [see for example (18, 24)]. Gender affirming hormonal interventions can be initiated if there are no contraindications, such as severe psychiatric disorders that warrant treatment more urgently, and the young person has adequate caregiver support. Surgical treatments are possible after coming of age.

The gender-referred sample of the present study were 215 adolescents consecutively admitted to the gender identity unit for minors in Tampere University Hospital between 2016 and 2019. Of the gender-referred group, 15% were assigned males at birth, and 85% were assigned females at birth. Their mean (sd) age was 16.2 (1.3) years.

The participants from general population were 400 high school students from four different schools in three different cities in Finland. They responded anonymously using an Internet-based form during regular school hours in the spring term of 2019. Their parents received an electronic information letter before the students were recruited to participate, but active parental consent was not required. The students were informed by their teachers about the study and the voluntariness of participating. Students who did not want to participate were instructed to submit an empty form. Completed forms were taken as a consent to participate. The population adolescents had a mean (sd) age of 16.2 (1.5) years and 38.8% were males and 61.2% females; two students did not report their sex.

A clinical psychiatric comparison sample comprised 77 adolescents who were in specialist level outpatient adolescent psychiatric treatment in the Department of Adolescent Psychiatry in Tampere University Hospital between December 2020 and December 2022, were at least 15 years of age and consented to participate in a study project assessing suitability of selected psychometric instruments for a later psychotherapy outcome study. Consenting, otherwise unselected adolescent psychiatric outpatients filled anonymously in a set of psychometric instruments, including AIDA, and indicated their age and sex. Other background information was not collected. The adolescent psychiatric outpatient sample had a mean (sd) age of 16.6 (1.0) years, and 87% (67/77) were females. It is known that more than half of the outpatients in the study clinic have a primary diagnosis in the categories of severe mood disorders (F30–39) and anxiety disorders (F40–49) (25).

The register based clinical data collection was duly approved by the Ethics Committee of Tampere University Hospital, and the population study received ethics approval from Tampere University Ethics Committee.

Measures

The “Assessment of Identity Development in Adolescence” (AIDA) is a self-report questionnaire enabling a dimensional differentiation between healthy and impaired identity development that is considered central in personality disorders, especially in borderline personality disorder (26). A detailed presentation of AIDA’s theoretical underpinnings can be found at (27). AIDA contains 58 items with a 5-step answering format (0 = no to 4 = yes). All items are added up to obtain the total score representing Identity Diffusion. For descriptive purposes, the total score can be divided into two dimensions, Discontinuity and Incoherence. The continuity/discontinuity dimension has three subdimensions: consolidating perspectives and attributes (9 items; e.g., “*I could list a few things that I can do very well.*”), consolidating relationships and roles (11 items; e.g., “*I feel like I’m a valuable member of my family.*”), and consolidating emotional self-experience (7 items; e.g., “*Sometimes I have strong feelings without knowing where they come from.*”). The coherence/incoherence dimension also has three subdimensions: consistency in self-concepts (11 items; e.g., “*I often feel lost, as if I had no clear inner self.*”), autonomy and ego strength (12 items; e.g., “*If I am criticized or others see me failing, I feel really worthless and devastated.*”), and integrating cognitive self-experience (8 items; e.g., “*I am confused about what kind of person I really am.*”). This reflects the theoretical origins and complexity of the concept. All scores are coded toward pathology, that is, higher scores indicate pathology. Goth and Schmeck (26) reported very good scale reliabilities (0.94 for total score, 0.86 and 0.92 for main dimensions, and from 0.76 to 0.86 for subdimensions) for the original AIDA in German. Jung et al. (20) have demonstrated that AIDA can differentiate adolescents with personality disorder from the general population and also from adolescents with other types of psychiatric problems. Scores clearly above the average (T-scores above 60) denote probable risk for a current (borderline) personality disorder and an in-depth clinical investigation (e.g., with a clinical interview) is therefore recommended.

The culture-adapted version *AIDA Finnish* (28) was developed by the last author and her associates at the Universities of Tampere and Helsinki, Finland, in cooperation with the original authors. The original items were translated into Finnish with respect to cultural compatibility and were empirically tested in a pilot test with 77 adolescents. Based on the results, 10 items were slightly reformulated for the main test version without changing the targeted identity-related content in order to improve comprehensibility and reliability. The main test was performed in a combined sample of 400 adolescents from four schools and 129 adolescent psychiatric patients. The full sample consisted of 32.2% boys and 67.8% girls in the age range 12–21 years (mean = 16.2, SD = 1.4). To test the clinical validity of the Finnish version of AIDA, the sample was enlarged with 33 suicidal patients with diagnoses from the internalizing spectrum (20 with major depressive disorder). The AIDA Finnish scale reliabilities were good with Cronbach’s alpha 0.96 on total, 0.90 and 0.95 on primary and 0.75–0.89 on subscale level. Exploratory factor analysis supported a one-factor solution speaking for a joint factor of “identity pathology”. The AIDA Finnish total

score on Identity Diffusion differed at a highly significant level of $p = 0.000$ and with a large effect size of Cohen’s $d = 1.4$ standard deviations between the adolescents of the school population (mean = 75.7, SD = 38.4) and the subsample of the 33 suicidal patients (mean = 126.0, SD = 30.7), mostly diagnosed with major depression based on K_SADS interview and a clinical classification conference after a thorough psychosocial evaluation of the young person and their family. This matches the results on clinical validity of the original Swiss-German AIDA version in patient groups with diagnoses from the internalizing spectrum (20).

In using self-report instruments, some information is always lost due to participants skipping individual questions or items of scales. AIDA Total score can be calculated if the number of missing items in the whole scale remains below 10%, and there is a maximum of 2 missing items per subscale. As per this rule, AIDA Total score and Discontinuity and Incoherence scores were successfully calculated for all participants in both population and clinical samples.

Statistical Analyses

The data were analyzed using one-way multivariate analysis of variance (MANOVA) with SPSS 27. MANOVA is used to determine whether there are any differences between independent groups on more than one continuous dependent variable. Mean values of AIDA Total score and Discontinuity and Incoherence dimensions as well as of their respective subdimensions were compared between population males, population females, gender-referred adolescents assigned males at birth and gender-referred adolescents assigned females at birth. Within each sample, comparisons were made between sexes, and the gender-referred adolescents were also compared with population adolescents of the same and the opposite sex. Statistical differences between groups were assessed using Wilk’s lambda, and effect sizes using partial eta squared (η^2p). Statistical significance of differences in pairwise comparisons was analyzed using Tukey’s *post-hoc* test, and due to multiple comparisons, cut-off for statistical significance was, using Bonferroni correction, set at $p < 0.006$. Next, we compared the proportions of general population males, general population females, and gender-referred adolescents assigned males and females at birth whose AIDA T-scores exceeded 60, which suggests impaired identity development, using cross-tabulations with chi-square statistics. Finally, AIDA Total score and Discontinuity and Incoherence dimensions as well as their respective subdimensions were compared between the gender-referred group and the general adolescent psychiatric outpatient sample.

RESULTS

Overall, there were statistically significant differences between the four groups on Identity diffusion and its subscales [$F_{(24,1740.8)} = 7.467$, Wilks’ Lambda = 0.753, $p < 0.001$]. AIDA Total score (=Identity diffusion), Discontinuity and Incoherence dimension and their subdimension scores are given in **Table 1** for general population males, general population females, gender-referred

TABLE 1 | AIDA total score, Discontinuity and Incoherence scale as well as their subscale scores by sex among population and gender-referred samples of Finnish adolescents [mean (sd)].

	Population boys <i>n</i> = 154		Population girls <i>n</i> = 244		Gender-referred natal boys <i>n</i> = 29		Gender-referred natal girls <i>n</i> = 184		<i>F</i> _(3;607)	<i>p</i> ¹	Partial eta squared ²
	Mean	sd	Mean	sd	Mean	sd	Mean	sd			
AIDA total score identity diffusion^a	68.07	40.46	80.56	36.21	63.54	29.39	69.66	32.47	5.730	0.001	0.028
Discontinuity ^b	32.15	16.61	35.43	16.25	30.64	13.83	34.22	14.33	1.851	0.137	0.009
Consolid. perspectives ^c	13.18	6.045	13.95	5.85	11.17	5.58	12.51	5.36	3.451	0.016	0.017
Consolid. relationships ^d	10.47	7.70	10.69	6.39	12.36	5.79	13.32	5.66	7.454	<0.001	0.036
Consolid. emot. self-experience ^e	8.49	6.64	10.80	6.37	7.10	5.48	8.40	6.04	7.875	<0.001	0.037
Incoherence ^f	35.93	26.23	45.13	21.43	32.90	17.67	35.44	19.77	9.516	<0.001	0.045
Consistency in self ^g	13.68	9.50	16.24	8.86	13.33	8.45	13.29	7.80	5.067	0.002	0.024
Autonomy ^h	13.51	10.73	18.33	8.73	11.17	7.52	13.47	8.88	14.933	<0.001	0.069
Cogn self-exper ⁱ	8.75	7.18	10.56	5.85	8.38	4.74	8.68	5.25	4.821 (3,607)	0.003	0.023

¹*p*-values in this column indicate that overall, there are statistically significant differences between the groups on the dimension of the line; detailed findings of pairwise comparisons are explained in the text. *P*-values statistically significant after Bonferroni correction are highlighted in bold.

²Effect size $\eta^2p > 0.01$ small, >0.06 medium, >0.14 large.

^aItems per scale 58, range 0–232.

^bItems per scale 27, range 0–108.

^cItems per scale 9, range 0–36.

^dItems per scale 11, range 0–44.

^eItems per scale 7, range 0–28.

^fItems per scale 31, range 0–124.

^gItems per scale 11, range 0–44.

^hItems per scale 12, range 0–48.

ⁱItems per scale 8, range 0–32.

assigned males at birth, and gender-referred assigned females at birth.

The females in the population sample scored significantly higher than the population males on AIDA Identity Diffusion ($p = 0.004$), Discontinuity subdimension emotional self-experience ($p = 0.002$), primary dimension Incoherence ($p < 0.001$) and its subdimension autonomy and ego strength ($p < 0.001$). No significant differences between sexes were seen on any dimension or subdimension scores within the gender-referred group.

Gender-referred adolescents assigned males at birth did not differ statistically significantly from either general population males or females on AIDA Total score and its primary dimensions. Regarding subscales, they displayed a *lower* score on the autonomy and ego strength subscale of the primary dimension Incoherence than general population females ($p = 0.001$).

Gender-referred adolescents assigned females at birth did not differ from either population males or females on AIDA Total score and its primary dimension Discontinuity. They differed from general population females—but not from males—in displaying a *lower* score on primary dimension Incoherence ($p < 0.001$). Regarding subdimensions, gender-referred adolescents assigned females at birth differed from population females by displaying a *higher* score on the Discontinuity subdimension consolidating relationships and roles ($p < 0.001$) and *lower* scores on the Discontinuity

subdimension consolidating emotional self-experience ($p = 0.001$) and on the Incoherence subdimensions consistency in self-concepts ($p = 0.003$) and autonomy and ego strength ($p < 0.001$), and borderline lower on the subdimension integrating cognitive self-experience ($p = 0.007$). They showed mostly subdimension scores comparable to those of general population males, differing only by scoring higher on discontinuity subdimension consolidating relationships and roles ($p < 0.001$; **Table 1**).

Proportions of Population and Gender-Referred Adolescents Displaying Identity Pathology

In the general population sample, 14.2% of the scores reached a range suggesting impairment in identity development (T -score > 60) on AIDA total scale Identity Diffusion, whereas in the GD sample, the corresponding proportion was 9.8% ($p = 0.07$).

Among the general population adolescents, 15.8%, and in the GD group, 14.0%, of the scores reached a range suggesting impaired development on primary dimension Discontinuity ($p = 0.32$), and 15.0 and 9.3%, respectively, on Incoherence ($p = 0.03$).

The proportions reaching impaired range among males and females in the general population and birth-assigned males and females in the gender-referred sample are shown in **Table 2**. Pairwise comparisons between the groups revealed that the difference in proportions of those reaching impaired

TABLE 2 | The proportion of those adolescents in each population/gender-referred group scoring within the pathological range (T-scores > 60) in Identity diffusion, Discontinuity and Incoherence [% (n/N)].

	Population males	Population females	Gender-referred assigned males at birth	Gender-referred assigned females at birth	<i>p</i>
Identity diffusion	11.0 (17/155)	16.4 (40/244)	3.4 (1/29) ^a	10.8 (20/185)	0.1
Discontinuity	13.5 (21/155)	17.2 (42/244)	6.9 (2/29)	15.1 (28/185)	0.5
Incoherence	11.0 (17/155)	17.6 (43/244)	3.4 (1/29) ^b	10.3 (19/185)	0.03

^a Difference to population females statistically significant at level $p = 0.05$.^b Difference to population females statistically significant at level $p = 0.03$.**TABLE 3 |** AIDA total score, Discontinuity and Incoherence scale as well as their subscale scores among gender-referred and adolescent psychiatric outpatient samples of Finnish adolescents [mean (sd)].

	Gender-referred <i>n</i> = 215		Outpatients <i>n</i> = 77		<i>F</i> _(1;287)	<i>p</i>	Partial eta squared ¹
	Mean	sd	Mean	sd			
AIDA total score identity diffusion^a	69.0	32.3	121.5	39.8	130.591	<0.001	0.314
Discontinuity ^b	33.8	14.5	54.2	17.6	96.729	<0.001	0.253
Consolid. perspectives ^c	12.5	5.4	18.6	6.4	64.315	<0.001	0.184
Consolid. relationships ^d	13.2	5.8	18.0	7.6	33.021	<0.001	0.104
Consolid. emot. self-experience ^e	8.2	6.0	17.6	6.6	125.314	<0.001	0.305
Incoherence ^f	35.1	19.7	67.8	23.7	136.040	<0.001	0.323
Consistency in self ^g	13.3	7.9	24.0	10.5	84.440	<0.001	0.229
Autonomy ^h	13.1	8.7	26.9	8.8	137.168	<0.001	0.325
Cogn self-exper ⁱ	8.6	5.2	16.7	6.8	109.796	<0.001	0.278

¹ Effect size $\eta^2p > 0.01$ small, >0.06 medium, >0.14 large.^a Items per scale 58, range 0–232.^b Items per scale 27, range 0–108.^c Items per scale 9, range 0–36.^d Items per scale 11, range 0–44.^e Items per scale 7, range 0–28.^f Items per scale 31, range 0–124.^g Items per scale 11, range 0–44.^h Items per scale 12, range 0–48.ⁱ Items per scale 8, range 0–32.

range in Identity diffusion was statistically significant only between gender-referred adolescents assigned males at birth and general population females ($p = 0.05$). For Discontinuity, none of the pairwise comparisons revealed statistically significant differences between the groups. For Incoherence, a statistically significant difference was in pairwise comparisons again seen only between gender-referred adolescents assigned males at birth vs. population females ($p = 0.03$).

Identity Development in Gender-Referred Adolescents Compared to Clinical Sample of Adolescent Psychiatric Patients

There were statistically significant differences between the gender-referred and the general adolescent psychiatric outpatient samples on Identity diffusion and its subscales [$F_{(8,278)} = 20.299$, Wilks' Lambda = 0.631, $p < 0.001$, $\eta^2p = 0.37$]. The gender-referred adolescents scored lower, indicating more favorable identity development, than the adolescent psychiatric outpatients on all AIDA scores (Table 3). Due to the very small number

of males in the outpatient sample, this analysis could not be stratified by sex, but *post-hoc* analysis among only adolescents with female sex confirmed the systematic differences between the groups, all statistically significant at level $p < 0.001$.

DISCUSSION

Finnish adolescents with features of GD in our study showed no marked pathological identity development as a group, which concurs with the results of the only study on the subject so far, conducted on Austrian youth [i.e., (21)]. The adolescents with features of GD did not differ from the population adolescents of either the same or the opposite sex regarding AIDA total score Identity integration and AIDA primary dimension Discontinuity. As to the primary dimension Incoherence, a difference in favor of gender-referred adolescents assigned females at birth in relation to population females was observed. Differences in subscale scores, when present, mostly suggested favorable development in the gender-referred adolescents in relation to

population at large. Among the compared groups, the proportion scoring to identity impairment was lowest among gender-referred adolescents assigned males at birth.

The identity development of adolescents with features of GD has not yet been extensively studied and focusing on identity consolidation/identity diffusion at large is the unique contribution of the present study. Earlier research on identity in adolescents with features of GD has almost exclusively focused on the aspect of gender identity, ignoring the larger context of identity development at large.

In the only comparable study, by Haid-Stecher et al. (21), Austrian gender-referred adolescents scored to population norms on AIDA total score, primary dimensions and almost all their subdimensions. Our findings are slightly in favor of the gender-referred adolescents who on several scales displayed lower scores than their peers in population. The scores of the gender-referred adolescents in the present study also appear systematically lower, and thus more favorable, than the scores of the sample in the Austrian study (21). Adolescents presenting in gender identity services may differ between countries (29) for many reasons, such as differences in service systems and pathways to care as well as in societal acceptance of diversity.

Fewer of the adolescents with features of GD scored within the impaired range of Identity Diffusion compared to the young people in general population. This differs from the findings of Haid-Stecher et al. (21), where Identity Diffusion appeared likely in one third of the transgender adolescents, clearly exceeding the proportion in their population sample and also in our sample of gender-referred adolescents. Our finding suggests that for the vast majority of Finnish adolescents with features of GD, gender concerns are not associated with impaired identity development at large and, thus, do not indicate disturbances in their personality functioning.

There were no differences in the identity development between sexes among the adolescents with features of GD, whereas within the general population group females scored significantly higher than males on most comparisons (including total Identity Diffusion and primary dimension Incoherence). Higher scores suggest higher levels of impairment in general, however, the scores of the females did not reach levels anywhere near to identity pathology. It should be kept in mind that the clinical group of suicidal adolescents scored a mean 126.0 in AIDA total score (28).

It may be of interest to compare the scores of the adolescents with features of GD with those of the gender opposite to their birth-assigned sex in general population, and vice versa. In our study, the scores of the birth-assigned males with features of GD did not differ significantly from those of the population males or females (except for one subdimension in comparison to the population females). Meanwhile, the birth-assigned females in the gender-referred group differed on one primary dimension and some subdimensions from the general population females but not from the males. Hence, the identity development of the gender-referred females was slightly more mature than that of the population females and did not differ significantly from that of the population males. Additionally, analyses comparing proportions scoring to impaired range of identity development

suggested least problems among gender-referred adolescents assigned males at birth.

This study suggests that the identity development trajectory may be slightly different among the adolescents with features of GD compared to that of adolescents on average, but in a positive way. The adolescents with features of GD may have been required to process their identity more and may thus have benefited from their possible identity crisis deriving from the experience of GD. This seems to be the case especially among the birth-assigned males with features of GD in our study, who seem to have been able to consolidate their identity most successfully, perhaps against many environmental odds, since feminine behavior in boys may be less readily tolerated than masculine behavior in girls (30, 31).

Excessive psychopathology has been reported in adolescents with GD (16–18), and severe psychopathology has been connected to poorer identity development (20). However, in our sample of gender-referred adolescents, identity development appeared normative and differed positively from the identity development of an adolescent psychiatric outpatient sample. However, more research is warranted on the role of psychopathology in identity integration among gender-referred samples.

Limitations

Our study included 215 adolescents with features of GD, which yields quite a representative sample of this group in Finland. However, the number of birth-assigned males in the GD group was relatively low ($n = 29$), thus, further research with larger samples of birth-assigned males with GD is needed. The possibility should also be considered that those adolescents with features of GD who may simultaneously be suffering from more severe psychiatric comorbidities may not even have been referred to gender identity assessment and thus are not included in our sample. Additionally, the gender-referred adolescents in our sample were at the initial stage of the gender identity assessment process and were not (at least yet) diagnosed with Gender Dysphoria/ Transsexualism or receiving any gender affirming treatment.

Certain caution is warranted in interpreting the meaning of the finding of the slightly more favorable identity development in the gender-referred group as compared to the population one. Demographic and psychological variables, such as socioeconomic status and IQ, could differ between the groups and actually account for differences in identity development (32). Future research needs to proceed to exploring identity development taking into account such factors.

In addition to comparing identity development between gender-referred adolescents and same-aged peers in the general population, we were able to make comparisons between gender-referred adolescents and a sample of adolescents in specialist level psychiatric outpatient treatment. The gender-referred differed clearly from this clinical group, with the adolescent psychiatric outpatients displaying systematically significantly more impairment. Thus, gender-referred adolescents did not display general identity pathology as compared to population adolescents, and their identity development clearly differed from

that of clinical adolescent psychiatric patients, the latter showing systematically more impairment. Future studies should further pursue to compare the identity development of gender-referred adolescents to different samples, also taking into account the possible psychopathology of the gender-referred adolescents. In the present data, no such background information was available. This is a limitation of the present study and warrants attention in future studies. It is known that adolescents presenting for gender identity assessment in the study clinic commonly present with severe psychiatric disorders and also differ from general population regarding sociodemographics, for example by living less commonly with both parents (18).

AIDA has been shown to have excellent clinical validity in detecting personality disorders, especially borderline personality disorder, and this has been shown in several languages (20, 26). Unfortunately, there was no Finnish borderline personality disorder sample to similarly test this clinical validity because diagnosing personality disorders before the age of 18 is not recommended in the ICD-10 (33), which is the diagnostic classification in use in Finland. However, the Finnish version is equivalent in all other result patterns to the original version of AIDA and has been developed step-by-step in cooperation with the original authors to ensure equivalence in the content. Moreover, a sample of Finnish suicidal adolescent psychiatric patients showed clearly elevated levels of impaired identity development. Persistent suicidality in adolescents may suggest borderline personality development (34), and, thus, findings among suicidal patients suggest that AIDA Finland likely differentiates personality pathology similarly to the original German version. Finnish version of the AIDA is, however, relatively recent, and research on its associations with dimensions of psychopathology in the general population is pending.

As concerns self-report materials at large, we cannot rule out attempts to present oneself overtly favorably or to exaggerate one's problems. Some of the gender-referred adolescents may have attempted to avoid discussion of possible mental health related needs, in hope of so prompting access to medical interventions. However, impression management when responding to AIDA is difficult as the underlying construct of identity development is complex and, therefore, it is not that easy to clearly understand the pathological reference of the full item set and manipulate the full result.

Different identity theories may use the same terminology to refer to different concepts and phenomena. In the work of Erikson, Marcia, and Kroger (3, 9), identity diffusion is an identity status characterized by lack of identity commitments and active identity work. In AIDA, the concept of identity diffusion refers, in line with Kernberg's theory of personality disorders, to a pathological identity development deemed a psychiatric syndrome underlying all severe personality disorders. Borderline

personality organization in particular is characterized by identity diffusion manifesting in a non-integrated concept of the self and significant others (7, 20). In both these theoretical approaches, identity diffusion may manifest in a lack of commitment in a variety of life domains.

CONCLUSION

In our study, the clinically referred adolescents with features of GD displayed similar or slightly more favorable identity development than did the Finnish young people in general. Adolescent birth-assigned males with features of GD presented with least impairment in their identity development. This does not suggest that transgender identification with feelings of GD would represent problems in identity development at large. The gender-referred adolescents with features of GD may have been required to process their identity more and, thus, may have benefited from the possible identity crisis related to GD. The potential progress in the identity development of these adolescents could be seen as their strength and taken into account when working with these adolescents, whether they progress further in their gender-affirming treatments or not.

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 Ethics Committee of Tampere University Hospital and Tampere University. Written informed consent from the participants' legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

RK analyzed the data. MK was responsible for drafting and revising the manuscript. All authors contributed to the design of the work, acquisition and interpretation of the data, revising the manuscript, and approving its submission to *Frontiers in Psychiatry*.

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