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Crime, mental health, and the law: A psycho-criminological perspective

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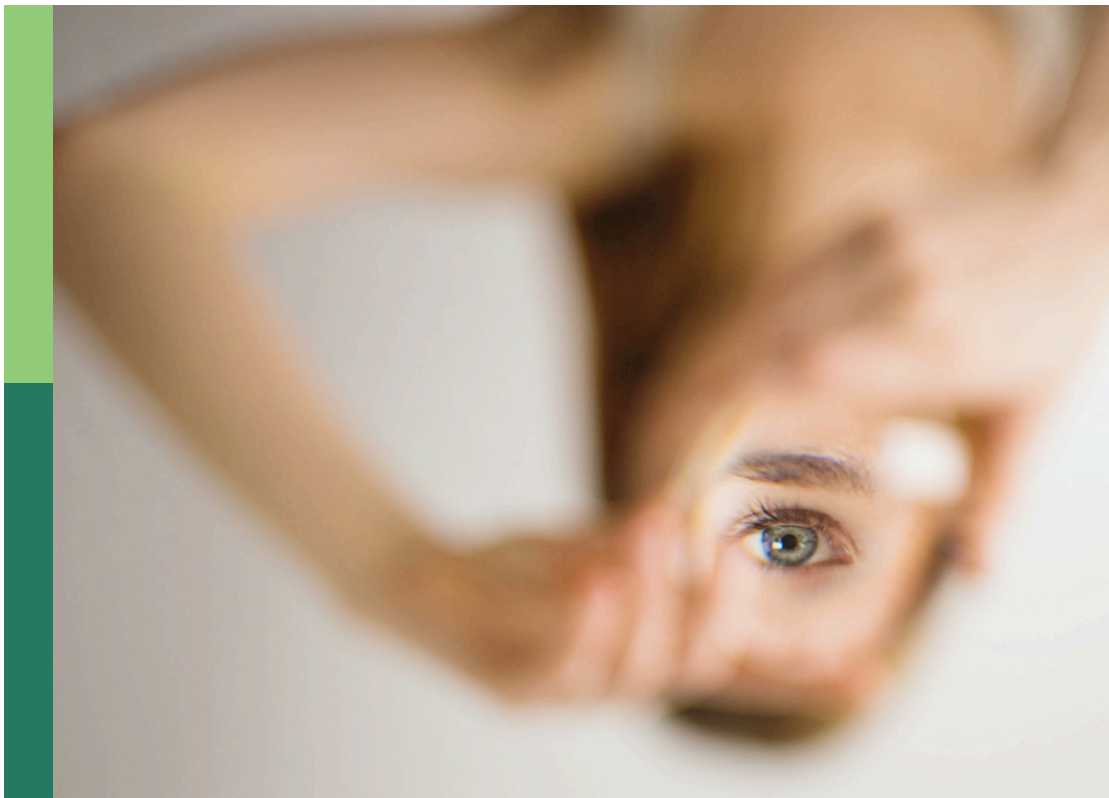

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Crime, mental health, and the law: A psycho-criminological perspective

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Table of contents

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Editorial: Crime, mental health, and the law: A psycho-criminological perspective

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Editorial on the Research Topic
Crime, mental health, and the law: A psycho-criminological perspective

Broadly speaking, psychology is the scientific study of behavior and mental processes, while criminology is the scientific study of crime and criminal offenders. Psychological criminology (or simply as psycho-criminology), which combines the two, is generally concerned with the use of psychological knowledge and skills to explain, describe, and potentially prevent or deal with deviant and criminal behavior (Hollin, 2012; Chan and Ho, 2017; Chan and Sheridan, 2020; Chan and Adjorlolo, 2021; Chan and Wong, 2023). More specifically, psycho-criminology (an abbreviated term for "psychological criminology") is the study of individual criminal behavior, with particular interest on how the behavior is learned, evoked, continued, and evolved as a result of personality, social, and/or environmental influences (Bartol, 2002). In the words of Wortley (2011), psychological criminology addresses the general question, "What is it about the individuals and their experiences that cause them to commit crime and/or to become criminal?" (p. 1).

In this Research Topic (RT), the focus lies on the application of psycho-criminological approaches and constructs to crime, criminal and civil law, and the influence of law on mental health and behavior. This RT aims to advance our understanding of psycho-criminological mechanisms (i.e., personal, social, and environmental influences) associated with different criminal behavior in the intersections of mental health and the law. The 10 articles included in this RT explore varied aspects of crime and criminal behavior through the application of psychological concepts and theories to increase our understanding of crime, delinquents and criminal offenders, and their behavior. The highlight of this RT is the range of contribution conducted with six sampling populations, namely Spanish, mainland Chinese, Hong Kongers, Americans, Germans, and Italians. Besides, the collection of these articles addresses the different aspects in the criminal justice system (e.g., youth, correctional, legal, and mental health) from a psycho-criminological standpoint.

This RT begins with an empirical study of testing a typology of Spanish homicides by Pecino-Latorre et al.. Using a sample of 448 homicides, this article examines the effectiveness and validity of the Action System model to distinguish thematically between the structure of the homicides and to generate a homicide typology in Spain based on the relationships between the modus operandi, and victim and offender characteristics. Four homicide typologies were identified: Expressive, Adaptive, Integrative, and Conservative. Next, Zhu and Shek investigate the effect of individual dimensions and the global positive youth development (PYD) measures on adolescent delinquency, individually; and

the underlying mediating effect of life satisfaction. Employing a two-wave longitudinal data collected from 2,648 mainland Chinese adolescents, findings are found to be consistent with the general theoretical prediction of the PYD approach; in which different PYD attributes (cognitive-behavioral competence, prosocial attribute, positive identity, and general PYD attribute) are inversely related to concurrent and future adolescent delinquency. Moreover, the negative predictions are mediated by the adolescents' life satisfaction. Also recruiting mainland Chinese adolescents, Xiong et al. construct a moderated mediation model to test the mechanisms underlying the relationship between perceived discrimination and proactive and reactive aggression in a longitudinal data of 470 mainland Chinese migrant students (aged 11–17). They observed that perceived discrimination fosters negative emotions, which in turns increase reactive aggression. Furthermore, socioemotional support reduces the negative impact of perceived discrimination on reactive aggression by weakening the relationship between perceived discrimination and negative emotions.

In Hong Kong, Chan sampled 1,171 young adults (aged 18–40) to explore the psychosocial risk factors of risky sexual behavior (RSB) by testing the theoretical propositions of several criminological theories (the theories of self-control, general strain, social learning, social control, and routine activity). Relative to females, males possess significantly higher mean levels of general, penetrative, and non-penetrative RSB; and negative temperament, use of alcohol and other drugs, and paraphilic interests. Males and females are generally sharing a similar set of psychosocial risk factors (use of alcohol and other drugs, and paraphilic interests) for their involvement in general, penetrative, and non-penetrative RSB. Similarly exploring risky behaviors, Méndez et al. explore the different adaptation profiles (personal, school, and social) in adolescents based on their interpersonal risk factors on drug use. Analyzing 1,201 secondary school students (aged 11–18 years) in Spain, a latent class analysis generated three different types of adaptation: Maladjusted group, At-risk group, and Adjusted group.

Next, Acklin and Velasquez argue that Structured Professional Judgment (SPJ) methods can be a corrective approach for unstructured clinical judgment that prone to evaluator bias and suboptimal levels of inter-rater reliability. The authors propose a SPJ model for criminal responsibility evaluations translated from violence risk assessment methodology. Sampling 230 patients in 13 forensic psychiatric hospitals in Germany, Büsselmann et al. measure the patients' quality of life in forensic psychiatric hospital using the Measuring the Quality of Prison Life (MQPL) questionnaire. They found that the adapted MQPL questionnaire demonstrates good internal reliability and construct validity. The next article by Titze et al. examine the self-reported acculturation processes and associated individual and social factors in a similar sampling population of 235 forensic psychiatric patients with a migration background in 11 forensic hospitals in Germany. The findings indicate that the patients oriented themselves more toward the culture of admission and less toward the country of origin than the reference sample did.

In Italy, Rossetto et al. retrospectively compared 42 readmitted with 48 non-readmitted females in an Italian forensic psychiatric hospital through a minimum of 42 months follow-up (ranges from 3.5 to 10 years). Their findings indicate that readmitted females were positively associated with the presence of substance use disorders and a primary diagnosis on Axis II. The final article of this RT is authored by Brown et al.. They examine the fetal alcohol spectrum disorder (FASD) by proposing a renewed focus on applying and adapting the Risk-Need-Responsivity (RNR) approach to individuals with FASD in criminal justice settings. The authors argue that the use of RNR approach can better determining the needs and interventions in reducing the propensity of offender recidivism.

With studies conducted in Spain, Mainland China, Hong Kong, the USA, Germany, and Italy, the 10 articles in this RT collectively demonstrate the importance of applying psycho-criminological knowledge and skills to better understand the underlying mechanism (i.e., personal, social, and environmental influences) associated with different criminal behavior in the intersections of mental health and the law. Having studies from different cultures and jurisdictions have clearly demonstrated that a combined etic-emic approach is arguably more appropriate when studying crime and criminal behavior, and developing culturally sensitive assessments and interventions (Ho and Cheung, 2007).[1] It is important to continue with more international research to advance our knowledge of research and best practice that have implications for further research, practice, and policy development/refinement in this emerging field of psycho-criminology.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of interest

The 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.

1 The etic approach proposes that theories and practices are universal and can be transferred to other cultures with little modification, while the emic approach assumes that behavior is culture-specific. The combined etic-emic approach suggests that elements (e.g., theoretical concepts and models) that appear to be universal can be initially identified and other emic elements (e.g., strategies and practices) can be developed based on specific cultural and population characteristics.

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The Action System Model: A Typology of Spanish Homicides

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The Action System model offers a scientific foundation to the differentiation and classification of crimes, based on behavioral indicators, allowing the establishment of relationships between the actions carried out by the offender on the crime scene and their characteristics. Although it was originally developed for application to fires, its utility has been tested in distinct criminal typologies, with few studies having considered homicides. The objective of this study was to examine the effectiveness and validity of the Action System model to differentiate thematically between the structure of the homicides and to create a typology of simple homicides in Spain, based on the relationships between the *modus operandi*, characteristics of the victims and characteristics of the offenders. The sample consisted of 448 homicides. Four homicide typologies were identified: Expressive, Adaptive, Integrative and Conservative, which represent 87.5% of the studied cases. Expressive homicides are impulsive, with offenders having criminal records and previously knowing their victims. Adaptive homicides are linked to robberies and sexual aggressions, in which the victim and offender are strangers. Integrative homicides take place in the family environment, specifically female offenders and femicides. Conservative homicides are very well planned, highlighting the presence of post mortem actions. The findings of this work suggest that the Action System model is a useful theoretical framework for the identification of variations in criminal behavior and understanding of the psychological processes underlying the homicides. These results have practical implications in the academic setting, since they offer a global perspective as to how simple homicides in Spain may be differentiated, also within the framework of criminal profiling, specifically, suspect prioritization.

Keywords: action system, homicides, investigative psychology, crime scene behavior, multidimensional scaling, cluster analysis

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INTRODUCTION

Homicides are considered to be the most extreme manifestation of criminal behavior (Liem, 2013). The International Classification of Crime defines it as "*unlawful death inflicted upon a person with the intent to cause death or serious injury*" (United Nations Office on Drugs and Crime [UNODC], 2015, 17). Over recent decades, its study has been of great interest in the academic and professional

areas, not only due to the seriousness of the offense, but also given its repercussions on psychosocial, political and economic aspects of a country (Botelho and Gonçalves, 2016; Vichi et al., 2020). And, homicides promote fear, social alarm and the perception of insecurity in a country, influencing the assessment made by society on the effectiveness of its police forces (Ganpat et al., 2011; Braga and Dusseault, 2018; González et al., 2018).

At the global level, homicides rates are relatively stable or declining for over the last few decades (Liem and Pridemore, 2012; United Nations Office on Drugs and Crime [UNODC], 2019). The global average homicide rate in 2017 was reported to be 6.1 per 100,000 population, with the highest rates was recorded in Central America and South America. By contrast, the subregions with the lowest levels of homicide were Southern, Western and Northern Europe (Weiss et al., 2016; United Nations Office on Drugs and Crime [UNODC], 2019; Miles and Buehler, 2020). Currently, Spain is one of the European countries with the lowest homicide rates (0.6), whereas the United States and the United Kingdom where the majority of homicide research is conducted, have rates higher than that (5 and 1.2, respectively) (United Nations Office on Drugs and Crime [UNODC], 2018).

Of the current trends in homicide studies, some works have focused on prediction, given the major practical implications that it has on police investigations (González-Álvarez et al., 2015; Abreu et al., 2018; Fox and Farrington, 2018). Specifically, there has been an interest in examining the utility of criminal profiling, as a criminal investigation technique directed at assisting in the prioritization and detention of offenders (Chan et al., 2019; Pecino-Latorre et al., 2019a; Sorochinski and Salfati, 2019; Ivaskevics and Almond, 2020). Therefore, numerous typologies have been created for homicides, always based on empirical evidence to ensure a more rigorous and systematic profile creation process (Horning et al., 2015; Fujita et al., 2016; Khoshnood and Väfors Fritz, 2017; Sea et al., 2017).

Similarly, many research studies have established a homicide classification, based on the Instrumental/Expressive dichotomy of aggressive behavior (Salfati and Park, 2007; Goodwill et al., 2014; Adjorlolo and Chan, 2015; Sea and Beauregard, 2017; Pecino-Latorre et al., 2019b). However, some authors consider that the Instrumental/Expressive instrument is an excessive simplification of the violence as it attributes the behavior to only one psychological construct (Häkkänen et al., 2004b; Thijssen and De Ruiter, 2011). Therefore, Canter and Youngs (2009) offer more complex models of criminal differentiation such as the Action System model, based on the General Systems Theory (von Bertalanffy, 1968; Shye, 1985).

Based on the Action System model it is assumed that criminal behavior includes two main facets, the source of the criminal action and the desired target of the criminal behavior, which may be internal or external to the offender (Canter and Fritzon, 1998). Thus, offenders can be differentiated based on whether the motivating source of their crime is expressive (internal) or instrumental (external) in nature (Fritzon et al., 2014). Similarly, offenders can also be categorized based on the nature of the target and whether it is external (object) or internal (person) to the offender. Furthermore, previous studies has suggested that offenders could be classified based not only on their crime scene actions but by their background characteristics too (Fritzon et al., 2001; Häkkänen et al., 2004b). In this way, the combination of these two facets leads to four modes of functioning: Expressive, Adaptive, Integrative and Conservative.

In the Expressive mode, the offender perceives the victim as an object on which his/her feelings of anger and frustration may be manifested (Canter, 2010; Hollows and Fritzon, 2012). Homicides included in this mode reflect a great impulsivity, with the main trigger being interpersonal conflicts between the victim and the author (Fritzon and Brun, 2005; Cullen and Fritzon, 2019). Also, it is likely that this type of violence is common in offenders who experience a negative emotional state; therefore, it is characteristic of offenders with criminal records (Fritzon and Brun, 2005; Cullen and Fritzon, 2019). In the Adaptive mode, the actions have an instrumental nature, and violence is a means of achieving the desired objectives of the offender (e.g., economic or sexual benefits) (Fritzon and Brun, 2005). In these cases, the victims do not hold a special significance to the offender, since they are not killed for who they are, but rather, for what they represent (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005). In the Integrative mode, homicides are related to an emotional explosion, interpreted as a form of freeing up accumulated emotional tension of the offender and, in the most extreme cases, the offender may commit suicide after carrying out the homicide (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005; Cullen and Fritzon, 2019). In these homicides, it is likely that the victim will be from the family setting (Fritzon and Garbutt, 2001; Cullen and Fritzon, 2019) and the offender will suffer from some sort of emotional disorder (Fritzon, 2013). In the Conservative mode, the actions carried out by the offender are not emotional, but rather, instrumental, as an attempt is made to maintain an integral part of his/her personality that has been attacked (e.g., cultural values, religious beliefs) (Fritzon and Brun, 2005). This is characteristic of homicides that are precipitated by arguments and are motivated by a desire for revenge, control and power; in addition, it is characterized by much criminal planning, given the large degree of psychological rumination (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005; Fritzon, 2013).

This model not only identifies four means of functioning, but also establishes similarities and differences between them (Fritzon et al., 2001; Fritzon, 2013). Considering these relationships, their disposition in the multi-dimensional space responds to a specific configuration. Therefore, the Expressive and Conservative modes appear to conflict with one another, being significantly different in terms of origin of the action, as is the case with the Integrative and Adaptive modes, in terms of objective of the action. Similarly, the direction of the latter is perpendicular to the direction outlined by the Expressive and Conservative modes (Canter, 2010).

Therefore, the Action System model offers a scientific foundation to differentiate and classify crimes based on behavioral indicators, allowing for the development of relationships between the actions carried out by offenders on the crime scene and their characteristics (Canter and Youngs, 2009; Canter, 2010). Similarly, it permits inferences to be made between certain psychological characteristics and characteristics

of personality that are associated with distinct forms of crime, facilitating the understanding of the psychological processes underlying the crime (Canter and Fritzon, 1998; Fritzon, 2013; Cullen and Fritzon, 2019).

Although this model was initially used to identify variations in criminal activity and determine criminological profiles in fires (Canter and Fritzon, 1998; Fritzon et al., 2001, 2014; Santtila et al., 2003; Häkkänen et al., 2004b; Almond et al., 2005), later, some authors have demonstrated its use in distinct crime typologies, such as terrorism (Fritzon et al., 2001), critical incidents (Hempenstall and Hammond, 2018), genocide (Hollows and Fritzon, 2012) and rape (Canter et al., 2003; Häkkänen et al., 2004a). In the case of homicide, few studies have explored its use, and the majority of those that have considered it have focused on a specific type, such as familicide (Fritzon and Garbutt, 2001; Cullen and Fritzon, 2019) and homicides taking place in the school setting (Fritzon and Brun, 2005).

After conducting a scientific literature review, no prior studies from Spain were found that used this model to classify homicides into typologies and link them to characteristics of the offenders. Therefore, the objective of this work is to verify the effectiveness and validity of the Action System model in order to offer a thematic differentiation of the homicide structure and create a typology of simple homicides in Spain based on the relationships between the *modus operandi*, victim characteristics and offender characteristics.

Specifically, four modes of functioning were identified: Expressive, Conservative, Integrative and Adaptive, which lead to a typology of simple homicides, according to the theoretical foundations of the Action System model.

Similarly, it is expected that each of the cases studied will be classified in a dominant functioning mode, demonstrating the suitability of this model to analyze, interpret and classify a sample of homicides in Spain.

MATERIALS AND METHODS

Data

The sample consists of 448 cases of homicides carried out in Spain between 2010 and 2012. Of the total, 81% of the homicides were committed by offenders who knew their victim and 11% were carried out by strangers. The majority of the offenders and victims are male (90.8 and 53%, respectively), tend to be Spanish (offenders: 70%; victims: 72%). The mean age of the offenders is 41.16 (SD = 15.18, range = 18–86) and 42.88 for the victims (SD = 19.85, range = 0–94) at the time of the offence.

Procedure

The database from the Report on Homicides in Spain (*RHS*) 2010–2012 was used (González et al., 2018). It was mobilized and coordinated by the Cabinet of Coordination and Studies of the Secretary of State for Security of Spain, under the Spanish Ministry of the Interior. During the early stages, the parties responsible for this project requested police reports from the corresponding police departments (Civil Guard and National Police forces) and created a database to permit information collection. Next, specialized training was received on how to carry out the data dump procedure and information extraction.

The final RHS database contains a total of 684 homicide cases, and it includes basic characteristics of each homicide, on the sociodemographic background of both victim and offender, and on the offender crime scene behavior.

In accordance with the methodology used in past studies on criminal profiling, only simple homicide cases were included (with an offender and a mortal victim), carried out by individuals over the age of 18 and solved by the police department, reducing the number of analyzed cases to 448.

Then, the variables were selected, referring to past literature on homicides in the field of Investigative Psychology (e.g., Salfati, 2000, 2003; Santtila et al., 2001). Other variables were also included which were not used in prior works, such as, for example, the offender's escape method and certain sociodemographic characteristics of the victims and offenders that are of special interest since they establish homicide typologies in Spain.

Finally, data purging was performed in order to thoroughly analyze the quality of the information and prepare a matrix for statistical analysis. Variables were dichotomized according to the presence (1) or absence (0) of homicide behavior or characteristics (Canter and Heritage, 1990; Canter and Fritzon, 1998; Gerard et al., 2017).

Statistical Analysis

The data analysis procedure was carried out in distinct phases. In the first phase, non-metric multidimensional scaling (nMDS) was used, based on R statistic software. The nMDS is a multivariant exploratory technique that represents the correlations between variables as distances on a bi-dimensional map, in which the proximity between variables indicates the frequency of their collective appearance and therefore, their thematic similarity. This procedure offers a global vision of the relationships between all of the variables which permits analysis and interpretation of the psychological processes underlying the homicide (Salfati and Canter, 1999; Groenen and Borg, 2014). The Jaccard similarity coefficient was used to calculate the association between the variables, since it is the most appropriate for the treatment of data from police sources (Ioannou et al., 2015; Almond et al., 2017b; Hempenstall and Hammond, 2018). Below, the goodness of fit was assessed for the model using Kruskal's *Stress*-I and the R^2 coefficient of determination.

In the second phase, the *k*-medoids clustering algorithm was used, with R statistic software in order to establish different homicide typologies. Based on the nMDS coordinates matrix, the variables were grouped in k clusters, using the Manhattan distance. For this, the number of clusters was determined *a priori*, first examining the optimal number of groupings. Next, the internal quality of the groupings was analyzed, considering the Global Silhouette Index and the Dunn index.

In the third and final phase, to assess the suitability of the Action System model, each of the cases was assigned to a dominant functioning cluster or mode. In this way, each case was assigned a score that reflected the proportion of variables present in each cluster, specifically classified in each when the

score for this cluster was greater or approximately equal to the sum of the scores of the other three. Cases were considered hybrids when they contained the same proportion of variables in more than two clusters. This classification method based on the proportion of variables has been used in past studies (e.g., Fritzon and Garbutt, 2001; Fritzon and Ridgway, 2001; Häkkänen et al., 2004b).

RESULTS

Descriptive Analysis

After performing a univariate analysis of the data, variables that were present in over 70% of the homicides were removed as they occur in the majority of cases and therefore, were not useful when differentiating between cases and identifying themes (Almond et al., 2017a). In addition, variables that occurred in less than 1% were removed because they would have limited utility for classification purpose (Fritzon and Garbutt, 2001).

This study, therefore, used 32 mutually exclusive variables, 19 of which are related to the crime scene, 5 with the offender, 3 with the victim and 5 with the interaction between victim and offender. **Table 1** presents a descriptive analysis of the variables used in the subsequent multivariable statistical analysis (see Appendix for the content dictionary).

Multidimensional Scaling

Figure 1 presents a bi-dimensional map resulting from the nMDS analysis, which shows the proximity of the 32 variables in a geometric space.

A Stress-I index of 0.215 was obtained, suggesting a poor data fit; however, the RSQ is close to 1 (0.795), demonstrating that the fit between disparities and distances is very good. Considering that the stress value is not a conclusive criterion to determine the goodness of fit of the data, it may be assumed that the model has an acceptable goodness of fit. Furthermore, some authors have affirmed that a model may be accepted even when not having a perfect fit, assuming that the spatial representation of the variables permits a significant interpretation (Salfati and Haratsis, 2001; Salfati and Dupont, 2006).

Cluster Analysis

Even though the solution for five clusters is that suggested by the program, this does not adjust to the theoretical foundations of the Action System model. Therefore, a *k*-medoids clustering algorithm was performed to obtain four groupings.

As **Figure 2** shows, the behavior of the offenders on the crime scene could be distinguished in terms of internally and externally motivation sources. Some behaviors occurring on the diagonal left-hand side of the plot suggest the expressive form of aggression (internal source of action). Victims tend to be individuals who are known by the offender, making it likely that these are homicides caused by an argument with the victim, with the offender attempting to inflict pain, thus indicating the important role of emotions in these crimes. Also, the offender who committing suicide following the homicide is interpreted as an outward expression of anger which subsequently turned inward. By contrast, the variables located on the vertical right-hand side of the plot (e.g., staged, body hidden, body displaced, sexual, stole) represent actions of an instrumental nature (external source of action) that are the result of an ulterior motive to the violent act.

On the other hand, the behavior of the offenders on the crime scene could also be differentiated in terms of the role of the target. The horizontal top half of the plot reflects the victim the victims are perceived as objects (external target of action) by the aggressor, who has no feelings for them (e.g., stranger, other relationship). Thus, the victims are perceived as a means of achieving the aggressor's main objective (economic, sexual). In addition, the horizontal bottom half of the plot was suggestive of the victim as person (internal target of action), in that offenders who perceived their victim as significant individuals tend to distance him/herself from the homicide

TABLE 1 | Descriptive analysis of the variables of the crime scene, offenders and victims.

Variables Name (label)	N (%)
Crime scene characteristics	
1. Sharp weapon (sharp)	220 50.6
2. Escape on foot (foot)	120 (39.6)
3. Arrested in crime scene (arrested)	109 (36.8)
4. Method of approach (approach)	106 (36.3)
5. Weapon displacement (wdisplaced)	131 (36.3)
6. Escape by vehicle (vehicleesc)	109 (36)
7. Bring a weapon to crime scene (wbring)	102 (31.7)
8. Crime scene outdoor (outdoor)	135 (30.1)
9. Firearms (firearms)	62 (14.3)
10. Physical force (force)	48 (11)
11. Blunt weapon (blunt)	42 (9.7)
12. Body displacement (bodydispl)	35 (7.9)
13. Hidden body (bodyhidden)	26 (5.9)
14. Property stolen (stole)	18 (5.2)
15. Suffocation (suffocation)	20 (4.6)
16. Crime scene vehicle (csvehicle)	19 (4.2)
17. Staged (staged)	10 (2.3)
18. Offender forensically aware (forensic)	8 (1.8)
19. Sexual assault (sexual)	3 (1)
Offender characteristics	
20. Offender aged 31–50 years (off31–50)	225 (50.5)
21. Offenders convicted for crimes against the person (crecord)	145 (43)
22. Non-Spanish offender (non-spanishoff)	134 (30)
23. Suicide (suicide)	70 (15.6)
24. Female offender (femaleoff)	41 (9.2)
Victim characteristics	
25. Female victim (femalevic)	209 (46.8)
26. Victim aged 31–50 years (vic31–50)	160 (37.1)
27. Acquaintance (acquaint)	150 (34.5)
28. Intimate relationship (intimate)	136 (31.3)
29. Non-Spanish victim (non-spanishvic)	123 (28)
30. Family (family)	82 (18.9)
31. Stranger (stranger)	39 (9)
32. Other relationship (other)	28 (6.4)

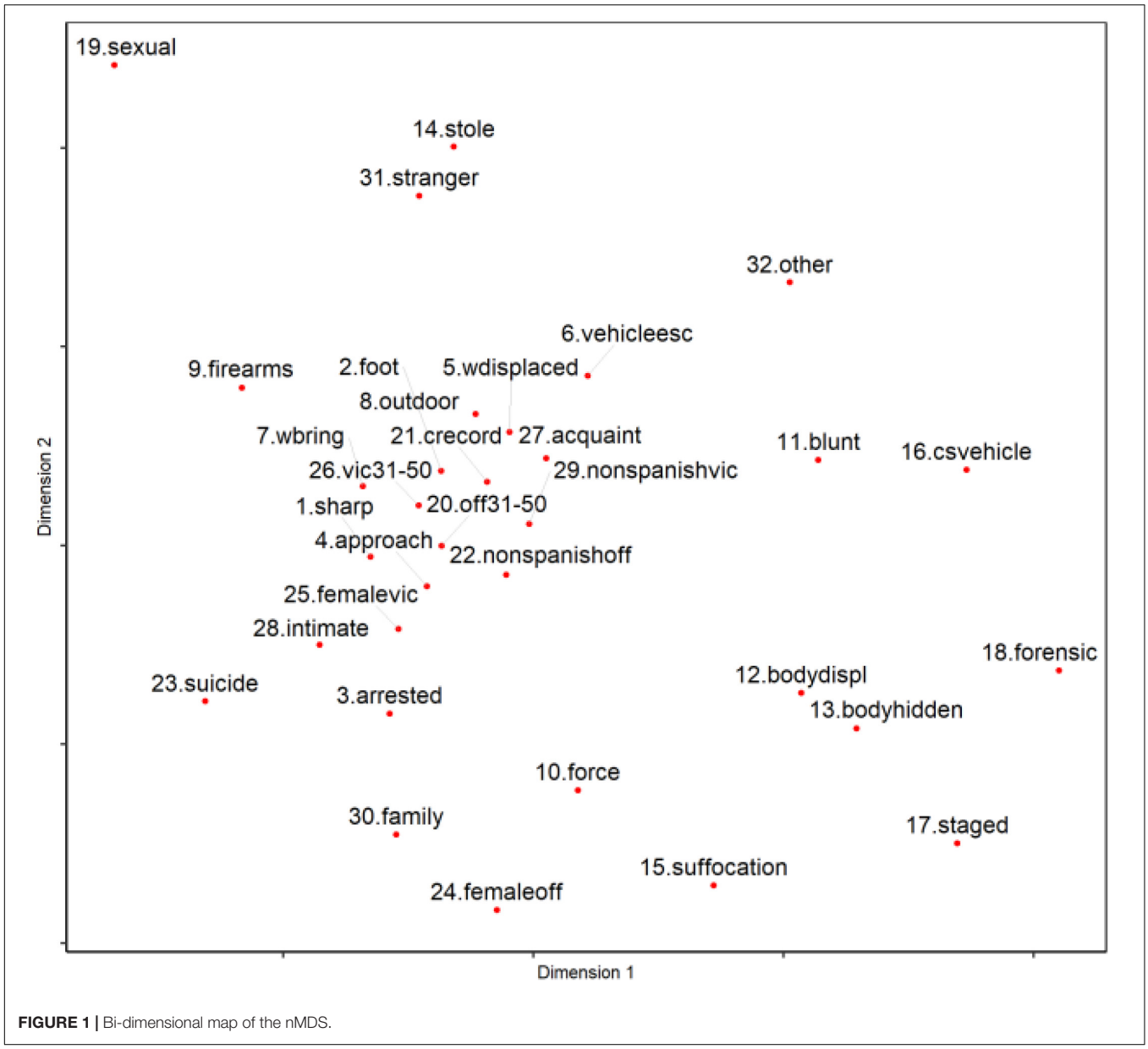

FIGURE 1 | Bi-dimensional map of the nMDS.

committed (e.g., intimate, family, forensic awareness, body displaced, body hidden).

Therefore, four modes of functioning may be identified which offer a typology of homicides: Conservative, Expressive, Integrative and Adaptive (**Figure 2**). Likewise, it may be seen that the Expressive and Conservative modes appear in opposition to one another, as is the case with the Adaptive and Integrative modes, with the direction of these latter being perpendicular to that of the Expressive and Conservative modes.

The Global Silhouette obtained a value of 0.37, observing that all of the variables were correctly assigned to the clusters; similarly, the Dunn index had a value of 0.99, therefore there is evidence that the clusters may be correctly separated. Ultimately, the analyses performed to assess the internal quality of the groupings revealed that the clusters had an acceptable internal validity, guaranteeing the goodness of the simple homicide typologies that were established.

Expressive Homicides

Cluster 1 is represented in the central part of the plot in **Figure 2**, and is made up of 15 variables. These are homicides that take place outdoors (outdoor), where the offenders approach their victims with the intent to kill them (approach). To do so, they use blunt objects (blunt), sharp weapons (sharp) and firearms (firearms), which tend to be brought to the scene by the aggressor (wbring) and which, after the homicide, are left at the original site of the event (wdisplaced); in addition, the offenders escape from the crime scene by foot (foot) or by vehicle (vehicleesc). As for the victims, they are between 31 and 50 years old (vic31–50), of foreign nationalities (non-spanishvic), and are known by

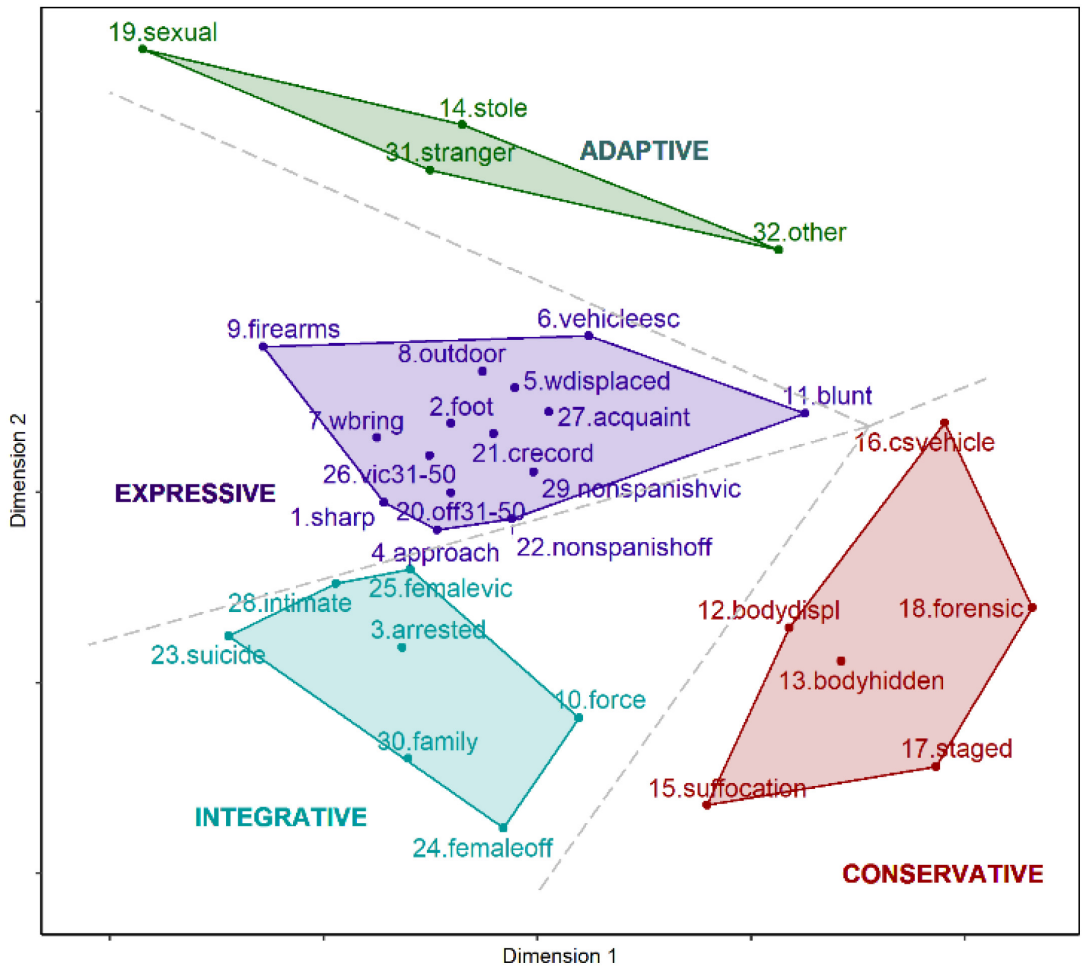

FIGURE 2 | Typology of simple homicides according to the Action System model.

the aggressors (acquaint). The offenders are between 31 and 50 years old (off31–50), also foreigners (non-spanishoff), and have criminal records for crimes against individuals (crecord). Therefore, taking into account the characteristics of the variables making up this cluster, it is considered that these homicides reflect an Expressive functioning mode.

Adaptive Homicides

Cluster 2 is represented in the upper part of the plot in **Figure 2**. The variables included indicate that these homicides take place during the course of other criminal activities, specifically, robberies (stole) and sexual aggressions (sexual). These homicides are instrumental in nature, since the purpose of the offender is to obtain sexual or economic gratification. The victims are unknown to the offenders (stranger) or have some other type of relationship with them (other). Therefore, these homicides reflect an Adaptive functioning mode.

Integrative Homicides

Cluster 3 is represented in the lower part of the plot in **Figure 2**, and is made up of 7 variables. These homicides take place in the family setting. According to the disposition of the variables in the multi-dimensional space, it has been found that, on the one hand, when the aggressor is female (femaleoff), the victims tend to be individuals from their closet family environment (family), and physical force is the most common homicide method used (force). On the other hand, cases of femicides are found here, in which the victims are women (femalevic) and in a sentimental relationship with the aggressor (intimate). In these latter cases, it is noted that the aggressors tend to be detained at the crime scene or commit suicide after committing the homicide. Given the characteristics of the variables in this cluster, these homicides reflect an Integrative functioning mode.

Conservative Homicides

Cluster 4 is represented in the right side of the plot in **Figure 2**, and is made up of 6 variables. It includes homicides that are characterized by a high degree of criminal planning, since the aggressor acts with a high level of forensic awareness (forensic), not leaving incriminating evidence at the crime scene which could facilitate his/her identification, and often intentionally altering the crime events (staged) to hinder the

TABLE 2 | Classification of cases in a dominant typology.

Typology	N (%)
Expressive homicides	204 (52)
Adaptive homicides	11 (2.8)
Integrative homicides	172 (43.9)
Conservative homicides	5 (1.3)

police investigation. Similarly, the offender often removes the victim's body from the original site of the crime and/or attempts to hide the body so as to remove all evidence and indica1.tors linking him/her to the homicide (bodydispl, bodyhidden). These homicides tend to take place inside vehicles (csvehicle) and suffocation is the most predominant method used to cause death (suffocation). Therefore, the characteristics of these homicides reflect a Conservative functioning mode.

Assignment of the Cases to a Dominant Typology

Following a classification criteria based on the proportion of variables, of the 448 homicides, 392 (87.5%) could be assigned to a dominant typology, while 56 (12.2%) cases were classified as hybrids. The majority of the cases were classified in the Expressive mode (52%), followed by the Integrative mode (43.9%). Adaptive represented 2.8% of the homicides and finally, in last place, 1.3% of the cases reflected the Conservative dominant functioning mode. **Table 2** shows the results of the classification of the cases.

DISCUSSION

The results are coherent with past studies that have revealed that the characteristics of homicides and the behaviors carried out by aggressors at the crime scene may be differentiated in terms of functioning mode, facilitating the understanding of the psychological processes underlying homicides (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005; Cullen and Fritzon, 2019). Similarly, the effectiveness and suitability of the Action System model for creating a typology of simple homicides have been demonstrated, establishing connections between the *modus operandi*, victim characteristics and aggressor characteristics that are representative of the studied sample. Four homicide types were identified: Expressive, Conservative, Integrative and Adaptive, and the majority of the cases (87.5%) were classified in a dominant typology.

The Expressive mode was representative of 52% of the cases studied and it included impulsive homicides in which the victims are known by their aggressors. According to Fritzon and Brun (2005), it is likely that this type of violence is the result of an argument between the victim and the offender, although it may also reveal a regular and interiorized way of maintaining interpersonal relations when the aggressor experiences negative feelings, indicating an absence of self-control. However, given the lack of information on emotional states prior to the crime, it was not possible to include variables related to homicide motivations or potential triggers. As for the Expressive offender profile, it is similar to that found in previous studies, tending to refer to offenders with criminal records acting with higher levels of criminal planning and forensic knowledge in order to prevent their identification, thanks to their criminal experience (e.g., displaced weapon, outdoor crime scene, the aggressor escapes from the crime scene) (Cullen and Fritzon, 2019; Pecino-Latorre et al., 2019a).

On the other hand, the Adaptive mode represents 2.8% of the analyzed cases. According to past studies, these homicides are linked to other criminal activities, specifically, robberies and sexual aggressions, reflecting the instrumental nature of the violence used (Fritzon and Brun, 2005). Also, confirming prior studies, the victims do not appear to have any special meaning to the aggressor, and in fact, they are often unknown individuals who are killed for what they may represent (e.g., prostitutes) (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005).

Confirming the results of Fritzon and Garbutt (2001), in the Integrative mode, we find homicides carried out in the family setting, representing 43.9% of the examined sample. This Integrative typology includes two homicide sub-types: (a) female offenders who will a family member (family, female offender) and (b) femicides (female victim, intimate). It is likely that both cases are precipitated by an emotional outburst, such that the violence exercised by the aggressor is directed at the recovery of an emotional balance and alleviation of their feelings of anguish (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005). Femicides are most often characterized by the offender's subsequent suicide, after committing the homicide, supporting past studies that have demonstrated that the suicide variable is the most representative of this mode (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005; Cullen and Fritzon, 2019). On the other hand, according to Cullen and Fritzon (2019), female offenders were more likely to kill minors from the family environmental, one tentative explanation is that the offenders suffer from an emotional disorder; however, these results may not be confirmed due to the absence of information.

Finally, despite the fact that the Conservative mode represents a minority of the cases (1.3%), it is similar to that which has been found in past studies, highlighting very well-planned homicides in which post mortem actions take place, related to the manipulation of the crime scene, the hiding and the displacement of the body from the original site of the events (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005). According to Fritzon and Brun (2005), this type of violence is instrumental in nature, since the actions are directed at maintaining an integral part of the aggressor's personality which has been damaged. Similarly, the results support past works in which these homicides have been associated with indirect methods of causing the death of the victim (e.g., suffocation) (Cullen and Fritzon, 2019).

However, it should be noted that past works using the Action System model to establish different homicide profiles have not used a general sample of homicides, but rather, have focused on samples of intra-family and school crimes. Therefore, it is difficult to establish similarities and differences between the results obtained and those found in these studies.

The results of this study should be considered based on the following limitations. First, the lack of information on the homicide motivation and possible triggers of the homicides may prevent a better understanding of the psychological processes underlying the crime. Second, no aggressor profile has been found in relation to the Conservative homicides. This may be because the database lacks sufficient information on homicide characteristics and characteristics related to victims and offenders. Therefore, it may be interesting to complete this database with information from other sources, such as, for example, psychosocial and personality characteristics of the offenders, derived from reports completed by penitentiary institutions. This would help in the creation of more detailed homicide typologies that may establish stronger connections between the *modus operandi* and characteristics of the offenders. Finally, the conclusions derived from this work cannot be generalized to all types of homicides, which limits it is applicability for police investigations.

Future lines of research suggest the replication of this methodology using distinct homicide types (multiple homicides, juvenile homicides). It would also be interesting to discover more about the psychological differences underlying crimes and knowledge of the cognitive processes of the aggressors, given the major practical implications that this could have on police interrogations. For this, future studies should use the Narrative Action System model in order to understand the offender's interpretations of the homicide, the cognitive distortions that they may have and the motivations that may lead to the criminal act (Canter and Youngs, 2009).

CONCLUSION

This work has confirmed the suitability and validity of the Action System model in order to differentiate between the structure of homicides in terms of modes of functioning and to create a typology of simple homicides in Spain, taking into account the relationships between the *modus operandi*, characteristics of victims and characteristics of offenders. This study offers empirical evidence that helps advance prior studies that have used this theoretical framework in distinct homicide samples (Fritzon and Garbutt, 2001; Fritzon and Brun, 2005; Cullen and Fritzon, 2019). Also, this work highlights the utility of theoretical models in interpreting the results that facilitate the understanding of psychological processes underlying homicide.

Similarly, the importance of the close collaboration between police departments and academic and research institutions that promote and study homicide and other crime typologies has been highlighted (González et al., 2018). In this sense, the utility of using large databases with information on the characteristics of the homicides and their participants has been noted. This permits the identification of criminal variations having a certain applied utility.

To conclude, these results have major practical implications on academia, since they offer a general view as to how simple homicides in Spain may be differentiated based on crime scene characteristics, an area that few past studies have considered. Approximately 95% of the cases take place in the family setting and between individuals of a close proximity to the offender, with a minority of homicides taking place between strangers. Also, it has major implications for criminal profiling, specifically, for the creation of more rigorous suspect prioritization methods and improving human resource management and materials used in criminal investigations. In fact, this study has found connections between the four homicide types and distinct offender profiles, potentially of great use in the search for suspects in criminal investigations of simple homicides in Spain. For example, it has been found to be more likely that offenders will be unknown to the victims (strangers) in cases of sexual assaults or homicides taking place during robberies (Adaptive). Likewise, it has been suggested that when the victims are females, there is a greater probability that the offender was her romantic partner or ex-partner (Integrative). And it has been proven highly likely that aggressors will be foreigners, aged 31 and 50, having a criminal record against other individuals, and known to the victim (not strangers), in homicides taking place in outdoor crime scenes and where firearms have been used (Expressive).

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

Ethical approval was not provided for this study on human participants because the data is from police reports of scenes where there is a deceased victim. This makes it impossible to obtain your informed consent. The data processing has been carried out in accordance with current legislation. Furthermore, the data has been analyzed with the permission and collaboration of the Spanish Ministry of the Interior. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

MP-L, RP-H, and MP-F developed the study concept and design. MP-L performed formal analysis and interpretation of data. MP-L and JS-H contributed with data collection. MP-L, JS-H, RP-H, MP-F, and JG wrote, reviewed, and edited the manuscript. All authors approved the final version of the manuscript.

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APPENDIX: CONTENT DICTIONARY

Crime Scene Characteristics

1. Sharp weapon: A weapon that is made up of a metallic blade or another material having similar physical characteristics, for cutting or puncturing
2. Escape on foot: The aggressor escapes from the crime scene by foot
3. Arrested in crime scene: The aggressor is detained at the crime scene
4. Method of approach: Method of approaching the victim (includes sudden attack, tricking, prior relationship or surprise)
5. Weapon displacement: The weapon was displaced by the aggressor from the crime scene
6. Escape by vehicle: The aggressor uses any type of vehicle to escape from the crime scene
7. Bring a weapon to crime scene: Weapon brought to the crime scene by the aggressor to carry out the act
8. Crime scene outdoor: Homicides carried out in scenes that are exposed to nature
9. Firearms: All portable weapons that have a barrel and that are shot, that are designed to be shot or that may be easily transformed to shoot a pellet, bullet or projectile, by action of a combustible propellant
10. Physical force: The aggressor uses his/her physical force to mortally harm the victim
11. Blunt weapon: An object that lacks a sharp edge and/or blade and that may have dull edges that can be used to hit and cause traumatic injuries
12. Body displacement: The cadaver was displaced from the crime scene
13. Hidden body: The victim's body was hidden by the aggressor
14. Property stolen: Robbery of objects with physical force, robbery with violence and intimidation and/or robbery and theft of vehicles
15. Suffocation: Refers to actions in which an instrument is used to suffocate the victim
16. Crime scene vehicle: Homicides carried out inside vehicles
17. Staged: Intentional staging of the crime scene by the offender, to mislead the investigation or to make the homicide appear to have been a suicide
18. Offender forensically aware: Existence of forensic knowledge by the aggressor (specialized knowledge permitting the offender to successfully commit the crime or remove evidence)
19. Sexual assault: Sexual assault

Offender Characteristics

20. Offender aged 31–50 years: Offender is between the age of 31–50 years
21. Offenders convicted for crimes against the person: Record of history of crimes against persons (including homicides)
22. Non-Spanish offender: Non-Spanish offender
23. Suicide: Suicide carried out or attempted by the aggressor (be it at the crime scene or at another location)
24. Female offender

Victim Characteristics

25. Female victim
26. Victim aged 31–50 years: Victim is between the ages of 31–50
27. Acquaintance: Acquaintance/neighbor, friend, work/commercial, school relations
28. Intimate relationship: Past or present intimate relationship (be it a couple, spouse, ex-couple, separated or divorced)
29. Non-Spanish victim: Non-Spanish victim
30. Family: Victim and offender have some sort of family relationship
31. Stranger: The victim and offender are strangers
32. Other relationship: Had another type of relationship that is not specified in the previous categories

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Predictive Effect of Positive Youth Development Attributes on Delinquency Among Adolescents in Mainland China

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The general proposition of the positive youth development (PYD) approach is that developmental assets such as psychosocial competence can promote healthy adolescent development and reduce problem behavior. Despite that many Western studies have shown that PYD attributes are negatively related to adolescent delinquency, not all empirical findings support the negative associations. Although different dimensions of PYD attributes may bear differential relationships with delinquency, this possibility has not been properly examined so far. In addition, related studies in mainland China do not exist. Finally, the possible mediating role of life satisfaction in linking PYD attributes to delinquency has rarely been studied. To address the research gaps and understand how PYD attributes are associated with adolescent delinquency and the underlying mediating effect of life satisfaction, matched longitudinal data were collected from 2,648 mainland Chinese secondary school students (1,109 girls, Mean age = 13.12 ± 0.81 years at Wave 1) at two waves which were separated by one year. On each occasion, participants completed a questionnaire containing validated measures of PYD attributes, life satisfaction, and delinquency. Congruent with the general theoretical prediction of the PYD approach, different PYD attributes were inversely related to concurrent and future adolescent delinquency in separate regression analyses. In addition, the negative predictions were mediated by life satisfaction. When all PYD attributes were included in a single path analysis model, three findings were observed. First, two PYD dimensions, including self-identity and general PYD attributes, showed robust negative predictions on delinquency via life satisfaction. Second, prosocial attributes displayed a weak and unstable negative predictive effect. Third, cognitive-behavioral competence showed an unexpected positive predictive effect on delinquency directly or via its negative effects on life satisfaction. The present findings add value to the existing literature by revealing the predictive role of PYD attributes on life satisfaction and delinquency among mainland Chinese adolescents. The findings also reinforce the importance of investigating individual dimensions of PYD attributes simultaneously in the research field. The present study suggests that it is promising to cultivate PYD attributes as a strategy to reduce delinquency among adolescents in mainland China.

Keywords: longitudinal study, delinquency, life satisfaction, mediation, high school student

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INTRODUCTION

Adolescence is a transition period when adolescents experience physical and psychosocial changes, explore their adult identities, and learn to live independently. If adolescents are not capable of dealing with developmental challenges, problematic behaviors such as delinquency are likely to emerge. Plentiful evidence shows that higher prevalence rates of delinquency are growing global concern, particularly among early adolescents in both Western and Chinese contexts (Felson and Kreager, 2015; Shek and Lin, 2016). Delinquency's co-occurrence with other developmental issues, such as depression and substance consumption, also severely hinders interpersonal development, academic achievement, well-being, and even society's sustainability (Chen et al., 2012; McDonough-Caplan et al., 2018). In fact, early and persistent delinquent behaviors have been regarded as strong predictors of later violence, unemployment, and substance abuse (Bradshaw et al., 2010; Brook et al., 2013). For example, adolescents who were involved in battling and inferior theft reported maladaptive problems such as depression, withdrawal from high school in late adolescence, and substance abuse problems (Cook et al., 2015). In view of these long-term disruptive outcomes, adolescent delinquency has brought heavy stresses and costs to families and society (Regoli et al., 2016). Thus, identifying factors that protect adolescents from delinquency becomes an important task of youth studies.

Although research and intervention programs have long adopted a problem-centered approach which focuses on developmental deficits and "treating the problems," most youths experience adolescence with promising and positive trajectories, despite the thorough physiological, behavioral, and psychosocial changes across the period (Lerner, 2009). Some scholars believe that adolescents are not "troubles" but valuable resources with capability, potential, and strength that can be nurtured and utilized for their holistic development and positive functioning (Damon and Gregory, 2003). With such an emphasis on adolescent strengths, the positive youth development (PYD) approach has been used to understand adolescent development and the importance of nurturing their positive attributes (Tolan et al., 2016). In contrast to the deficit perspective highlighting developmental risks, the PYD perspective argues that various youth problems, including delinquency, can be mitigated or avoided through the cultivation of PYD attributes (Shek et al., 2019a).

Theoretically, PYD attributes are a set of developmental assets related to one's inner world and positive experience derived from the external world, both of which can be utilized to help adolescents effectively cope with developmental challenges and buffer life stress, thus reducing problem behavior and making adolescents thrive in adversity (Shek et al., 2019a). Scholars have conceptualized PYD attributes from different approaches. For instance, the developmental assets framework proposed by Benson et al. (2011) holds that there are 20 internal assets (positive individual strengths such as positive values and social competencies) and 20 external assets (supportive environment and constructive interactions with the external world such as empowering and expectations) that are critical for youth growth and thriving. Similarly, Lerner et al. (2011) emphasized the importance of "Five Cs," including "connection," "confidence," "competence," "character," and "caring" in healthy youth development. The authors further pointed out that the development of these five Cs in adolescents will eventually shape the sixth C, "contribution." In addition, Catalano et al. (2004) summarized 15 essential PYD constructs that had been widely incorporated in effective youth prevention programs. These PYD constructs cover a wide range of positive internal assets, such as cognitive, emotional, and social skills, prosocial values, optimism about the future, positive self-perception, optimism, and spirituality, as well as positive external assets, such as bonding with parents, teachers, and friends, and the supportive environment for doing prosocial behavior.

Consistent with the general theoretical expectation that PYD leads to good developmental outcomes, the above mentioned PYD attributes defined in different frameworks have been empirically found to be protective factors against adolescent delinquency. Specifically, both the global measures of PYD or individual PYD attributes negatively predict delinquency among children and adolescents. For example, Geldhof et al. (2014) reported that both the individual "Five Cs" (i.e., "connection," "confidence," "competence," "character," and "caring") and the integrated higher-order of the "Five Cs" negatively correlate with the composite problem behavior including delinquency and substance use among American adolescents. Likewise, Sun (2016) found that PYD attributes indexed by Catalano's 15 PYD constructs also significantly and negatively predict misconduct in Hong Kong Chinese adolescents. Different PYD attributes have also been identified to be negatively associated with delinquency among mainland Chinese adolescents (Huang et al., 2019; Chai et al., 2020). Evaluation findings from youth programs adopting PYD approaches in the West and Chinese contexts also demonstrated that the cultivation of multiple PYD attributes among adolescents successfully lessens the likelihood of their participation in problem behavior, including delinquency (Domitrovich et al., 2017; Ma et al., 2019; Zhu and Shek, 2020a).

Despite the accumulating evidence that indicates the inverse relationship between PYD attributes and delinquency, several research gaps are present. First, not all empirical findings showed significant negative associations between PYD attributes and delinquency. For instance, Phelps et al. (2007) reported that youth with the highest trajectory of PYD attributes tended to display the up-and-then-down trajectory in risk behavior. Lewin-Bizan et al. (2010b) did not find an inverse relationship between PYD and problematic behaviors (including delinquency and substance use) among most youth. Specifically, some adolescents with a decreasing PYD trend were more likely to exhibit a low trajectory rather than an increase in problematic behaviors. Shek and Lin (2016) also demonstrated a positive relationship between PYD and an increased rate of delinquency among Chinese adolescents. Noteworthy, PYD attributes in all the above-mentioned studies were indexed by a global measure, thus ignoring the nuanced relationship between individual dimensions of PYD and delinquency as well as the possibility that the individual dimensions may bear differential relationships with delinquency (Arbeit et al., 2014; Geldhof et al., 2014).

Therefore, it is necessary to clarify the relationships between PYD and delinquency by using not only a global measure of PYD but also individual dimensions underlying the PYD construct.

Second, the potential mediating mechanisms underlying the link between PYD attributes and adolescent delinquency have been under-researched. In particular, life satisfaction, which refers to one's cognitive evaluation of his or her overall life quality (Diener et al., 1985), may serve as a mediator in linking PYD attributes and delinquent behavior among adolescents. Theoretically, the development of positive psychosocial competence enables adolescents to well adapt to biological, psychological, and social changes occurring in adolescence (Larson, 2011). With the healthy adjustment, adolescents are more likely to live a healthy lifestyle, maintain health and fitness, gain support and build positive connections, all of which make adolescents positively appraise their life (Shek et al., 2019a; Ma, 2020). A higher level of life satisfaction, in turn, cultivates a positive appraisal style, which renders adolescents to copy stressful life events and environmental challenges more effectively (Shek and Chai, 2020) and less likely to externalize life distress to delinquent behavior (Park, 2004).

The above theoretical notions have been supported by rich empirical findings showing positive predictions of PYD attributes on adolescent life satisfaction (Zhang, 2016; Lázaro-Visa et al., 2019; Ma, 2020) and negative predictions of life satisfaction on adolescent delinquency (Jung and Choi, 2017; Hanniball et al., 2018; Lee et al., 2020). A handful of pioneering studies have empirically tested the mediational role of life satisfaction in linking PYD attributes to behavioral problems (Sun and Shek, 2010, 2012). Nevertheless, these studies only used global indicators of PYD without considering individual dimensions. As a result, there is a need to further clarify the proposed mediating effects of life satisfaction on the associations between individual PYD dimensions and delinquency among adolescents.

Third, while there are many Western studies on PYD attributes and adolescent risk behavior, very few systematic studies have been carried out to understand how PYD attributes are associated with adolescent delinquency in mainland China (Wiium and Dimitrova, 2019). Primarily, the function of PYD attributes may not be the same in different cultural contexts (Wiium and Dimitrova, 2019), especially concerning the differences in the emphasis on positive youth attributes between Western and Chinese contexts. For example, some PYD constructs conceived in the West are closely related to individualistic "Me" and autonomous self, such as self-identity, self-efficacy, and self-determination. However, these qualities are not strongly emphasized in traditional Chinese thoughts, which place more emphasis on interdependent "We" and relational harmony (Yang and Zhou, 2017). Empirically, studies reported unique definitional and structural features of PYD attributes among mainland Chinese adolescents, and such features are different from that have been identified in models based on Western adolescents (Chen et al., 2018; Chai et al., 2020). For example, the individual-individual connection (i.e., peer connection) among mainland Chinese adolescents is not as salient as that in their Western counterparts, which may be attributable to the collectivistic orientation in China where the individual-level connection is likely to be embedded in the individual-group connections in family, school, and society (Chai et al., 2020).

Nonetheless, internal and external assets are also highlighted in Chinese traditions. In Confucian thoughts, the development of virtues is an important factor shaping the social behavior of children. By cultivating virtues and good character in children (i.e., internal assets), children would thrive (Shek et al., 2013). At the same time, positive environmental influence (i.e., external asset) was emphasized by Mencius, as exemplified by the "three moves" of the mother of Mencius (Carey and Vitz, 2020). Furthermore, the rapid social and economic development in mainland China makes Chinese people more and more "Westernized." For instance, individualistic values have been increasingly adopted in Chinese society (Steele and Lynch, 2013). In particular, Chinese parents have adapted to the globalization and westernization by confirming less to traditionally prescribed parental roles and beliefs as well as stressing more on the development of children's independence and self-expression (Chang et al., 2011; Inglehart et al., 2020). It has also been found that the younger generation in mainland China are more self-centered and individualistic but less identified with the traditional collective ideology than the old generations (Sun and Wang, 2010; Zhou et al., 2018). In view of these contextual features in mainland China, it will be theoretically illuminating to examine the inter-relationships among PYD attributes, life satisfaction, and delinquency among mainland Chinese adolescents. In addition, among the world adolescent population aged between 10 and 19, roughly 13.5% are Chinese adolescents in mainland China (UNICEF, 2019), which makes Chinese data essential to establishing the universality of the related findings in the field of PYD studies.

To address these research gaps, this study attempted to provide answers to the following three research questions using two waves of data collected from Chinese adolescents in mainland China.

Research Question 1: What are the predictions of PYD attributes on adolescent delinquency? Based on the theoretical frameworks of PYD approaches, we expected negative concurrent and longitudinal predictions of PYD attributes on adolescent delinquency (Hypothesis 1).

Research Question 2: Does life satisfaction function as a mediator underlying the linkage between PYD attributes and adolescent delinquency? Based on the preceding literature review, we hypothesized that life satisfaction serves as the mediator for the predictive effects of PYD attributes on delinquency. We expected that PYD attributes positively predict life satisfaction (Hypothesis 2), which in turn negatively predicts adolescent delinquency (Hypothesis 3).

Research Question 3: Do the hypothesized relationships differ for the global measure and the individual dimensions of PYD attributes? Despite the general theoretical prediction of a negative relationship between PYD attributes and delinquency, some empirical findings suggest that individual PYD dimensions may bear differential associations with delinquency (Arbeit et al., 2014; Geldhof et al., 2014), leading to different predictions between the global PYD measure and individual

PYD dimensions. Therefore, in addition to investigating the influence of individual dimensions and the global PYD measure on delinquency separately, we also included the different PYD dimensions in a single model to reveal their relative influence.

Based on the above hypotheses, we proposed a mediating effect model among PYD attributes, life satisfaction, and adolescent delinquency as the conceptual framework of the present study (see **Figure 1**). In the mediation model, both the global measure and individual dimensions of PYD attributes were examined. In the previous studies, age, gender, and family intactness were found to be associated with adolescent life satisfaction and problem behavior (Proctor et al., 2009; Chen, 2010; Sogar, 2017). Hence, these demographic variables were included as control variables in this study.

MATERIALS AND METHODS

Participants and Procedures

This study was a 2-year survey involving four junior secondary schools in four different cities (Suzhou, Jiujiang, Zhaoqing, and Shanwei) in mainland China. The first occasion of data collection was conducted at the beginning of the 1st semester in the 2016/17 school year. All the Grade 7 and Grade 8 students in these schools were invited to respond to questionnaires measuring adolescent PYD attributes, problem behavior (e.g., delinquency), and well-being. One year later, these students responded to the questionnaires once again.

At Wave 1, a total of 3,010 (n = 1,362 at Grade 7; n = 1,648 at Grade 8) students completed the survey, among whom, 2,648 students (n = 1,305 at Grade 7; n = 1,343 at Grade 8) also completed the survey at Wave 2, resulting in an overall attrition rate of 12.03%. The matched sample (N = 2,648, Mean age = 13.12 ± 0.81 years at Wave 1), who completed the questionnaires at both waves, formed the working sample of this study. Among these students, 1,109 (41.88%) were girls, 1,513 (57.14%) were boys, and 26 students (0.98%) did not report their gender information. A total of 2,225 (84.03%) students were from intact families, and the other 401 (15.14%) students reported that they were living in non-intact families.

Ethical approval was obtained from the "Human Subjects Ethics Subcommittee" at the authors' university. Before the commencement of the study, the participating schools and parents of the students gave their written consent for the students' participation after we explained the study purposes and key principles we would follow in collecting, using, and disseminating data. These principles included voluntary participation, do-no-harm, anonymity, confidentiality, and free withdrawal. Prior to each occasion, all student respondents signed the written consent after they were well informed of the study objectives and those aforementioned vital principles.

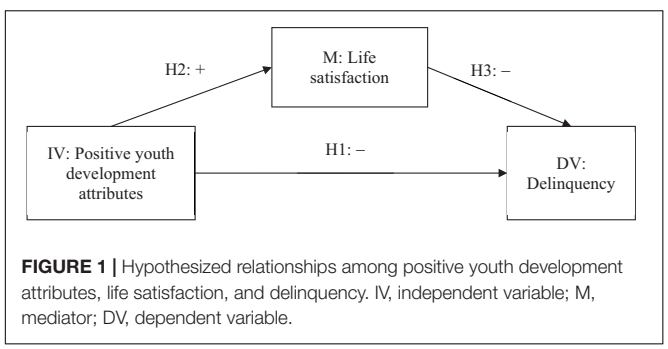

FIGURE 1 | Hypothesized relationships among positive youth development attributes, life satisfaction, and delinquency. IV, independent variable; M, mediator; DV, dependent variable.

Measures

The survey contained several validated measures related to the psychological adjustment of adolescents. The foci of the present study were the associations among PYD attributes, life satisfaction, and delinquency. The measurement tools of these constructs are outlined below.

PYD Attributes

The 80-item "The Chinese Positive Youth Development Scale" (CPYDS) was adopted in this study. This scale was developed and validated in a local context (Shek and Ma, 2010), and it has demonstrated good psychometric properties in assessing PYD attributes among Chinese adolescents in prior research (Sun and Shek, 2012; Sun, 2016; Zhu and Shek, 2020a). There were 15 subscales in the CPYDS assessing the key 15 PYD attributes (e.g., emotional competence, resilience, and prosocial involvement) included in Catalano et al.'s (2004) PYD framework. These 15 primary PYD attributes were further grouped into four individual PYD dimensions including (1) Cognitive-behavioral competence (CBC) under which there were three primary qualities, i.e., "cognitive competence," "self-determination," and "behavioral competence"; (2) Prosocial attribute (PA) which consisted of two primary qualities, i.e., "prosocial involvement" and "prosocial norms"; (3) Positive identity (PI) that included two primary qualities (i.e., "clear and healthy identity" and "beliefs in the future"); and (4) General PYD attribute (GPYD) under which there were eight primary qualities, including "bonding," "social competence," "emotional competence," "moral competence," "resilience," "self-efficacy," "spirituality," and "recognition for positive behavior." All items were rated from 1 ("strongly disagree") to 6 ("strongly agree"). Confirmatory factor analyses (CFA) showed that the hierarchical factor structure with four higher-order factors indicated by 15 primary factors showed acceptable model fit at Wave 1 (χ^2 = 9834.88, df = 3048, CFI = 0.90, NNFI = 0.89, RMSEA = 0.03, average primary factor loading = 0.65, average higher-order factor loading = 0.86) and Wave 2 (χ^2 = 11044.81, df = 3048, CFI = 0.90, NNFI = 0.90, RMSEA = 0.03, average primary factor loading = 0.72, average higher-order factor loading = 0.87). Composite scores were computed for the four individual PYD dimensions. Besides, a total PYD (TPYD) score as a global measure of PYD was also calculated by averaging scores across all items. The related Cronbach's alpha values can be seen in **Table 1**.

Life Satisfaction (LS)

Life satisfaction was measured by the "Satisfaction with Life Scale" (Diener et al., 1985), which has been locally validated by Shek (1992) for assessing Chinese people's evaluation of their

TABLE 1 | Descriptive statistics and reliability measures for positive youth development attributes, life satisfaction, and delinquency.

Measures	Wave 1				Wave 2			
	Mean	*SD*	α	Mean inter-item correlation	Mean	*SD*	α	Mean inter-item correlation
Positive youth development attributes								
CBC	4.82	0.74	0.91	0.38	4.95	0.78	0.94	0.49
PA	4.87	0.84	0.86	0.40	5.01	0.85	0.90	0.48
PI	4.73	1.00	0.88	0.44	4.87	1.02	0.90	0.49
GPYD	4.81	0.71	0.95	0.30	4.92	0.76	0.96	0.37
TPYD	4.78	0.69	0.97	0.31	4.90	0.73	0.98	0.38
Life satisfaction	4.06	1.12	0.81	0.48	4.06	1.13	0.84	0.53
Delinquency	0.45	0.54	0.74	0.27	0.42	0.57	0.78	0.34

CBC, cognitive-behavioral competence; PA, prosocial attribute; PI, positive identity; GPYD, general positive youth development attribute; TPYD, total positive youth development attribute.

overall LS (Zhu and Shek, 2020b). The scale included five items. Using a rating scale with six points ("1 = strongly disagree"; "6 = strongly agree"), the respondents indicated their cognitive evaluations of their overall life quality (e.g., "The conditions of my life are excellent" and "I am satisfied with my life"). In this study, CFA yielded good model fit for the single-factor structure of LS across waves (Wave 1: $\chi^2 = 58.89$, $df = 4$, CFI = 0.99, NNFI = 0.97, RMSEA = 0.07, average factor loading = 0.67; Wave 2: $\chi^2 = 72.72$, $df = 4$, CFI = 0.99, NNFI = 0.97, RMSEA = 0.08, average factor loading = 0.71). The Cronbach's α estimates of the scale were above 0.80 across the two waves (see **Table 1**).

Delinquency

A 12-item scale was used to assess how often ("0 = never"; "6 = more than 10 times") the participants engaged in the listed twelve delinquent behaviors, such as "stealing," "cheating," "running away from home," "staying outside the home overnight without parental consent," and "trespassing," during the last 12 months. Among these behaviors, some (e.g., "stealing" and "damaging others' properties") can be considered illegal, while other behaviors such as "running away from home" and "having sexual intercourse with others" do not violate the law but are perceived to be risky for adolescents in the Chinese context. The one-factor structure of this scale possessed adequate reliability and validity in measuring Chinese adolescents' delinquency in previous research (Shek and Zhu, 2019). In the present study, CFA showed adequate model fit for the one-factor model of delinquency at both waves (Wave 1: $\chi^2 = 778.74$, $df = 49$, CFI = 0.90, NNFI = 0.90, RMSEA = 0.07, average factor loading = 0.51; Wave 2: $\chi^2 = 838.10$, $df = 49$, CFI = 0.93, NNFI = 0.90, RMSEA = 0.08, average factor loading = 0.58). The Cronbach's α value was 0.74 and 0.78 at the two assessment occasions, respectively (see **Table 1**).

Covariates

Consistent with previous studies, gender, age, and family intactness were measured as covariates. Intact families were defined as families in which parents were in their first marriage, while non-intact families were characterized by parental separation, divorce, or re-marriage.

Data Analysis

First, correlational analyses were conducted to check the cross-sectional and longitudinal correlations among key variables. Second, to investigate the hypothesized relationships among PYD attributes, life satisfaction, and delinquency, we used the PROCESS macro in SPSS 26.0 (Preacher and Hayes, 2008) to test the mediation model displayed in **Figure 1**. Five separate mediating effect analyses were carried out based on the four higher-order PYD attributes and the total PYD score, respectively. Third, to further investigate the proposed mediation model in a more holistic manner, we also performed path analysis using structural equation modeling (SEM), including four higher-order PYD attributes simultaneously in one single model. The path analysis was performed using AMOS 26.0. Model fit indices, including "Comparative Fit Index" (CFI), "Non-Normed Fit Index" (NNFI), and "Root Mean Square Error of Approximation" (RMSEA), were utilized to assess model fit. CFI > 0.90, NNFI > 0.90, and RMSEA < 0.08 indicate an adequate model fit (Kline, 2015). Following suggestions given by Preacher and Hayes (2008), we performed bootstrapping with 5,000 resamples in both PROCESS and path analysis and calculated bias-corrected (BC) 95% confidence intervals (CIs).

RESULTS

Attrition Analyses

Results revealed that the matched sample ($N = 2{,}648$) and those 362 dropouts did not differ in their demographic attributes, including age, gender, and family intactness. Regarding baseline PYD attributes, results showed that dropouts at Wave 2 reported higher scores on GPYD and the total PYD score than did non-dropouts at the same grade level (mean differences = 0.15–0.23, $t = 2.28$–3.80, $ps < 0.001$, Cohen's $d = 0.22$–0.33). While the two groups at Grade 7 did not significantly differ from each other on baseline LS, Grade 8 dropouts ($M = 4.30$, $SD = 1.10$) showed higher baseline life satisfaction than did non-drops ($M = 3.98$, $SD = 1.07$; $t = 4.59$, $p < 0.001$, Cohen's $d = 0.29$). For baseline delinquency, the two groups did not have a significant difference. Because the differences between the two groups of students were not great, sample attrition was not a major concern.

TABLE 2 | Correlations among control variables, positive youth development attributes, life satisfaction, and delinquency at two waves.

Measures	Correlations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Age	–			–												
(2) Gender[a]	−0.08***	–														
(3) Family intactness[b]	0.02	0.01	–													
(4) W1 CBC	−0.09***	−0.01	−0.05**	–												
(5) W1 PA	−0.09***	0.08***	−0.05*	0.66***	–											
(6) W1 PI	−0.11***	−0.10***	−0.07***	0.71***	0.58***	–										
(7) W1 GPYD	−0.12***	0.01	−0.07***	0.83***	0.70***	0.74***	–									
(8) W1 TPYD	−0.12***	−0.01	−0.07***	0.90***	0.79***	0.83***	0.97***	–								
(9) W1 LS	−0.07***	−0.07***	−0.07***	0.51***	0.47***	0.56***	0.60***	0.61***	–							
(10) W1 DE	0.11***	−0.14***	0.08***	−0.29***	−0.31***	−0.26***	−0.36***	−0.35***	−0.29***	–						
(11) W2 CBC	−0.10***	−0.02	−0.02	0.44***	0.35***	0.39***	0.43***	0.45***	0.31***	−0.21***	–					
(12) W2 PA	−0.09***	0.07***	−0.02	0.34***	0.41***	0.32***	0.40***	0.41***	0.27***	−0.26***	0.65***	–				
(13) W2 PI	−0.06**	−0.12***	−0.04*	0.38***	0.30***	0.48***	0.41***	0.44***	0.34***	−0.18***	0.71***	0.61***	–			
(14) W2 GPYD	−0.08***	−0.01	−0.03	0.43***	0.38***	0.42***	0.49***	0.50***	0.38***	−0.25***	0.84***	0.69***	0.75***	–		
(15) W2 TPYD	−0.09***	−0.02	−0.03	0.45***	0.40***	0.45***	0.50***	0.51***	0.38***	−0.26***	0.91***	0.78***	0.83***	0.97***	–	
(16) W2 LS	−0.03	−0.08***	−0.06**	0.21***	0.18***	0.25***	0.27***	0.27***	0.38***	−0.16***	0.44***	0.43***	0.56***	0.57***	0.57***	–
(17) W2 DE	0.07***	−0.12***	0.06**	−0.21***	−0.20***	−0.17***	−0.23***	−0.23***	−0.21***	0.43***	−0.25***	−0.22***	−0.21***	−0.29***	−0.29***	−0.22***

*[a]1 = male, 2 = female; [b]1 = intact, 2 = non-intact; W1, Wave 1; W2, Wave 2; CBC, cognitive-behavioral competence; PA, prosocial attribute; PI, positive identity; GPYD, general positive youth development attribute; TPYD, total positive youth development attribute; LS, life satisfaction; DE, delinquency. *p < 0.05, **p < 0.01, ***p < 0.001.*

Correlations Among Variables

Correlations among variables are shown in **Table 2**. After Bonferroni-correction ($p = 0.05/17 = 0.003$), all PYD attributes were inversely correlated with delinquency and positively correlated with life satisfaction, both cross-sectionally and longitudinally. Besides, life satisfaction and delinquency were negatively correlated with each other, both cross-sectional and over time. Overall speaking, these observations are consistent with our original expectations.

Predictions of PYD Attributes and Mediating Effect of Life Satisfaction

Tables 3, **4** show the results of cross-sectional and longitudinal mediating effect analyses through the PROCESS, respectively. Several observations can be highlighted. First, each PYD attribute showed significant and negative concurrent and longitudinal predictive effects on adolescent delinquency (i.e., total effect), providing support for Hypothesis 1. Second, all PYD attributes showed significant and positive concurrent and longitudinal predictive effects on life satisfaction, giving support for Hypothesis 2. Third, life satisfaction significantly and negatively predicted adolescent delinquency, showing support for Hypothesis 3. Finally, the indirect effects of each PYD attribute on concurrent or future delinquency via life satisfaction were also significant, supporting the mediating effect model. Overall speaking, the findings suggest that adolescents' PYD attributes enable them to feel more satisfied with life, which in turn leads to a lower level of delinquency.

Figure 2 outlines the significant standardized path coefficients of the mediation models involving the four higher-order PYD attributes simultaneously. The path coefficients and indirect effects of PYD attributes on delinquency are also presented in **Table 5**. We tested two models. In the first model, PYD attributes at Wave 1 were the independent variables (IVs), life satisfaction at Wave 1 was the mediator, and adolescent delinquency at Wave 2 was the dependent variable (DV). The second model used the same IVs and DV and used life satisfaction at Wave 2 as the mediator. The two models showed adequate model fit (the first model: $\chi^2 = 6.37$, $df = 3$, $\chi^2/df = 2.13$, CFI = 0.99, NNFI = 0.99, RMSEA = 0.02; the second model: $\chi^2 = 9.48$, $df = 3$, $\chi^2/df = 3.16$, CFI = 0.99, NNFI = 0.99, RMSEA = 0.03).

When using life satisfaction at Wave 1 as the mediator (i.e., the first model, see **Table 5** and the results before the slash in **Figure 2**), three PYD attributes including prosocial attribute ($\beta = 0.07$, $p < 0.05$), positive identity ($\beta = 0.24$, $p < 0.001$) and general PYD attribute ($\beta = 0.42$, $p < 0.001$) were positive predictors of life satisfaction, which in turn negatively predicted adolescent delinquency ($\beta = -0.11$, $p < 0.001$). Thus, the negative indirect effects of these three PYD attributes on delinquency were significant (prosocial attribute: $\beta = -0.01$, $p < 0.01$, 95% CI = [−0.02, −0.002]; positive identity: $\beta = -0.03$, $p < 0.01$, 95% CI = [−0.04, −0.02]; general PYD quality: $\beta = -0.05$, $p < 0.01$, 95% CI = [−0.07, −0.03]). An unexpected finding is that cognitive-behavioral competence showed a negative predictive effect on life satisfaction ($\beta = -0.06$, $p < 0.05$). However, its indirect effect on delinquency was

TABLE 3 | Cross-sectional mediating effect analyses of life satisfaction (the mediator) at Wave 1 on the effect of PYD measures on delinquency at Wave 1.

	Independent variables (IV)																	
	CBC				PA				PI				GPYD				TPYD			
Regression models summary	*B*	*SE*	*t*	Point estimate	*B*	*SE*	*t*	Point estimate	*B*	*SE*	*t*	Point estimate	*B*	*SE*	*t*	Point estimate	*B*	*SE*	*t*	Point estimate
Total effect of IV on DV	−0.20	0.01	−15.52***		−0.19	0.01	−16.39***		−0.14	0.01	−13.76***		−0.26	0.01	−19.11***		−0.26	0.01	−19.06***	
IV to Mediator	0.77	0.03	30.46***		0.64	0.02	27.45***		0.67	0.02	34.30***		0.96	0.02	38.70***		1.00	0.03	40.00***	
Mediator to DV	−0.09	0.01	−9.12***		−0.09	0.01	−9.17***		−0.10	0.01	−9.61***		−0.06	0.01	−5.66***		−0.06	0.01	−5.45***	
Direct effect of IV on DV	−0.13	0.02	−8.88***		−0.13	0.01	−10.33***		−0.08	0.01	−6.27***		−0.20	0.02	−11.92***		−0.20	0.02	−11.74***	
Mediating effect	**Point estimate**	**Bootstrapping (BC 95% CI)**			**Point estimate**	**Bootstrapping (BC 95% CI)**			**Point estimate**	**Bootstrapping (BC 95% CI)**			**Point estimate**	**Bootstrapping (BC 95% CI)**			**Point estimate**	**Bootstrapping (BC 95% CI)**		
		Lower	Upper			Lower	Upper			Lower	Upper			Lower	Upper			Lower	Upper	
	−0.07***	−0.09	−0.05		−0.06***	−0.07	−0.04		−0.07***	−0.09	−0.05		−0.06***	−0.09	−0.03		−0.06***	−0.10	−0.03	

*Results pattern of mediating effect analyses at Wave 2 was the same as that shown in the table; in all analyses, covariates were statistically controlled. CBC, cognitive-behavioral competence; PA, prosocial attribute; PI, positive identity; GPYD, general positive youth development attribute; TPYD, total positive youth development attribute; BC, bias corrected; CI, confidence interval. ***$p < 0.001$.*

TABLE 4 | Longitudinal mediating effect analyses of life satisfaction at Wave 2 (the mediator) for the effect of PYD measures at Wave 1 on delinquency at Wave 2.

	Independent variables (IV) at Wave 1																	
	CBC			PA				PI			GPYD			TPYD				
Regression models summary	***B***	***SE***	***t***	***B***	***SE***	***t***	***B***	***SE***	***t***	***B***	***SE***	***t***	***B***	***SE***	***t***	***B***	***SE***	***t***
Total effect of IV on DV	−0.15	0.01	−10.42***	−0.13	0.01	−9.99***	−0.10	0.01	−8.85***	−0.18	0.02	−12.03***	−0.19	0.02	−12.02***			
IV to mediator	0.32	0.03	10.83***	0.24	0.03	9.09***	0.30	0.02	13.06***	0.44	0.03	14.46***	0.44	0.03	14.14***			
Mediator to DV	−0.09	0.01	−9.71***	−0.10	0.01	−10.08***	−0.09	0.01	−9.70***	−0.08	0.01	−8.72***	−0.08	0.01	−8.78***			
Direct effect of IV on DV	−0.12	0.01	−8.35***	−0.11	0.01	−8.26***	−0.07	0.01	−6.31***	−0.14	0.02	−9.36***	−0.15	0.02	−9.41***			
Mediating effect	**Point estimate**	**Bootstrapping (BC 95% CI)**		**Point estimate**	**Bootstrapping (BC 95% CI)**		**Point estimate**	**Bootstrapping (BC 95% CI)**		**Point estimate**	**Bootstrapping (BC 95% CI)**		**Point estimate**	**Bootstrapping (BC 95% CI)**				
		Lower	**Upper**		**Lower**	**Upper**		**Lower**	**Upper**		**Lower**	**Upper**		**Lower**	**Upper**			
	−0.03***	−0.04	−0.02	−0.02***	−0.03	−0.02	−0.03***	−0.04	−0.02	−0.04***	−0.05	−0.03	−0.04***	−0.05	−0.03			

*In all analyses, covariates were statistically controlled. CBC, cognitive-behavioral competence; PA, prosocial attribute; PI, positive identity; GPYD, general positive youth development attribute; TPYD, total positive youth development attribute; BC, bias corrected; CI, confidence interval. ***$p < 0.001$.*

insignificant ($\beta = 0.01$, $p > 0.05$, 95% CI = [0.00, 0.02]). Besides, only general PYD attribute showed a significant direct effect on adolescent delinquency ($\beta = -0.16$, $p < 0.01$, 95% CI = [−0.21, −0.11]).

Similar observations were found when using life satisfaction at Wave 2 as the mediator (see **Table 5** and the results after the slash in **Figure 2**). The only exception is that the prosocial attribute at Wave 1 did not show a significant longitudinal effect on life satisfaction at Wave 2 ($\beta = -0.03$, $p > 0.05$).

DISCUSSION

Based on a 2-year longitudinal design, this study investigated how PYD attributes were associated with adolescent delinquency and how life satisfaction mediated the effect among mainland Chinese adolescents. Consistent with the original predictions, single PYD attributes negatively predicted adolescent delinquency concurrently and longitudinally. As expected, life satisfaction also showed a significant mediating effect by being positively predicted by PYD attributes and negatively predicting delinquency. However, when all PYD measures were included in a single model, some "odd" observations for the role of cognitive-behavioral competence were found. The present study adds theoretical and practical value to the existing literature by deepening our understanding of the inter-relationships among PYD attributes, including the global PYD measure and individual dimensions, life satisfaction, and delinquency over time.

Regarding the first research question, results of correlation analyses and regression analyses consistently revealed that both the global PYD measure and individual PYD dimensions were negatively associated with adolescent delinquency, both concurrently and longitudinally. These findings initially supported our Hypothesis 1. The findings are congruent with the general theoretical expectation that the development of PYD attributes builds a constructive foundation for adolescent adaptive adjustment in the long run and protects them from externalizing life stress with delinquency (Shek et al., 2019a). Our findings also replicate previous empirical findings in the West (Geldhof et al., 2014; Voisin et al., 2020) and Chinese contexts (Shek and Lin, 2016; Shek and Zhu, 2018). As most existing empirical evidence in the Chinese context is from Hong Kong, the present findings further extend the conclusion to mainland China, suggesting that the general negative associations between PYD attributes and problematic development may hold across cultural contexts.

For the second research question, the overall findings also support our expectation that life satisfaction serves as a mediator for the predictions of PYD attributes on delinquency. In the regression models, each dimension of PYD attributes (i.e., "cognitive-behavioral competence," "prosocial attribute," "positive identity," and "general PYD attribute") and the total PYD score positively predicted life satisfaction, which subsequently functioned as a negative predictor of adolescent delinquency. These findings echo the previous evidence that different PYD attributes generally have positive linkages with life

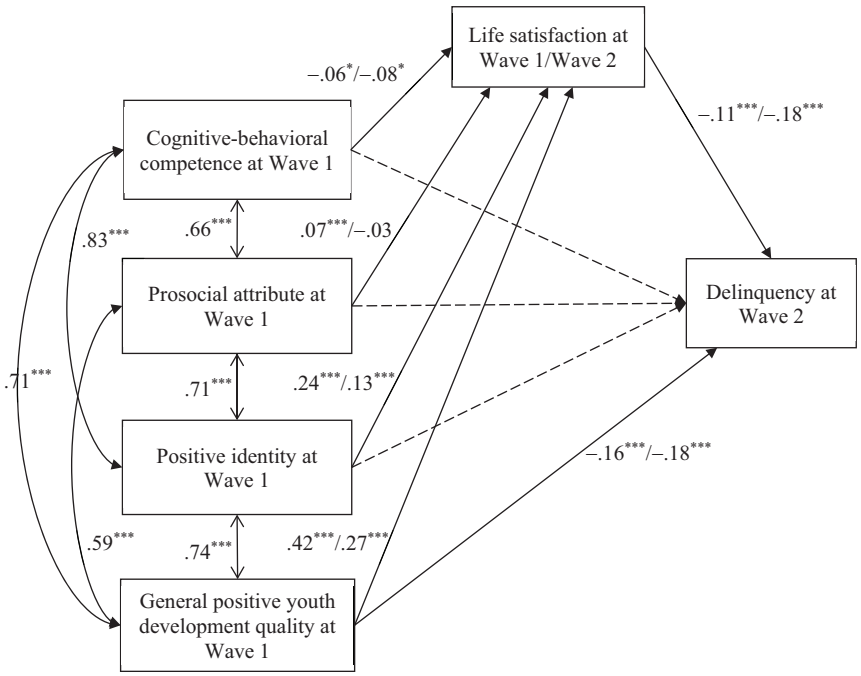

FIGURE 2 | Standardized results of path analyses on the relationships among adolescent positive youth development attributes, life satisfaction, and delinquency. Age, gender, and family intactness were statistically controlled. Numbers before the slash are the results of analysis using life satisfaction at Wave 1 as the mediator and numbers after the slash are the results of analysis using life satisfaction at Wave 2 as the mediator. Solid paths indicate significant associations and dotted paths indicated insignificant associations. $^{*}p < 0.05$, $^{***}p < 0.001$.

satisfaction (Lázaro-Visa et al., 2019; Ramos-Díaz et al., 2019) and life satisfaction negatively predict delinquency (Jung and Choi, 2017; Hanniball et al., 2018). In the separate regression analysis, all related PYD attributes also showed significant direct predictions on delinquency. This observation is in line with and extends the previous findings that involved Hong Kong Chinese adolescents and only investigated global measures of PYD (Sun and Shek, 2010, 2012).

With reference to the third research question, the separate regression analyses yielded consistent negative predictions of the global PYD measure and the four individual PYD dimensions. However, when all four individual dimensions of PYD attributes were included in a single model simultaneously, mixed findings were revealed. Specifically, positive identity and general PYD attribute showed expected negative predictions on delinquency via their positive effects on life satisfaction, whereas prosocial attributes showed insignificant to weak positive effects and cognitive-behavioral competence had even negative effects on life satisfaction. These findings support the conjecture of a nuanced relationship between individual dimensions of PYD and delinquency (Arbeit et al., 2014; Geldhof et al., 2014) and reinforce the importance of distinguishing between different PYD dimensions in examining their relationships with developmental outcomes. Several aspects of the findings are discussed below.

First, cognitive-behavioral competence, which mainly refers to adolescents' intellectual and decision-making ability, showed negative cross-sectional and longitudinal predictions on life satisfaction. Although initially counterintuitive, this finding kindly mirrors the previous finding that caring, one C in Lerner's (Lerner et al., 2011). Five Cs model ("connection," "confidence," "competence," "character," and "caring"), was positively related to anxiety and depressive symptoms when the effects of other Cs were statistically controlled (Holsen et al., 2017). It is argued that a high level of caring may represent adolescents' emotional hypersensitivity that may make them manifest stronger anxiety and depressive feelings (Holsen et al., 2017).

Likewise, strong cognitive capacity may render adolescents more critical, more likely to experience over-expectations from others, and harder to feel satisfied with current life situations. Indeed, the setting of especially high standards (e.g., perfectionism) has been found to be associated with psychological distress and mental health problems (Proctor et al., 2009). Besides, higher cognitive-behavioral competence may also expose adolescents to the experimentation of risk behavior, which is believed by some scholars to be developmentally appropriate and adaptive (Dworkin, 2005; Shek and Lin, 2016). In essence, empirical findings support a certain degree of overlap between adaptive functioning and adolescent risk trajectories (Lewin-Bizan et al., 2010b; Warren et al., 2016). While original PYD theories hold that "one good thing leads to another" (Lewin-Bizan et al., 2010a, p. 759), these findings collectively suggest the need to refine the understanding of what is meant by "good" and optimal development.

Second, the prosocial attribute at Wave 1 showed a weak positive linkage with concurrent life satisfaction, and it did not have a significant association with life satisfaction over time.

TABLE 5 | Results of path analyses for the mediation model involving the four individual PYD attributes, life satisfaction, and delinquency.

Paths	*B*	*SE*	β
W1 life satisfaction as the mediator			
W1 CBC → W1 life satisfaction	−0.09	0.04	−0.06*
W1 PA → W1 life satisfaction	0.10	0.03	0.07***
W1 PI → W1 life satisfaction	0.29	0.03	0.25***
W1 GPYD → W1 life satisfaction	0.66	0.05	0.42***
W1 life satisfaction → W2 delinquency	−0.06	0.01	−0.11***
W1 GPYD → W2 delinquency	−0.13	0.02	−0.16***
		Bootstrapping (BC 95% CI)	
Indirect effect on W2 delinquency through W1 life satisfaction	**β**	**Lower**	**Higher**
W1 CBC	0.01	0.00	0.02
W1 PA	−0.01**	−0.02	−0.002
W1 PI	−0.03**	−0.40	−0.02
W1 GPYD	−0.05**	−0.70	−0.03
Direct effect on W2 delinquency			
W1 GPYD	−0.16**	−0.21	−0.11
W2 Life satisfaction as the mediator	***B***	***SE***	**β**
W1 CBC → W2 life satisfaction	−0.13	0.05	−0.08*
W1 PA → W2 life satisfaction	−0.05	0.04	−0.03
W1 PI → W2 life satisfaction	0.16	0.04	0.13***
W1 GPYD → W2 life satisfaction	0.44	0.06	0.28***
W2 life satisfaction → W2 delinquency	−0.90	0.01	−0.18***
W1 GPYD → W2 delinquency	−0.15	0.02	−0.18***
		Bootstrapping (BC 95% CI)	
Indirect effect on W2 delinquency through W2 life satisfaction	**β**	**Lower**	**Higher**
W1 CBC	0.02**	0.003	0.03
W1 PA	0.01	−0.003	0.02
W1 PI	−0.02**	−0.04	−0.01
W1 GPYD	−0.05**	−0.07	−0.03
Direct effect on W2 delinquency			
W1 GPYD	−0.18**	−0.22	−0.14

*W1, Wave 1; W2, Wave 2; CBC, cognitive-behavioral competence; PA, prosocial attribute; PI, positive identity; GPYD, general positive youth development attribute; BC, bias corrected; CI, confidence interval. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.*

In contrast, positive identity and general PYD quality showed relatively stronger and robust associations with life satisfaction, both concurrently and longitudinally. In particular, the general PYD attribute was the strongest predictor that exerted the strongest indirect effect on delinquency through life satisfaction among all the PYD dimensions and showed the only significant direct effect on delinquency.

The findings do not imply that prosocial attribute (e.g., adopting of prosocial attitude and willingness to engage in prosocial behaviors) is not important, as it was a significant predictor of life satisfaction and delinquency in the current separate regression model and previous research (Schludermann et al., 2000; Lázaro-Visa et al., 2019). Instead, it can be reasoned that positive identity and general PYD attribute, especially the latter, may prevail over prosocial attributes in explaining the development of adolescent delinquency. Another explanation for the weak or insignificant effect of prosocial attributes on life satisfaction is that there is a "dark side" of prosociality, as being prosocial and helping others may lead to additional psychological costs and stress, which harms individual well-being (Bolino and Grant, 2016). These speculations should be verified in future studies.

For general PYD attribute, solid associations have been documented between those psychosocial competencies included in this dimension (e.g., bonding with parents, emotional skills, spirituality, resilience, and moral competence) and life satisfaction and delinquency in both Western and Chinese contexts (Raaijmakers et al., 2005; Shek and Zhu, 2018;

Lázaro-Visa et al., 2019; Ramos-Díaz et al., 2019; Zhu and Shek, 2020b), which may contribute to the unique strong predictions of general PYD attribute in the present study. The strong and robust predictions of general PYD attribute also echo previous findings on the effect of Five Cs ("connection," "confidence," "competence," "character," and "caring") (e.g., Geldhof et al., 2014), which are conceptually similar to those psychosocial competencies included in general PYD attribute. It is very likely that well-being, as indicated by high life satisfaction and low delinquency of mainland Chinese students, is also closely related to their competence in using adaptive intra- and interpersonal strategies such as the abilities to regulate emotions, overcome adversity, and build positive relationships with parents (Lázaro-Visa et al., 2019).

For positive identity, it showed relatively stable positive predictions on adolescent life satisfaction in the present study, although its effect was not as strong as that of the general PYD attribute. Another recent study involving mainland Chinese adolescents also found that positive self-identity was negatively associated with developmental problems (Xie et al., 2019; Chi et al., 2020). Although representation of the self has not been emphasized as much as interdependence in traditional Chinese culture (Greenfield et al., 2006; Yang and Zhou, 2017), a positive self-identity can be a protective factor of adolescent adjustment in mainland China in the contemporary society. Perhaps, the present Chinese adolescents are likely to be influenced by Western values and have become more individualistic as a result of the rapid westernization and modernization in mainland Chinese societies (Steele and Lynch, 2013; Cai et al., 2018). Future research will certainly benefit from the replication of the present findings.

To sum up, our findings explicate the complex associations between PYD dimensions and delinquency, which echo previous findings that some aspects of PYD attributes may not necessarily have positive predictions on adolescent developmental outcomes (Holsen et al., 2017; Lázaro-Visa et al., 2019). For example, while empathy, self-esteem, and emotional competence showed positive predictions on life satisfaction, cognitive competence was not a significant predictor when all these positive attributes were analyzed together (Lázaro-Visa et al., 2019). It is possible that while PYD attribute, in general, is associated with positive adolescent development (Lewin-Bizan et al., 2010a), certain dimensions, such as caring and cognitive competence, are compatible with risk behavior among adolescents (Arbeit et al., 2014; Warren et al., 2016). Taken together, these findings reinforce the need to use a discrete measure of PYD in future studies, as merely using a global measure of PYD is unable to reveal the complexity of the effect of different PYD attributes.

Practically, our findings highlight the notion that the cultivation of PYD attributes among adolescents can foster their life satisfaction and reduce delinquent behavior. This is particularly informative for educators, policymakers, researchers, and teachers, who are finding effective ways to deal with the worldwide trend of growing developmental problems among adolescents (World Health Organization, 2019). In the mainland China context, Bao (2018) asserted that rapid social change has made the youth's life more stressful and leads to more juvenile delinquency. Chen and Cheung (2020) also suggested that the likelihood of committing delinquent acts is high among some Chinese adolescents as they face high levels of academic pressure and relational strains in terms of parental and teacher blame and punishment as a result of their unsatisfactory school achievement. Based on the present findings, building up inner strengths among Chinese adolescents is a promising strategy to promote their well-being and protect them from delinquency. Despite rich PYD programs and related rigorous evaluation findings in the West (Catalano et al., 2004; Lerner et al., 2011), the development, implementation and, evaluation of youth programs based on evidence-based approach are still at the infant stage in mainland China (Shek et al., 2019b; Zhu and Shek, 2020a). Although there are evaluation studies showing the positive impact of PYD programs in Hong Kong (e.g., Ma et al., 2019; Shek and Zhu, 2020), evaluation of PYD programs in mainland China is not systematic. Our findings provide further theoretical support for the utilization of PYD programs in mainland China.

This study has several limitations. First, we only collected two waves of data. Future studies will benefit from collecting more waves of data in a longer time span, which can help delineate a comprehensive picture of the inter-relationships among considered variables over time, particularly regarding the influence of the mediators. Second, the data were collected only from four secondary schools in four cities. Future studies need to replicate the present findings in other places in mainland China. Third, only self-reported questionnaires were used in the present study. Different informants such as parents and teachers can be involved in future studies to draw a richer picture for the related topic. Fourth, we only considered one mediator (i.e., life satisfaction). In the present study, the direct effect of the general PYD attribute on delinquency was much larger than the indirect effect accounted by life satisfaction, which suggests the existence of other mediators. There is a need to investigate other possible mediators, such as social support or school engagement in future studies. Finally, the effect sizes of the statistically significant results were small to moderate. One may raise a concern about the overpowering due to the large sample size in the present study. Of note, small effect size is not uncommon in social sciences research, and it is generally smaller in longitudinal research than in cross-sectional research (Ferguson, 2009). Obviously, there is a need to replicate the present findings. Besides, it is necessary to distinguish between statistical significance and practical significance. The present findings offer theoretical and practical implications in promoting adolescent life satisfaction by promoting their inner strengths.

CONCLUSION

This study addressed several research gaps in the extant literature regarding the association between PYD attributes and delinquency among adolescents. Consistent with our hypotheses, separate dimensions of PYD attributes were negatively associated with adolescent delinquency through the mediating effect of life satisfaction, both concurrently and longitudinally. Nevertheless, when all the four dimensions of PYD attributes were included

in one mediating effect model, cognitive-behavioral competence was negatively associated with life satisfaction, exerting a positive effect on delinquency. Future longitudinal studies with a longer time span should focus on replicating the present findings in other Chinese and non-Chinese communities and further explore the underlying mechanisms, including different mediators and moderators.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by "Human Subjects Ethics Subcommittee" at The Hong Kong Polytechnic University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

XZ contributed to the design of the project, data collection, data interpretation of the work, drafted the work, and revised it based on the critical comments provided by DS. DS conceived the project, obtained the funding, and edited the manuscript. Both authors contributed to the article and approved the submitted version.

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Perceived Discrimination and Aggression Among Chinese Migrant Adolescents: A Moderated Mediation Model

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Previous research has showed that Chinese rural-to-urban migrant adolescents are at high risk for discrimination, negative emotions, and aggression. However, little is known about how discrimination, negative emotions, and aggression are interrelated and whether social support addressing the emotional needs of the adolescents would moderate the relationship of discrimination to aggression. This study attempts to fill these gaps. Based on prior research, it is proposed that perceived discrimination relates to reactive aggression by increasing negative emotions that foster aggressive responses to stressful events. Considering the central role that negative emotions may play, it is also hypothesized that socioemotional support provided by family, friends, and community mitigates the impact of perceived discrimination on reactive aggression by reducing negative emotions. The results obtained from the analysis of two-wave survey data collected from a probability sample of 470 migrant students aged 11–17 (46.17% female; mean age = 13.49) in China supported these hypotheses. The findings indicate that perceived discrimination fosters negative emotions, which in turn increase reactive aggression. Additionally, socioemotional support reduces the adverse impact of perceived discrimination on reactive aggression by weakening the link between perceived discrimination and negative emotions. Practical and policy implications of these findings are discussed.

Keywords: perceived discrimination, aggression, negative emotions, socioemotional support, migrant adolescents

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INTRODUCTION

Aggression is a frequently observed behavior among children and adolescents (Connor, 2002; Hartshorn et al., 2012). Children of migrants, including domestic and international migrants, are especially at risk for aggression (WHO Regional Office for Europe, 2010; Li and Xia, 2018). Some studies have shown that over 50% of migrant adolescents experienced interpersonal conflicts related to peer aggression (Qin et al., 2008). Research has linked the high prevalence rate to discrimination experienced by these children in the receiving places (Lan et al., 2020; Song et al., 2020). They argued that discrimination impedes the development of these children by increasing their involvement in antisocial behavior.

The existing research has generally treated discrimination as a precursor to aggression (Wright and Wachs, 2019; Mulvey et al., 2020; Xie et al., 2020). However, aggression is a complex and multifaceted construct that may encompass different subtypes. Researchers have distinguished between proactive and reactive aggression (Dodge, 1991; Raine et al., 2006). Proactive aggression is a deliberate, coercive behavior used as a means of achieving a desired goal, while reactive aggression occurs as a retaliatory or defensive response to frustration or provocation and is often associated with elevated levels of emotional problems. Of these two types, reactive aggression may be more likely to occur in response to an aversive event such as discrimination and may affect migrant children more strongly (Connor, 2002; Bushman, 2017).

However, despite the emerging evidence supporting the role of discrimination in the instigation of reactive aggression, few studies have examined the relationship between discrimination and aggression. Additionally, to our knowledge, no study has explicitly tested how discrimination, negative emotions, and aggression are interrelated and whether socioemotional support addressing the emotional needs of the adolescents would moderate the effect of discrimination on aggression. This study aims to fill these gaps by proposing and empirically testing a moderated mediation model that integrates the mediating roles of negative emotions and the moderating role of socioemotional support in the relationship between perceived discrimination and adolescent aggression.

The data used to test the model were collected from a two-wave longitudinal survey of a probability sample of Chinese migrant adolescents. The experiences of migrant children in China are especially pertinent to the research questions. In the last several decades, China has undergone rapid industrialization and urbanization. As demands for factory workers and service labors grew, hundreds of millions of rural residents migrated to cities to seek better employment opportunities, and living conditions, with many of them bringing children with them. This pattern of migration has displaced nearly 36 million rural-born children and moved them to the big cities (Duan et al., 2013). It is well-documented that these migrant children have a higher tendency to engage in aggression and violence than native-born children (Zhong et al., 2017). What is less clear is what causes these children to be more heavily involved in aggressive behavior. Discrimination and its link to reactive aggression may hold one of the answers, as discrimination may lead to anger and frustration that invoke aggressive responses. In mainland China, rural migrants are often subject to discrimination due to their lower social status and the institutional barriers that deprive them of the rights afforded to urban residents (Kuang and Liu, 2012). A large amount of empirical evidence indicated that migrant adolescents in China were confronted with individual and institutional discrimination (Wang and Mesman, 2015; Lan and Moscardino, 2020). Data collected from this population present a unique opportunity to test whether perceived discrimination is related to aggression through this process.

Perceived discrimination refers to individuals' perception of negative attitude, judgment, or unfair treatment due to their specific characteristics such as gender, race, ethnicity, and social status (Banks et al., 2006). In this study, we focus specifically on discrimination related to social status. Discrimination has been identified as a predictor of aggression and violence among migrant children in many studies (Smokowski and Bacallao, 2006; Rivera et al., 2010). The general strain theory (GST) proposed by Agnew (1992) considers delinquent behavior as a strategy for coping with stressful experiences. According to the GST, strains are "relationships in which others are not treating the individual as he or she would like to be treated" (Agnew, 1992, p. 48). Such relationships create negative emotions, which in turn lead to delinquent coping that may include aggressive behavior. The GST (Agnew, 1992, 2013) contends that discrimination is one of the strains that promote delinquent coping because it is often seen as unjust and denigratory by the person who receives the unfair treatment. The theoretical underpinnings of the GST are supported by empirical research showing a positive relationship between discrimination and adolescent aggression. This relationship has emerged across different adolescent demographic groups including Latinx adolescents (Smokowski and Bacallao, 2006; Wright and Wachs, 2019), African American youth (Mulvey et al., 2020; Xie et al., 2020), and Chinese migrant adolescents (Beiser et al., 2010; Lan et al., 2020; Song et al., 2020).

Discrimination may have different effects on proactive and reactive aggression. Dodge (1991) maintained that reactive and proactive aggression arise from distinct social experiences and develop independently. The concept of reactive aggression derives from Berkowitz (1962) frustration-aggression model, which contends that reactive aggression occurs as a retaliatory or defensive response to perceived provocation or offenses and usually comes along with intense emotions of anger and frustration. This model posits that stressful life events such as exposure to discrimination that are perceived as intentional or threatening elicit feelings of fear or the need to defend oneself, thereby leading to an escalation in reactive aggression (Berkowitz, 1978).

On the contrary, proactive aggression, which is rooted in the social learning theory (Bandura, 1973), is referred to as aggressive behavior directed toward achieving a desired goal. Unlike reactive aggression that happens as a defensive reaction to situational stimulus, proactive aggression develops in supportive circumstances that value the use of aggression as an effective strategy to resolve conflicts or obtain desired outcomes (Dodge and Coie, 1987; Dodge, 1991).

As a reaction to the anger–frustration stimulus, reactive aggression is more likely to be triggered by situational factors in comparison with proactive aggression. Since discrimination is mainly a situational factor, it should affect reactive aggression more strongly. Consistent with this view, empirical literature has shown that adolescents subjected to peer rejection and provocations tend to perceive peers' intentions as hostile, leading to an increased likelihood of reactive rather than proactive aggression (Camodeca et al., 2002; Card and Little, 2006; Fite et al., 2012; Brown et al., 2016). In line with these studies, Chan et al. (2018) found that that verbal victimization by peers significantly contributes more to adolescent reactive aggression than proactive aggression in a sample of more than 1,000 Hong

Kong youth. Considering this evidence, we expect that perceived discrimination is more strongly related to adolescent reactive aggression than proactive aggression.

According to the GST (Agnew, 1992, 2013), the relationship between stressful circumstances and delinquent coping is not straightforward. Rather, exposure to stressful experiences like discrimination generate negative emotions, which in turn provide major impetus for delinquent coping that may include aggressive behavior. The GST contends that negative emotions can render people irritable, impatient, resentful, and explosive. People who suffer from these emotions have a stronger desire for revenge, which may lead to the elevated risk of delinquent coping including aggression (Agnew, 1992). Indeed, negative emotions operate as intervening variables between discrimination and aggression, as evidenced in prior research demonstrating that discrimination is linked to aggression through negative emotions (Simons et al., 2006; Hartshorn et al., 2012; Herts et al., 2012).

Negative emotions have been differentially associated with reactive and proactive aggression (Vitaro et al., 2002). The frustration-anger theory of aggression contends that reactive aggression is emotionally based behavior stemming from an emotional and impulsive reaction to perceived provocation (Berkowitz, 1962, 1993). According to the theory, negative emotions especially anger and frustration lay the foundation for reactive aggression. In consistency with this argument, reactive aggression has been found to occur in the context of multiple mental health problems, especially anger and hostile emotions (Frick and Morris, 2004; Marsee and Frick, 2007; Moore et al., 2019). Children who have experienced intense and dysregulated anger tend to act out by involving in reactive aggression when provoked by situational stimuli (Damon et al., 2006). Prior research has documented the important role that anger plays as a catalyst for reactive aggression (Sullivan et al., 2017; Jambon et al., 2019). The positive relationship between anger and reactive regression has also been supported by studies conducted among toddlers (Vitaro et al., 2006) and among Chinese adolescents (Fung et al., 2015). In addition to anger and hostility, other negative emotions have also been found to be related to reactive aggression. For example, a sizeable body of empirical studies have shown that internalizing problems, including anxiety-depression symptoms (Fung et al., 2015; Slaughter et al., 2020), chronic depression (Brendgen and Poulin, 2018; Evans and Fite, 2019), and emotional dysregulation (Stellwagen and Kerig, 2018) are significantly linked to reactive aggression.

Unlike reactive aggression that is regarded as an emotional form of aggression, proactive aggression is driven by desired goals and is characterized by lack of emotionality (Crick and Dodge, 1996). Indeed, empirical research examining the relationship between negative emotions and proactive aggression has failed to provide evidence that negative emotions act as a predictor of proactive aggression (Card and Little, 2006; Rosen and Factor, 2015). In an analysis of longitudinal data collected from a sample of 599 elementary-school children in Germany, Rohlf et al. (2017) found that anger dysregulation was positively linked to reactive aggression both concurrently and longitudinally but was not related to proactive aggression. Similarly, a more recent study conducted by Moore et al. (2019) also showed that adolescents' daily emotions including sadness, fear, and angry reactions to daily hassles are significantly linked to reactive aggression but not to proactive aggression.

Based on theories and empirical evidence reviewed in this section, we expect that negative emotions mediate the relationship between perceived discrimination and reactive aggression, but play no role linking perceived discrimination and proactive aggression. Specifically, migrant adolescents' perceived discrimination increases their experience of negative emotions, which in turn place them at a higher risk for reactive aggression.

Prior studies have shown that socioemotional support strongly influences adolescent adjustment and developmental outcomes (Ni et al., 2016; Sterle et al., 2018; Wright and Wachs, 2019). Defined as the range of behaviors through which one person conveys love (i.e., affection or emotional acceptance) and esteem (i.e., respect or social acceptance) toward another person, socioemotional support is one of the major domains of social support satisfying the most basic emotional needs of individuals (Foa and Foa, 1974). For children and adolescents who are confronted with strains, socioemotional support could facilitate a positive, resilient sense of self, and meanwhile afford an arena of comfort that would attenuate the deleterious impact of stressors (Luthar, 2006). The protective function of socioemotional support can be explained by the extension of the GST. The GST identifies social support as a protective factor, potentially alleviating the deleterious impact of strains such as discrimination by influencing an individual's subjective appraisal of strains and his or her capability to modulate emotional responses to strains (Agnew, 2013). Likewise, the theory of differential social support and coercion suggests that social support could shelter individuals from negative emotions, afford individuals resources to tackle hardship through prosocial means, thereby decreasing the adverse impact of strains like discrimination (Colvin et al., 2002). In this regard, socioemotional support as a major form of social support could play an important role in protecting migrant children from developing negative emotions and aggressive behavior.

Prior studies have provided strong evidence showing that socioemotional support can serve important protective functions, buffering individuals from adverse effects of strains. Kort-Butler (2010) found that while exposure to victimization is significantly and positively related to delinquent behavior for adolescents with lower levels of socioemotional support, the relationship does not exist for those with higher levels of socioemotional support. Utilizing data collected from African Americans, Steers et al. (2019) found that social support, in the form of socioemotional support and tangible support, moderates the relationship between discrimination and mental health problems. Similarly, in their longitudinal study of male adolescents and their parents, Simons et al. (2006) found that warmth and affection from parents mitigate the deleterious impact of discrimination on adolescent violent and aggressive behavior. Their results suggested that parental socioemotional support achieves this buffering effect by reducing the likelihood that discrimination leads to anger and hostility (Simons et al., 2006).

Based on the evidence provided in previous studies, we expect that socioemotional support moderates the relationship between discrimination and reactive aggression. Specifically, migrant children with higher level of socioemotional support are less likely to act aggressively when being discriminated against than children with lower level of socioemotional support.

Drawing on the theories and research reviewed above, this study constructs a moderated mediation model to test the mechanisms underlying the relationship between perceived discrimination and the two forms of aggression, including proactive and reactive aggression among migrant adolescents. Specifically, the current research investigates the mediating role of negative emotions and the moderating role of socioemotional support in the relationship between perceived discrimination and aggression. We use two-wave longitudinal data collected from a random sample of migrant adolescents in China to test the interrelationships in the model. We proposed the following hypotheses:

- H1: Perceived discrimination by Chinese migrant adolescents is positively related to their aggression, while its influence on reactive aggression is expected to be stronger than its effect on proactive aggression among the adolescent group.
- H2: Perceive discrimination increases negative emotions, which in turn lead to adolescent aggression, especially reactive aggression.
- H3: Socioemotional support weakens the link between perceived discrimination and aggression through the following two mechanisms: (a) it acts as a buffer to inhibit aggressive response by moderating the impact of perceived discrimination on negative emotions and (b) it suppresses aggressive response by moderating the direct effect of perceived discrimination on aggression.

MATERIALS AND METHODS

Data

The current study used data collected from a two-wave longitudinal research project on family processes and delinquency conducted in one of the largest metropolitan areas in China. The institutional review board of the university that funded the project reviewed and approved the study design and procedures. We collected the first wave of data in 2015 and the second wave of data one year later. The research site had been a major city in China before the country opened up its economy to the world in the late 1970s, but it has developed into a highly populated and diverse metropolis in recent years with mixed urban and suburban districts. It is now home to 30 million people, including millions of migrant workers and ethnic minorities.

To ensure the representativeness of the sample, we randomly selected eligible participants who attended secondary schools designated for migrant children using a three-stage stratified probability proportionate-to-size sampling procedure. In the first stage, we randomly selected three districts to study, including two urban districts, and one suburban district. In the second stage, we randomly selected one suburban middle school, one urban middle school, one suburban high school, and one urban high school within each district, resulting in a total of 12 schools. In the third stage, in each sampled school, we proportionately selected a random number of classes in the seventh, eighth, tenth, and eleventh grades. Considering that ninth and twelfth graders, which were the final years of middle and high school, respectively, would graduate before the second wave of the survey, we did not include them in the baseline survey.

Prior to survey administration, we provided the schools with the written informed consent forms for both the students and their parents. The forms clearly state that the participation in this study is entirely voluntary, and the privacy and confidentiality of the respondents will be strictly protected. We used self-identification as a way to identify migrant students. We asked a series of questions about place of origin and adaptation to life in the city. Students were instructed to skip this set of questions if they considered themselves as a "local resident" of the city. Only respondents who answered the questions on migration were included in this study, which yielded 534 eligible participants. A paper-and-pencil survey was then administered to the sampled students. In the following year (2016), we conducted the second wave of the survey to the same students in the same schools. The response rates for the Wave 1 and Wave 2 surveys were 97.20 and 96.73%, respectively. Additionally, 61 participants who had missing values on the study variables, including the non-respondents, were excluded in the analyses, resulting in a final sample of 470.

Measurement

We used standard instruments with verified validity and reliability in prior research to measure the key theoretical concepts introduced in this study, including perceived discrimination, negative emotions, socioemotional support, and aggression. To facilitate causal inference, aggression is measured using data collected in Time 2 (T2), while all other variables are measured by data collected in Time 1 (T1). We also included demographic measures as control variables.

Perceived Discrimination

Perceived discrimination was measured by Perceived Discrimination among Migrant Children (PDAMC) developed by Liu and Shen (2009). PDAMC consists of 20 five-point-Likert-scale questions measuring 4 aspects of discrimination: physical discrimination, avoidance, policy discrimination, and general discrimination. PDAMC has been widely used to assess perceived discrimination and has been shown to have good validity and reliability (Liu and Shen, 2009). The Cronbach alpha value of the items was 0.95, indicating a high level of reliability. In the current study, we measured the concept of discrimination by taking an average of all 20 questions.

Negative Emotions

Wang et al. (1997)'s mental health inventory of middle school and high school students (MMHI) was used to measure negative emotions in this study. We selected 30 items from five subscales (6 items each) to measure five common psychological disorder symptoms including depression (alpha = 0.84), anxiety (alpha =

0.88), interpersonal strain (alpha = 0.78), hostility (alpha = 0.86), and paranoid ideation (alpha = 0.84). For each symptom, the mean of the six items was used as a measure of the corresponding psychological disorder. An additional analysis showed that the 30 items formed a single index with an alpha value of 0.95. Considering the high level of internal consistency among the items, we took an average of the 30 items and used it as an indicator of negative emotions.

Socioemotional Support

Socioemotional support was measured by the Index of Sojourner Social Support (ISSS) developed by Ong and Ward (2005), which consists of 18 Likert-scaled questions. The ISSS contains separate measures of socioemotional support and instrumental support, each of which is composed of nine questions. In the current study, we used the mean score of the nine questions (alpha = 0.93) measuring socioemotional support as an indicator of the level of socioemotional support.

Aggression

Aggression was measured by Reactive–Proactive Aggression Questionnaire (RPQ) developed by Raine et al. (2006). The RPQ consists of 23 items, 11 for reactive aggression (alpha = 0.88) and 12 for proactive aggression (alpha = 0.94). Answer scales of the RPQ are 0 (never), 1 (sometimes), or 2 (often). Summations of the 11 and 12 items formed the measurement of reactive and proactive aggression, ranging from 0 to 22 and from 0 to 24, respectively.

Control variables. Age, gender, parental education, and family monthly income were included as the control variables in the analysis. Age was an interval variable measured by years, ranging from 11 to 17. Gender was a dichotomous variable, with 0 representing male and 1 representing female. Parental education was measured by asking the respondents to rate paternal education and maternal education separately on a 4-point scale ranging from 1 (primary school or less) to 4 (undergraduate education or more). Family monthly income was reported by the respondents on 6 categories ranging from 1 (less than RMB 1,000) to 6 (more than RMB 9,000).

TABLE 1 | Descriptive statistics ($N = 470$).

Variable	Mean/%	Std. Dev.	Min	Max
Perceived discrimination	1.60	0.71	1	5
Socioemotional support	2.89	1.00	1	5
Negative emotions	2.09	0.78	1	5
Aggression				
Proactive aggression	2.23	3.94	0	24
Reactive aggression	5.44	4.25	0	22
Demographics				
Gender				
Male	53.83%			
Female	46.17%			
Age	13.49	1.47	11	17
Family monthly income				
<1,000	1.70%			
1,000–3,000	21.19%			
3,001–5,000	52.34%			
5,001–7,000	13.40%			
7,001–9,000	5.96%			
>9,000	4.68%			
Paternal education				
Primary school or less	18.51%			
Secondary school	75.11%			
Junior college	4.47%			
Undergraduate education or more	1.91%			
Maternal education				
Primary school or less	25.53%			
Secondary school	69.57%			
Junior college	3.62%			
Undergraduate education or more	1.28%			

Analytical Approach

Descriptive analysis was conducted to provide an overview of the sample. After descriptive analysis, we conducted independent sample *t*-tests and *F*-tests to compare the mean differences of the key study variables by the demographic variables. Then correlational analysis was conducted to examine the bivariate relationships between the study variables. Conditional process analysis (CPA) (Hayes, 2013) was used to test the mediating effect of negative emotions and the moderating effect of socioemotional support on the relationship between perceived discrimination and the two types of aggression. We first tested the mediation model and added the interaction term to test the moderating effect of negative emotions. We applied the bootstrapping approach with 95% confidence intervals (CI) based on 2,000 random samples to estimate the effect. The 95% CI without zero indicates statistical significance (Preacher and Hayes, 2008). The CPA can be estimated by the following two regressions (Hayes, 2013):

$$\mathrm{M} = \beta_0 + \beta_1 \mathrm{X} + \beta_2 \mathrm{W} + \beta_3 \mathrm{XW} + \beta_4 \mathbf{C}_1 \quad (1) \tag{1}$$

$$\mathrm{Y} = \gamma_0 + \gamma_1 \mathrm{X} + \gamma_2 \mathrm{M} + \gamma_3 \mathrm{W} + \gamma_4 \mathrm{XW} + \gamma_5 \mathbf{C}_2 \quad (2) \tag{2}$$

In the above formulas, X, W, M, and Y denote exposure variable (independent variable), moderator, mediator, and outcome variable (dependent variable), respectively. C_1 and C_2 are control variables for each regression. Conventionally, the classic

TABLE 2 | Descriptive statistics by demographic variables ($N = 470$).

Variable	Perceived discrimination	Socioemotional support	Negative emotions	Proactive aggression	Reactive aggression
Gender					
Male	1.70	2.77	2.07	3.13	5.92
Female	1.48	3.03	2.12	1.18	4.91
T statistics	3.28***	−2.75**	−0.71	5.53***	2.58*
Family monthly income					
<1,000	2.00	2.68	2.69	1.13	5.25
1,000–3,000	1.61	2.81	2.05	1.97	5.07
3,001–5,000	1.60	2.93	2.09	2.24	5.38
5,001–7,000	1.61	2.75	2.00	2.30	6.02
7,001–9,000	1.58	3.05	2.35	2.61	6.00
>9,000	1.34	3.12	2.00	3.00	5.82
F statistics	1.11	0.87	1.88	0.44	0.53
Paternal education					
Primary school or less	1.63	2.86	2.20	2.45	5.78
Secondary school	1.61	2.89	2.06	2.22	5.39
Junior college	1.41	2.79	2.23	1.90	5.58
Undergraduate or more	1.21	3.30	2.07	1.33	4.56
F statistics	1.46	0.58	1.01	0.29	0.34
Maternal education					
Primary school or less	1.61	2.90	2.10	2.58	5.87
Secondary school	1.61	2.85	2.09	2.19	5.36
Junior college	1.19	3.21	2.04	1.06	5.18
Undergraduate or more	1.76	3.63	2.37	0.83	2.67
F statistic	2.02	1.82	0.28	1.07	1.31

*$P < 0.05$; **$p < 0.01$; ***$P < 0.001$.

TABLE 3 | Zero-order correlations.

		1	2	3	4	5
1	Perceived discrimination	1				
2	Socioemotional support	−0.23***	1			
3	Negative emotions	0.26***	−0.13**	1		
4	Proactive aggression	0.12*	−0.12*	0.10*	1	
5	Reactive aggression	0.09	−0.10*	0.18***	0.69***	1

All correlation coefficients are standardized.
*$P < 0.05$; **$p < 0.01$; ***$P < 0.001$.

mediation analysis (Baron and Kenny, 1986) can be estimated by regressing X on M and regressing X + M on Y. In other words, only the first two and the last term in regression (1) and the first three and the last term in regression (2) are included in the analysis. However, in order to explore how W moderates the mediation process (the conditional process), the main effect of W and the interaction term of W and X are added to both regressions.

It should be noted that in the CPA, the parameter tests of β_3 and γ_4 can indicate whether W significantly moderate the effect of X on M, and the direct effect of X on Y. In classic mediation analysis, the direct, indirect and total effects of X on Y are calculated by three constants γ_1, $\beta_1\gamma_2$, and $\gamma_1 + \beta_1\gamma_2$, respectively. In contrast, because of the introduction of interactive terms, the direct, indirect and total effects of X on Y in CFA change to $\gamma_1 + \gamma_4 W$, $(\beta_2 + \beta_3 W)\gamma_2$, and $\gamma_1 + \gamma_4 W + (\beta_2 + \beta_3 W)\gamma_2$, which are not constant but determined by the values of W. The interpretation of the direct, indirect, and total effects, therefore, is usually done by substituting the average value and the average value minus/plus 1 standard deviation of W as representatives of medium, low or high levels of the moderator into the equations to predict the contextual direct, indirect, and total effects.

RESULTS

Table 1 provides the descriptive statistics of all the variables included in the analysis. As shown in the table, 46.17% of the surveyed migrant students were female and the average age was 13.49. More than half of the respondents' family monthly income were between 3,001 and 5,000 RMB (52.34%). Most of respondents' parents received secondary school education. The sample as a whole reported experiencing a modest level of perceived discrimination and a medium level of socioemotional support. The average score of negative emotions exceeded 2. Wang et al. (1997) has suggested that a mean score of 2 indicates the presence of a mild level of mental illness. Based

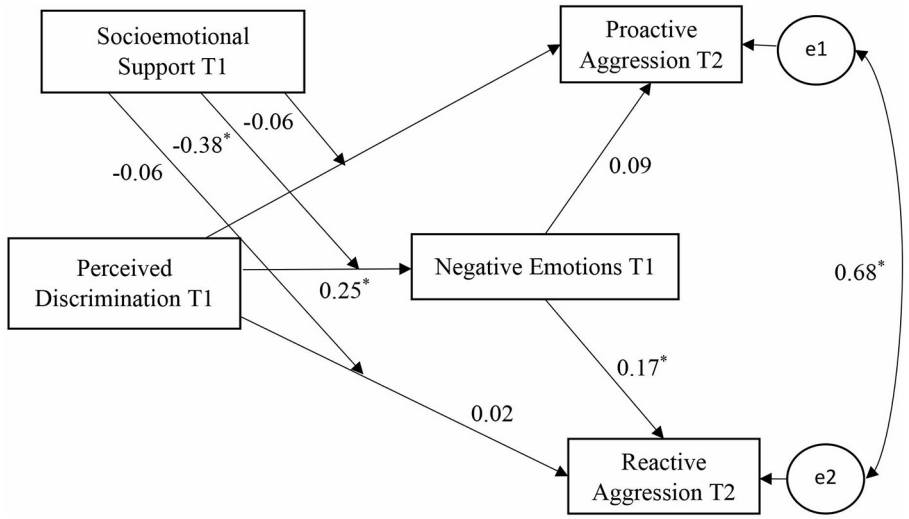

FIGURE 1 | The conditional process analysis. All the coefficients are standardized. Gender, age, family monthly income and parental education are controlled for all the endogenous variables. *$P < 0.05$.

on their suggestion, we calculated the prevalence rate of negative emotions among migrant adolescents in our sample, which was 46.81%, suggesting that 46.81% of migrant adolescents suffered from some level of mental health problems. Furthermore, the mean score of proactive aggression and reactive aggression was 2.23 and 5.44, respectively, indicating that reactive aggression was nearly one and a half times higher than proactive aggression among Chinese migrant students.

Table 2 presents the mean differences of the key study variables by gender, family monthly income, paternal education and maternal education. There are significant gender differences in perceived discrimination, socioemotional support, proactive aggression, and reactive aggression. Compared with their female counterparts, male adolescents reported higher levels of perceived discrimination (male: $M = 1.70$; female: $M = 1.48$; $t = 3.28$, $p < 0.001$), proactive aggression (male: $M = 3.13$; female: $M = 1.18$; $t = 5.53$, $p < 0.001$), reactive aggression (male: $M = 5.92$; female: $M = 4.91$; $t = 2.58$, $p < 0.05$), and had a lower level of socioemotional support (male: $M = 2.77$; female: $M = 3.03$; $t = -2.75$, $p < 0.01$). There was no significant difference in study variables by family monthly income, paternal education, and maternal education.

Table 3 shows the Pearson correlation coefficients for all the bivariate relationships among the key variables included in the analysis, which provide a partial test of our research hypotheses. As shown in the table, perceived discrimination was positively correlated with proactive aggression ($r = 0.12$, $p < 0.05$) and negative emotions ($r = 0.26$, $p < 0.001$). **Table 3** also shows that perceived discrimination was negatively correlated with socioemotional support ($r = -0.23$, $p < 0.001$). Further, negative emotions were also positively correlated with proactive ($r = 0.10$, $p < 0.05$) and reactive ($r = 0.18$, $p < 0.001$) aggression. Finally, socioemotional support was negatively associated with proactive ($r = -0.12$, $p < 0.05$) and reactive ($r = -0.10$, $p < 0.05$) aggression.

As Pearson correlations only reflect bivariate relationships between the variables, a CPA was conducted to provide more robust evidence for the research hypotheses. **Figure 1** shows the framework and standardized coefficients of the CPA analysis.

As indicated in model 1 in **Table 4**, the direct effects of perceived discrimination on proactive/reactive aggression were not significant. However, the effect of perceived discrimination on negative emotions was significant ($\beta = 0.25$, bootstrapping 95% CI = [0.13, 0.38]), and the effect of negative emotions on reactive aggression was also significant ($\beta = 0.17$, bootstrapping 95% CI = [0.06, 0.28]). These findings supported the first two hypotheses that perceived discrimination was significantly related to reactive aggression and its effect was mediated by negative emotions. The effect of perceived discrimination on proactive aggression, however, was not significant.

Model 2 in **Table 4** added the interaction term (perceived discrimination × socioemotional support). Model 2 revealed that socioemotional support significantly moderated the relationship between perceived discrimination and negative emotions ($\beta = -0.38$, bootstrapping 95% CI = [−0.72,−0.05]). Through this mechanism, socioemotional support moderated the total effect of perceived discrimination on reactive aggression by reducing the effect of discrimination on negative emotions. The direct effects of perceived discrimination on both proactive and reactive aggression, however, were not moderated by socioemotional support. These findings support hypotheses H3a and H3b.

To facilitate the interpretation of the moderating effect of emotional support, **Figure 2** plots the total effect of perceived discrimination on reactive aggression at different levels of socioemotional support with simulated data. The low, medium, high levels of emotional support were defined by the average minus one standard deviation, the average, and the average plus one standard deviation of the measure of socioemotional support. We firstly simulated a set of values from 1 to 5 by 0.2 to represent perceived discrimination, and then calculated

TABLE 4 | The results of conditional process analysis.

Variables	Model 1	Model 2
Endogenous variables: Negative emotions		
Gender	0.08(−0.01 to 0.18)	0.09(−0.01 to 0.18)
Age	0.05(−0.04 to 0.13)	0.05(−0.03 to 0.14)
Family monthly income	0.03(−0.07 to 0.13)	0.03(−0.06 to 0.13)
Paternal education	−0.02(−0.12 to 0.07)	−0.03(−0.13 to 0.06)
Maternal education	0.02(−0.06 to 0.11)	0.03(−0.06 to 0.11)
Perceived discrimination	0.25(0.13 to 0.38)*	0.57(0.28 to 0.87)*
Socioemotional support	−0.08(−0.20 to 0.04)	0.19(−0.09 to 0.46)
Discrimination × support		−0.38(−0.72 to −0.05)*
Intercept	1.71(0.69 to 2.75)	0.96(−0.28 to 2.20)
Endogenous variables: Proactive aggression		
Gender	−0.23(−0.30 to −0.16)*	−0.23(−0.30 to −0.16)*
Age	−0.02(−0.09 to 0.05)	−0.02(−0.09 to 0.06)
Family monthly income	0.06(−0.03 to 0.16)	0.06(−0.03 to 0.16)
Paternal education	−0.02(−0.11 to 0.07)	−0.02(−0.11 to 0.06)
Maternal education	−0.07(−0.15 to 0.00)	−0.07(−0.15 to 0.00)
Negative emotions	0.09(−0.02 to 0.20)	0.09(−0.03 to 0.20)
Perceived discrimination	0.04(−0.07 to 0.15)	0.09(−0.26 to 0.44)
Socioemotional support	−0.07(−0.18 to 0.04)	−0.03(−0.28 to 0.22)
Discrimination × support		−0.06(−0.41 to 0.29)
Intercept	0.95(−0.02 to 1.93)	0.84(−0.43 to 2.11)
Endogenous variables: Reactive aggression		
Gender	−0.10(−0.19 to −0.02)*	−0.10(−0.19 to −0.01)*
Age	0.01(−0.07 to 0.09)	0.01(−0.07 to 0.09)
Family monthly income	0.08(−0.01 to 0.17)	0.08(−0.01 to 0.17)
Paternal education	−0.01(−0.10 to 0.09)	−0.01(−0.10 to 0.09)
Maternal education	−0.09(−0.18 to −0.00)*	−0.09(−0.18 to −0.00)*
Negative emotions	0.17(0.06 to 0.28)*	0.17(0.06 to 0.28)*
Perceived discrimination	0.02(−0.09 to 0.12)	0.07(−0.22 to 0.35)
Socioemotional support	−0.06(−0.16 to 0.04)	−0.02(−0.23 to 0.20)
Discrimination × support		−0.06(−0.36 to 0.23)
Intercept	1.07(0.07 to 2.06)*	0.95(−0.22 to 2.12)
Covariance (proactive vs. reactive)	0.68(0.61 to 0.74)	0.68(0.62 to 0.74)

All the coefficients are standardized. Bootstrapping 95% CI with 2,000 replicates are shown in parenthesis.
**Indicates that bootstrapping CI does not include zero.*

the corresponding value of reactive aggression based on the model described in **Table 4** and **Figure 1**. As shown in **Figure 2**, although the total effects of perceived discrimination on reactive aggression were positive at all levels of socioemotional support, the slop descended when socioemotional support changed from high to low, suggesting that adolescents perceiving discrimination were less likely to engage in reactive aggression when they had higher levels of socioemotional support.

DISCUSSION

The relationship between perceived discrimination and antisocial behavior has garnered considering research interest in recent year. Much of this research has focused on the link between discrimination and illegal behavior. Few studies have examined the influence of discrimination on the broad range of aggressive behavior common among adolescents, including proactive and reactive aggression. The current research fills this gap. Using longitudinal data collected from a representative sample of migrant adolescents in one of the largest urban areas in China, this study found that perceived discrimination was differentially related to reactive aggression and proactive aggression. Specifically, the results showed that perceived discrimination in Wave 1 increased reactive aggression in wave 2 but it had no effect on proactive aggression in the second wave. These findings are consistent with the propositions of the GST (Agnew, 1992, 2013) and the frustration-aggression model (Berkowitz, 1962), suggesting that exposure to discrimination promote various circumstances in which children would act out and cope with provocations aggressively. As a reaction to provocations, reactive aggression may be regarded as an effective mean by those who have experienced discrimination to defend themselves, take revenge on the perpetrator and unleash anger triggered by discrimination (Berkowitz, 1962; Simons et al., 2003). The positive relationship between discrimination and reactive aggression is also in line with Dodge (1980) finding that children who are mistreated by a peer tend to attribute a hostile intention to the instigator of the unfair treatment, which in turn foster a belief that reactive aggression is a necessary and justifiable response. Consistent with our hypothesis, perceived discrimination was not significantly related to proactive aggression. This finding confirms the previous evidence that stressful life events did not predict proactive aggression (Fite et al., 2012; Brown et al., 2016), suggesting that discrimination might affect reactive aggression only.

The differential relations of perceived discrimination with reactive aggression and proactive aggression are believed to be attributed to the mechanisms underlying these relationships. Moving beyond the identification of the overall association between perceived discrimination and the two types of aggression, the current study takes a step further to examine the mediating role of negative emotions in the formation of the relationships. The results showed that negative emotions fully mediated the relationship between perceived discrimination and reactive aggression. Exposure to discrimination appeared to interfere with adolescents' ability to regulate their emotions, which in turn led to reactive aggression (Fite et al., 2012). This finding provides further support of the GST's view that the association between discrimination and aggression is indirect through negative emotions. However, the process was true only for reactive aggression as perceived discrimination had no effect on proactive aggression. Taken together, these findings suggested that both discrimination and negative emotions contributed to reactive aggression, with the former playing a more distal role and the latter a more proximate role in facilitating the behavior.

Furthermore, we investigated the buffering role of socioemotional support in moderating the relationship between perceived discrimination and the two types of aggression. In support of the argument that social support inhibits aggressive and delinquent behavior (Agnew, 1992, 2013; Colvin et al.,

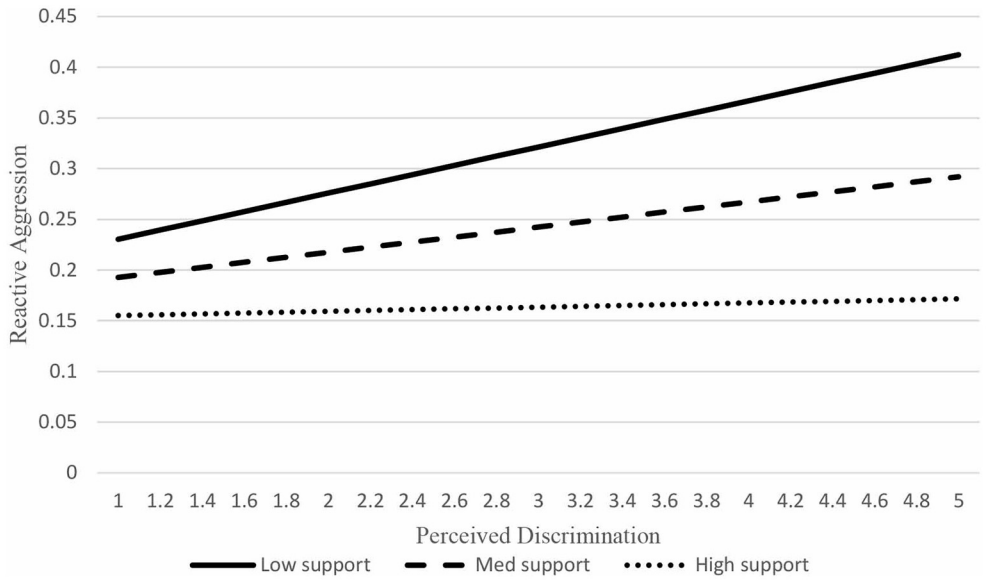

FIGURE 2 | The moderating effect of socioemotional support.

2002), our result confirmed that socioemotional support mitigated the adverse effect of discrimination on adolescent reactive aggression. Socioemotional support that fulfills the basic emotional needs of individuals is thought to promote a positive and resilient sense of self (Luthar, 2006). Therefore, even in the presence of stressors like discrimination, migrant adolescents with high levels of socioemotional support may be able to cope with stressors with socially appropriate behavior rather than involving in reactive aggression. We further examined the mechanisms through which socioemotional support achieves this buffering effect. We found that socioemotional support fulfills this role by reducing the likelihood that perceived discrimination leads to negative emotions. When facing discrimination, migrant adolescents with a higher level of socioemotional support were less likely to develop negative emotions. As suggested by the theory of differential social support and coercion and the GST, it appeared likely that socioemotional support such as warmth and care reduced the emotional impact of discrimination by enabling migrant adolescents to reevaluate the strain of discrimination and cope with it by non-threatening means, thereby leading to a decreased likelihood of aggressive response (Agnew, 2013).

The findings of the current study have important implications for social policy and programs related to aggression prevention and intervention. First, considering the critical role that socioemotional support plays in protecting migrant adolescents from negative emotions and aggressive behavior, it is important to provide migrant adolescents with strong socioemotional support when they resettle in big cities. For example, in the family context, parent service programs could be afforded to migrant workers to improve their awareness that socioemotional support is important for their children's development and well-being. It would also be helpful to make more time available to migrant workers for them to attend to their children's social and emotional needs. Second, schools should make a strong effort to promote multiculturism and foster a climate of mutual support and inclusiveness. For example, teachers can help migrant children develop friendship with local students and promote positive interactions between them to increase their mutual respect and trust. Research has demonstrated that building peer support system is the most effective way to improve migrant adolescents' post-settlement adjustment (Wu et al., 2010). Third, prevention programs should be provided to at-risk adolescents, especially those who have been frequently targeted for discrimination by their peers, to help them learn constructive and problem-solving coping strategies to deal with interpersonal conflict, thereby preventing them from repeated discrimination victimization and adaptation of aggressive responses that may further undermine their well-being. Lastly, active measures should be taken at the policy level to curtail discrimination. The lack of social resources and equal education opportunities caused by policy discrimination against migrant families and children is the hardest to resolve, because it stems from the rigidity of the household registration system that is deeply rooted in Chinese social structure (Wang and Mesman, 2015). Despite the structural barriers, government on all levels can make policy or regulatory changes to allot more resources for migrant adolescents, such as constructing a favorable and supportive community environment, expanding educational opportunities, and bridging the gap between regular public schools and schools designated for migrant children. The joint efforts of eliminating discrimination and building support system from family, school, and government will decrease migrant adolescents' risk for reactive aggression and promote their post-settlement well-being.

Despite the contributions of the current study, there are certain limitations that are worth noting. Firstly, aggression at Time 1 and Time 2 might be highly correlated. The survey, however, did not collect data on aggression in Wave 1. Because of it, this study was unable to control for aggression at Time 1. The omission of the Time 1 measure might have affected the accuracy of the research findings concerning the relationships between the explanatory variables and aggression. Second, although the sample adopted in this study was randomly selected, it may not be representative of all migrant children in China because cities may differ in their policies and regulations for migrant children. As such, the patterns observed in this study may not be applicable to other cities in China. To address these limitations, future studies should consider incorporating measures from multi-informants such as teachers, parents, and peers to reduce measurement errors. Additionally, to yield more unbiased and reliable results, researchers should include measures of aggression across waves in their analysis. Moreover, further research should be conducted in different cities to strengthen the external validity of the research findings.

DATA AVAILABILITY STATEMENT

The dataset used in this paper is not publicly available because of data use restrictions from the university that sponsored the study. Requests to access the dataset should be directed to SL at spencerli@um.edu.mo.

ETHICS STATEMENT

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

AUTHOR CONTRIBUTIONS

SL conceived the project, obtained the funding, contributed to data collection and the design of the study, reviewed and edited the manuscript. RX contributed to the design of the study, data interpretation, drafted the original manuscript, and revised it based on the critical comments provided by SL. YX conducted formal analysis and drafted the original manuscript. All authors have read and agreed to the published version of the manuscript.

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Risky Sexual Behavior of Young Adults in Hong Kong: An Exploratory Study of Psychosocial Risk Factors

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There is limited knowledge of the prevalence and nature of risky sexual behavior (RSB) among young adults in Hong Kong. This cross-sectional study explored the psychosocial risk factors of RSB with a sample of 1,171 Hong Kong university students (aged 18–40 years). Grounded in the theoretical propositions of several criminological theories (i.e., the theories of self-control, general strain, social learning, social control, and routine activity), engagement in three types of RSB (i.e., general, penetrative, and non-penetrative) was studied alongside a range of psychosocial risk factors. Relative to female participants, male participants reported significantly higher mean levels of general, penetrative, and non-penetrative RSB. Male participants also reported significantly higher mean levels of negative temperament, use of alcohol and other drugs, and paraphilic interests than female participants, who reported significantly higher mean levels of self-control and social bonds than their male counterparts. The results of multivariate analyses (i.e., OLS regressions) revealed that, to a large extent, the male and female participants shared a similar set of psychosocial risk factors (i.e., use of alcohol and other drugs, and paraphilic interest) for their involvement in general, penetrative, and non-penetrative RSB. Furthermore, a high level of negative temperament was significantly associated with penetrative RSB for both genders, while a high level of perceived neighborhood disorganization was found to be an important factor in the participation of females in general, penetrative, and non-penetrative RSB. The findings of this study may have important implications for practice in regard to reducing, if not entirely preventing, the tendency to engage in RSB.

Keywords: sexual risk taking, risky sexual behavior, sexual behavior, psychosocial risk factors, young adults

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INTRODUCTION

Risky sexual behavior (RSB), such as unprotected vaginal, oral, or anal intercourse, incorrect or inconsistent use of contraceptive measures, and sex with multiple partners and/or high-risk partners (i.e., intravenous drug users), has an enormous global impact. Around the world, over a million people are infected with a sexually transmitted infection (STI) each day (World Health Organization, 2019). A population-based geospatial household survey and test conducted with 881 participants (aged 18–49 years) in Hong Kong from 2014 to 2016 found that the prevalence of *Chlamydia trachomatis* (CT) was low overall (1.4%) but relatively high (5.8%) among sexually active young females (aged 18–26 years) (Wong et al., 2017). Chlamydia is a common bacterial infection

caused by the CT bacteria that is transmitted through sexual contact with infected persons and is the most frequently notified STI in the European Union and the United States. In addition to STIs (including CT and HIV infections), RSB can lead to long-term poor reproductive health outcomes, such as infertility and pelvic inflammatory disease (Abajobir et al., 2017). The most significant risks for sexually active people are HIV infection, other STIs (e.g., chlamydia, gonorrhea, and syphilis), and unintended pregnancy (Hoyle et al., 2000). At a societal level, STIs can place a significant burden on a country's health care system.

Adolescents and young adults are at a heightened risk for negative sexual health outcomes in part due to their high rates of unprotected sex with multiple partners. The Global Burden of Disease Study that includes annual assessments for 188 countries from 1990 to 2013 found that unsafe sex practiced by young people aged 10–24 years was a risk factor for an increased level of disability-adjusted life-years (Mokdad et al., 2016). In the United States, for instance, <50% of sexually active adolescents reported using condoms on a regular basis (Martinez et al., 2011), and 14% of sexually active adolescents reported four or more lifetime sexual partners, which was higher than other age groups (DiClemente et al., 2010). Fetene and Mekonnen (2018) found in their sample of 524 young adults in Addis Ababa with a mean age of 21 years that 42% of the participants had more than one sexual partner and 47% of them did not use a condom during sexual intercourse in the past 12 months. In Chiang Mai, Thailand, Pinyopornpanish et al. (2017) found that most of their adolescent and young adult participants (35% of 1,744 participants) had not used a condom during sexual intercourse in the past 3 months (i.e., 66% of those aged 15–19 years, 80% of those aged 20–29 years, and 89% of those aged 30–39 years), and 41% of participants aged from 15 to 19 years reported having had more than one sexual partner in the past 3 months.

Understanding RSB remains pertinent not just from a public health standpoint but also in the criminal justice arena (because, for example, engaging in RSB may lead to perpetrating such criminal behavior as nonconsensual sexual intercourse). Importantly for this study, the high rates of RSB among young adults and the resulting high risk of negative sexual health outcomes highlight the need to understand the risk factors associated with RSBs so that an effective and timely identification of and intervention for those who are at the greatest risk for these outcomes can be made. More importantly, most of the literature on the topic is explored from a public health or clinical perspective. Hence, examining the psychosocial risk factors of RSB through a criminological lens will further advance our knowledge in this area and contribute to literature, particularly when the escalation of RSB to more serious deviant sexual behavior (e.g., sexual assault, rape) is possible.

THEORETICAL BACKGROUND

Self-control has been widely adopted to explain an individual's intention to engage in offending and risky behavior. The self-control theory (a.k.a. the general theory of crime) proffered by Gottfredson and Hirschi (1990) posits that individuals with less self-control are more likely to engage in risky and offending behavior in pursuit of immediate satisfaction without considering the potential consequences. Individuals who are low in self-control are likely to manifest six key characteristics: they are risk-seeking, impulsive, short-tempered, and self-centered, and they prefer physical over mental activities and simple over complex tasks (Muraven et al., 2006). The developmental phase of these individuals is often characterized by early exposure to criminogenic environments that did not allow them to develop sufficient control over their behavior. It is argued that the self-control personality trait, formed between the ages of 6 and 10, is relatively stable over the lifespan of individuals (Hirschi and Gottfredson, 1994), irrespective of their demographic characteristics, such as age, gender, culture, and social class (Vazsonyi and Klanjšek, 2008). Freeman and Muraven (2010) found that relative to those who were high in self-control, individuals who were low in self-control were more likely to take excessive risks. Low self-control individuals have been found by empirical studies to be more likely to engage in various types of risky behavior, such as RSB (Griffin et al., 2012; Kahn et al., 2015), reckless driving (Ferreira et al., 2009; Ellwanger and Pratt, 2014), the use of alcohol and other drugs (Vazsonyi et al., 2006; King et al., 2011), and general risky behavior and minor delinquency (Lu et al., 2013; Chan and Chui, 2017).

According to the general strain theory, the experiencing of stressors (strains) in individuals may interact with their individual characteristics to amplify the risk of engaging in maladaptive behaviors, such as risky behavior and criminal activities (Agnew, 2002). These manifestations of negative coping arise in response to adverse conditions, events, or treatment. Negative emotions (e.g., anger, depression, and frustration) function as a stimulus for action that triggers a progression from the experience of strain through to risky and offending behavior (Agnew, 1992). Exposure to strains may produce negative emotions that demand corrective action (Agnew et al., 2002). For instance, Leith and Baumeister (1996) found that individuals who experienced bad moods were more likely to engage in risk-taking behavior due to impaired self-regulation. Auerbach et al. (2007) noted that individuals who exhibited high levels of neuroticism and emotional regulation deficits were more likely than others to report increased engagement in risky behaviors following increases in the symptoms of negative emotions (e.g., depression, anxiety). A similar finding was reported in Auerbach et al. (2010) study of Chinese adolescents, in which individuals who exhibited high levels of neuroticism and a tendency to adopt maladaptive cognitive emotional regulation strategies were more likely than others to report greater engagement in risky behaviors following increases in the symptoms of depression. According to Stuewig and Tangney (2007), shame and guilt both reflect self-evaluative judgments that may result in negative and uncomfortable emotions (e.g., depression, anxiety, and anger), which may lead to maladaptive behavior, such as substance abuse and RSB. Later, Stuewig et al. (2015) reported that shame-prone children were more likely to engage in RSB (e.g., unprotected sex) and use illegal drugs in young adulthood.

The learning approach, which includes Sutherland's (1947) differential association theory and Akers's (1985) social learning theory, postulates that risky, delinquent, and offending behavior is learned through close social interaction with family and peers in the form of reinforcement or reward and punishment. Differential reinforcement or punishment simply refers to the net balance of expected social and/or nonsocial rewards and costs associated with different behavior (Akers, 1997). Social reinforcement involves "not just the direct reactions of others present while an act is performed, but also the whole range of tangible and intangible rewards valued in society and its subgroups" (Akers, 1997, p. 55), such as financial rewards, positive facial expressions, and verbal approval from significant others. Nonsocial reinforcements, conversely, are "unconditioned positive and negative effects of physiological and psychological stimuli" (Akers, 1998, p. 71), such as the psychophysiological effects of a stimulant. Bandura (1973) stressed that the imitation of observed behavior is also a primary process of behavioral learning. The probability of an individual learning the observed behavior increases when he/she anticipates incentives. Nonetheless, the impact of such exposure varies greatly according to the frequency, duration, intensity, and priority of different associations (Akers, 1998). It is suggested that adverse childhood and/or adolescence traumatic experiences (e.g., physical and/or sexual abuse and witnessing domestic violence) predisposed an individual to subsequent negative life outcomes (e.g., sexual deviant and criminal behavior; Chan et al., 2011; Chan, 2015, 2019a). Even though the primary social groups (e.g., family and peers) tend to have a strong influence on the behavioral learning process, secondary and reference groups (e.g., the school system, colleagues and work groups, the mass media, the Internet, and computer and mobile games) can be similarly important to normative definitions (e.g., attitudes, values, norms, and beliefs) in the learning process (Warr, 2002). For instance, Taylor et al. (2007) reported that gang members were more likely than non-gang members to engage in delinquent lifestyles, such as to be involved in unsupervised activities with peers, to hang out with peers where alcohol and/or other drugs were available, and to engage in a considerably greater amount of delinquent and risky behavior. A plethora of literature has consistently found support for a positive relationship between the use of alcohol and/or other drugs and involvement in risky behavior (e.g., unsafe sex, going on a blind date, hitchhiking; Windle, 1994; Zapolski et al., 2009; Roth et al., 2015). Specifically, Leigh (1990) reported a strong correlation between the frequency of using alcohol or other drugs in conjunction with sexual activity and the frequency of engaging in RSB in a sample of homosexual adults. Staton et al. (1999) found that the increased use of alcohol and marijuana at younger ages was significantly related to riskier sexual activity and increased use of alcohol and marijuana as young adults.

A positive relationship has also been noted between paraphilic interests and/or activities and RSB. Consistent with some theories of sexual offending, Lalumière et al. (2005) posited that an individual's paraphilic behavior may be influenced by his/her degree of impulsivity or propensity to engage in sexual and nonsexual risky behavior. Empirical support for the roles of risk-taking and impulsivity in the expression of paraphilic interests and activities has accumulated (e.g., Kafka, 1997, 2001; Långström and Seto, 2006; Marshall, 2007; Chan, 2021). Dawson et al. (2016) asserted that low levels of general inhibition, as a result of greater degrees of sensation-seeking and impulsivity, may lead to the development of atypical sexual interests. Arguably, a high sex drive and a strong preference for novelty precede or contribute to the development of paraphilic interests, such that some individuals may habituate to conventional sexual partners and activities (Kafka, 2001). Studies have found that individuals diagnosed with paraphilias report a high number of sexual partners, high rates of sexual behavior, and high sexual appetite and preoccupation (Kafka and Hennen, 2003; Långström and Hanson, 2006; Kafka, 2009). As such, the development of new (atypical) sexual interests may be related to an individual's impulsivity and risk-taking tendencies.

Hirschi's (1969) social control theory explains offending behavior in terms of the strength or weakness of social bonds. According to this theory, individuals with strong social bonds to conventional society (e.g., parents, prosocial peers, and school) are less likely to become involved in risky, delinquent, or criminal activities. There are four key elements of a social bond: (1) attachment (i.e., an individual's affective or emotional ties toward parents, peers, and school), (2) commitment (i.e., an individual's investment in prosocial behavior, including a willingness to do what is promised and a respect for the expectations of others over delivering on a promise), (3) involvement (i.e., an individual's active participation in prosocial activities, such as sports, religious practices, and community services), and (4) belief (i.e., an individual's respect for the moral validity of societal norms and regulations). These elements are strongly correlated, and their combined effect is likely to be stronger than their individual effects. Laundra et al. (2002) argued that attachment and commitment to prosocial individuals and activities are likely to increase an individual's morality belief, which may reduce their propensity to engage in delinquent or criminal activities. Empirical research has found support for a positive association between weak social bonds (e.g., parental and school attachment) and involvement in various types of risky behavior such as RSB (e.g., Peterson et al., 2010; Simons et al., 2016) and general risky and delinquent behavior (e.g., Chan and Chui, 2013, 2015). Specifically, a study of adolescent females conducted by Taylor-Seehafer and Rew (2000) found that positive family and school connectedness, the presence of caring adults, and the development of a healthy sexuality were significant protective factors against the early initiation of sexual activity, which may result in such RSB as the early initiation of sexual intercourse, unprotected sexual intercourse, and the inconsistent use of condoms and other forms of barrier contraception. A recent meta-analysis conducted by Kim and Miller (2020) reported that insecure attachment styles were related to RSB. The relationship between attachment anxiety and having multiple partners was stronger when the average age of the participants was higher and when the study population was specifically an at-risk population.

Situational mechanisms, such as routine activities and lifestyle choices, are also commonly used to explain risky and offending behavior. In their routine activity theory, Cohen and Felson

(1979) hypothesized that the probability of a crime occurring is largely influenced by the convergence in time and space of three core elements in the daily routines of individuals: (1) a potential or motivated offender, (2) a suitable or attractive target, and (3) an absent or ineffective guardian who would be otherwise capable of protecting against a violation. The lack of any of these elements diminishes the possibility of a potential crime (Felson and Cohen, 1980). This theoretical model, which was originally developed to explain victimization as the outcome of legitimate and routine daily activities that expose poorly guarded targets to potential offenders in close proximity, has later been extended to describe risky, delinquent, and offending behavior. Simply put, an individual's tendency to engage in risky behavior is largely correlated with his/her specific daily activities (e.g., prosocial or deviant peer association), lifestyle (e.g., living environment), and status (e.g., personal characteristics). Osgood et al. (1996) asserted that individuals who spend substantial times in "unstructured socializing" with deviant peers and without adult supervision may be at an increased risk of engaging in risky and criminal activities. Indeed, studies have reported findings that an affiliation with deviant peers was associated with more RSB [e.g., STIs, unintended pregnancies; see Lansford et al. (2014)] and the use of alcohol and other drugs (Sanchagrin et al., 2017). Tangible and intangible rewards (e.g., status or reputation within a group) may also encourage initial and persistent participation in risky and criminal activities [e.g., sexual risky and offending behavior carried out in groups; see Hart-Kerkhoffs et al. (2011)]. Criminogenic environments (e.g., domestic and community criminogenic exposure) have also been consistently found to be associated with sexual and nonsexual risky and offending behavior (Hewitt and Beauregard, 2014; Chan et al., 2015b).

THE PRESENT STUDY

Through examining a number of mainstream theoretical principles and concepts, this cross-sectional study explores the psychosocial risk factors that are correlated with general, penetrative, and non-penetrative RSB in Hong Kong male and female young adults. In this study, penetrative RSB is simply referred to sexual behavior that involved sexual penetration (e.g., vaginal sex), while sexual behavior that does not involve sexual penetration is regarded as non-penetrative RSB (e.g., breast fondling). General RSB is the overall sexual behavior that involves both penetrative and non-penetrative RSB. The study makes three important contributions. First, it might be the first empirical work to examine different types of RSB by testing several mainstream criminological theories. Second, it explores the gender differences among a large sample of young male and female adults recruited in Hong Kong. Third, the findings can inform practice in the specific area of preventive measures by identifying significant psychosocial risk factors for different types of RSB. Strategic and timely interventions could help to reduce the propensity of young adults to engage in RSB. Drawing from the literature, the following research hypotheses were put forward.

Hypothesis 1: Young male adults are expected to have higher mean levels than young female adults of all types of RSB (i.e., general, penetrative, and non-penetrative behavior) and of most psychosocial risk factors (i.e., negative temperament, alcohol and drug use, paraphilic interest, and perceived neighborhood disorganization), while young female adults are expected to have higher mean levels than young male adults of self-control and social bonds.

Hypothesis 2: Psychosocial risk factors are expected to be correlated with different types of RSB, even after controlling for the young adults' demographic characteristics (i.e., age, religiosity, and marital status), with low levels of self-control and social bonds, and high levels of negative temperament, use of alcohol and other drugs, paraphilic interest, and perceived neighborhood disorganization are expected to be correlated with all types of RSB.

METHODS

Participants and Procedure

The participants were aged 18 years and above and were students at eight public (i.e., government funded) and two private universities in Hong Kong. Participants were approached randomly within university compounds (e.g., student cafeterias, reading corners, libraries, and common areas) with no preset time period (i.e., about 2 years). The study was approved by the institutional review board of the author's university. A pen-and-paper questionnaire was administered to the participants upon receiving their informed consent. Their participation in the study was completely voluntary, and they were ensured that their anonymous responses would only be used for research purposes. No monetary incentive was provided. The participants took an average of 25 min to complete the questionnaire. The rate of successful responses for this questionnaire survey was ∼90%.

A total of 1,171 valid questionnaires were collected. Of the participants, 58.5% were females and 41.5% were males (see **Table 1**). The mean age was 20.95 years ($SD = 2.01$, range = 18–40). A slight gender difference was observed, with the mean ages of male and female participants being 21.24 years ($SD = 2.14$) and 20.75 years ($SD = 1.88$), respectively ($t = 3.98$, $p < 0.001$). A large majority of the participants (88.6%) were from Hong Kong, with the remainder either from mainland China (8.5%) or other countries (2.9%; e.g., Canada, Macau, Japan, Australia, and USA). Nearly two-thirds of the participants (62.1%) reported that they were currently single, slightly more than half (57.6%) were post-secondary school educated, and ∼3 quarters of them were without any religious affiliation (73.1%).

Measures

Self-reported measures were used to explore (a) the participants' prevalence of general, penetrative, and non-penetrative RSB; (b) the gender differences in these three types of RSB; and (c) the general and gendered effects of psychosocial risk

TABLE 1 | Sample demographic characteristics ($N = 1,171$).

Variable	*N*	Percentage
Gender	($N = 1160$)	
Male	481	41.5%
Female	679	58.5%
Country of origin	($N = 1154$)	
Hong Kong	1023	88.6%
Mainland China	98	8.5%
Others	33	2.9%
(e.g., Canada, Macau, Japan, Australia, and USA)		
Marital status	($N = 1157$)	
Single	718	62.1%
Nonsingle	439	37.9%
Highest education attainment	($N = 1156$)	
Secondary school education	492	42.4%
Post-secondary school education	664	57.6%
(e.g., associate degree/ high diploma; and undergraduate and postgraduate degrees)		
Religious belief	($N = 1154$)	
Without a religious belief	844	73.1%
With a religious belief	310	26.9%
(e.g., Christianity, Catholic, Buddhism, Muslim)		

factors in association with general, penetrative, and non-penetrative RSB. The questionnaires were printed in both English and Chinese versions to accommodate the participants' different language abilities. To accommodate the local Chinese population, the English-language measures were first translated by an academically qualified and experienced English-to-Chinese translator. The Chinese versions were then back-translated to English to ensure face validity, and the back-translation was compared with the original English-language scales to determine their content similarity.

Risky Sexual Behavior

The Sexual Risk Survey (SRS; Turchik and Garske, 2009) was adopted with slight modifications to assess the participants' levels of involvement in RSB over the past 6 months. Each item on the 23-item measure (with 16 items for penetrative and seven items for non-penetrative RSB) was dichotomized ($0 = no$, $1 = yes$), with a higher overall score indicating a greater involvement in RSB. A total score ranged from 0 to 23. Sample items asked whether the participants "Had left a social event with someone he/she just met" (non-penetrative RSB), "Had anal sex without a condom," (penetrative RSB), and "Had sex with someone you don't know well or just met" (penetrative RSB). The Cronbach's α coefficient for the measure was 0.69 (males = 0.72, females = 0.60).

Self-Control Scale

The six original elements of self-control (risk-seeking, impulsivity, volatile temper, self-centeredness, preference for physical activities, and preference for simple tasks), as theorized in Gottfredson and Hirschi's (1990) self-control theory, are commonly known as indicators of low self-control. The 23-item Low Self-Control Scale (LSCS; Grasmick et al., 1993), measured on a four-point Likert scale ($1 = strongly\ agree$, $4 = strongly\ disagree$), was adopted to measure the participants' self-control levels. A total score on the LSCS ranges from 23 to 92, with a higher score denoting greater self-control. Sample items were "I always do whatever brings me pleasure here and now, even at the cost of some distant goal," "When I am really angry, other people better stay away from me," and "Excitement and adventure are more important to me than security." The α coefficient of LSCS was 0.87 (males = 0.89, females = 0.85).

Negative Temperament Scale

To measure the participants' levels of negative feelings, a scale with eight items assessed on a four-point Likert scale ($1 = strongly\ agree$, $4 = strongly\ disagree$) was used. The total score ranged from 8 to 32, with a higher score indicating a more strongly negative temperament (Tillyer and Wright, 2014). Sample items were "I get stressed out easily," "I get upset easily," and "I frequently have mood swings." The internal consistency of this measure was 0.64 (males = 0.64, females = 0.65).

Alcohol and Drug Use Scale

The use of alcohol and other drugs by participants over the past 30 days was measured using eight items. Items on this scale were scored on a six-point scale ($0 = never$, $5 = 20\ or\ more\ times$), with a total score ranging from 0 to 40 (Espelage et al., 2014). A higher score signified a higher frequency of alcohol and drug use. Sample items were "Drunk wine or wine coolers (more than a sip or taste)," "Used marijuana (like pot, hash, and reefer)," and "Smoked cigarettes." The Cronbach's α value of this measure was 0.80 (males = 0.80, females = 0.80).

Paraphilic Interests Scale

To assess the participants' interest in paraphilic activities, the 40-item Paraphilia Scale was adopted (Dawson et al., 2016). Items on this scale were measured on a seven-point scale ($-3 = very\ offensive$, $+3 = very\ arousing$), with a total score ranging from −120 to +120. A higher score indicated a greater interest in paraphilic activities. Sample items were "You are having your feet kissed, fondled, and touched," "You are spanking, beating, or whipping someone," and "You are having sex with a boy below the age of 12." The Cronbach's α value of this measure was 0.98 (males = 0.98, females = 0.98).

Social Bonding Scale

Based on Hirschi's (1969) social control theory, Chapple et al. (2005) developed an 18-item Social Bonding Scale (SBC) to assess the participants' conventional ties and attachments to their parents, peers, school, and society in general. The parental attachment component in the SBC was extracted into two separate latent constructs: parental dependence and parental bonding. With a total score ranging from 18 to 38, the SBC items were measured on either a four-point ($1 = never$, $4 = many\ times$; two items) or a five-point ($1 = strongly\ disagree$, $5 = strongly\ agree$; 16 items) Likert format. A higher score denoted a greater social bond. Sample items were "I respect my best friends' opinions about the important things in life," "I talk over future plans with my parents," and "I have lots of respect

for the police." The α coefficient of this measure was 0.72 (males = 0.72, females = 0.71).

Perceptions of Neighborhood Disorganization Scale

To measure the participants' living environment, a five-item scale was used to evaluate their perception of neighborhood disorganization (Posick, 2013). These items were measured on a four-point Likert scale (1 = *strongly agree*, 4 = *strongly disagree*), with a total score ranging from 5 to 20. Sample items were, "There is a lot of fighting," "There is a lot of graffiti," and "There is a lot of crime in my neighborhood." These items were reverse coded so that higher scores would indicate higher levels of perceived neighborhood disorganization. The internal consistency of this scale was 0.93 (males = 0.93, females = 0.92).

Analytic Strategy

Using SPSS version 27.0, independent sample *t*-tests were first computed to assess the gender differences in different types of RSB (i.e., general, penetrative, and non-penetrative behavior) and psychosocial risk factors (i.e., self-control, negative temperament, use of alcohol and other drugs, paraphilic interest, social bonding, and perceived neighborhood disorganization). Pearson correlations were subsequently computed to examine the links among general, penetrative, and non-penetrative RSB. Finally, ordinary least square (OLS) regressions were performed to investigate the effects of different psychosocial risk factors on general, penetrative, and non-penetrative RSB while controlling for the participants' demographic characteristics (i.e., age, religiosity, and marital status). Religiosity was measured on a six-point Likert format, asking how religious the participants perceived they were (1 = *not at all*, 6 = *very strongly*). The significance level was set at 0.05. Given only nine psychosocial predictor variables tested in this study, the large sample size in this study was found to generate sufficient power. Pearson correlations of the tested constructs were computed, and no correlation at or above 0.70 was observed, indicating no collinearity. Other OLS assumptions (e.g., normality of independent and dependent variables, absence of outliers, homoscedasticity, and residuals' independence) were also tested and found no violation. No data imputation was performed on the missing data as the amount of missing data was small (i.e., <10%) and was regarded as missing at random.

Ethical Considerations

This study was approved by the ethical committee of the author's university. Participants could end their participation, contact the primary investigator, and/or receive professional counseling at any time. Data were collected anonymously with no personal identifying details recorded.

RESULTS

Mean Differences Between Types of RSB and Psychosocial Risk Factors

Table 2 presents the mean scores for the different types of RSB and psychosocial risk factors of male and female participants. Male participants reported significantly higher levels of general ($t = 2.69$, $p = 0.007$), penetrative ($t = 2.62$, $p = 0.009$), and non-penetrative ($t = 2.24$, $p = 0.025$) RSB than female participants. Concerning the psychosocial characteristics, male participants scored significantly higher in negative temperament ($t = 3.07$, $p = 0.002$), use of alcohol and other drugs ($t = 4.72$, $p < 0.001$), and paraphilic interest ($t = 3.14$, $p = 0.002$) than their female counterparts. However, female participants reported higher levels of self-control ($t = -3.36$, $p < 0.001$) and social bonding ($t = -5.73$, $p < 0.001$).

Pearson Correlations of Penetrative and Non-penetrative RSB

Pearson correlations were computed to assess the relationships between penetrative and non-penetrative RSB. The results shown in **Table 3** indicate that both subtypes of RSB were significantly and positively correlated with one another, in the range of 0.64 to 0.69.

Effects of Psychosocial Risk Factors on General, Penetrative, and Non-penetrative RSB

Table 4 presents OLS regressions that were computed to examine the effects of psychosocial characteristics on self-reported general, penetrative, and non-penetrative RSB, while controlling for the participants' demographic characteristics (i.e., age, religiosity, and marital status). All OLS regression models were significant. Overall, the participants' levels of alcohol and drug use ($B = 0.26$, $SE = 0.02$, $p < 0.001$) and paraphilic interest ($B = 0.01$, $SE = 0.01$, $p < 0.001$), and being older ($B = 0.11$, $SE = 0.04$, $p = 0.002$), less religious ($B = -0.14$, $SE = 0.05$, $p = 0.003$), and not single ($B = -0.69$, $SE = 0.15$, $p < 0.001$) were significantly associated with their levels of RSB. Broken down by gender, participants' levels of alcohol and drug use (male: $B = 0.24$, $SE = 0.03$, $p < 0.001$; female: $B = 0.29$, $SE = 0.02$, $p < 0.001$) and paraphilic interest (male: $B = 0.01$, $SE = 0.01$, $p < 0.001$; female: $B = 0.01$, $SE = 0.01$, $p = 0.039$), and not being single (male: $B = -0.73$, $SE = 0.27$, $p = 0.006$; female: $B = -0.75$, $SE = 0.17$, $p < 0.001$) were positively correlated with self-reported RSB for both males and females. Moreover, being older ($B = 0.18$, $SE = 0.06$, $p = 0.003$) and being less religious ($B = -0.27$, $SE = 0.09$, $p = 0.002$) were significantly correlated with male participants' general RSB, while level of perceived neighborhood disorganization ($B = -0.08$, $SE = 0.03$, $p = 0.019$) was negatively associated with female participants' self-reported RSB. A gender difference was thus observed in regard to perceived neighborhood disorganization, which was only a significant predictor of general RSB among female participants.

Concerning penetrative RSB, the participants' levels of negative temperament ($B = -0.04$, $SE = 0.02$, $p = 0.043$), alcohol and drug use ($B = 0.16$, $SE = 0.01$, $p < 0.001$), and paraphilic interest ($B = 0.01$, $SE = 0.01$, $p < 0.001$), and being older ($B = 0.10$, $SE = 0.02$, $p < 0.001$), less religious ($B = -0.12$, $SE = 0.03$, $p < 0.001$), and not single ($B = -0.56$, $SE = 0.10$, $p < 0.001$) were found to be significant predictors. Broken down by gender, level of

TABLE 2 | Gender differences of the prevalence of self-reported risky sexual behavior and psychosocial characteristics.

Variable	All sample (*N* = 1,171)		Male (*N* = 481)		Female (*N* = 679)		*t*-value
	M	*SD*	*M*	*SD*	*M*	*SD*	
Risky sexual behavior							
General behavior	1.34	2.94	1.59	3.29	1.12	2.39	2.69**
Penetrative behavior	0.80	1.97	0.96	2.20	0.65	1.58	2.62**
Non-penetrative behavior	0.54	1.21	0.63	1.35	0.47	1.05	2.24*
Psychosocial risk factors							
Self-control	61.26	8.35	60.28	9.16	62.00	7.64	−3.36***
Negative temperament	20.01	2.76	20.30	2.75	19.80	2.75	3.07**
Alcohol and drug use	2.94	4.18	3.65	4.74	2.44	3.66	4.72***
Paraphilic interest	−73.55	41.55	−69.12	42.90	−76.96	40.20	3.14**
Social bonding	58.17	7.47	56.72	7.55	59.24	7.23	−5.73***
Disorganized neighborhood	8.01	2.78	7.99	2.95	8.03	2.63	−0.23

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

alcohol and drug use (male: $B = 0.15$, $SE = 0.02$, $p < 0.001$; female: $B = 0.17$, $SE = 0.02$, $p < 0.001$) and being older (male: $B = 0.13$, $SE = 0.04$, $p = 0.001$; female: $B = 0.07$, $SE = 0.03$, $p = 0.012$), less religious (male: $B = -0.18$, $SE = 0.06$, $p = 0.002$; female: $B = -0.08$, $SE = 0.04$, $p = 0.035$), and not single (male: $B = -0.61$, $SE = 0.18$, $p = 0.001$; female: $B = -0.58$, $SE = 0.11$, $p < 0.001$) were positively correlated with penetrative RSB for both males and females. Furthermore, male participants' tendency to engage in penetrative RSB was also positively associated with their level of paraphilic interest ($B = 0.01$, $SE = 0.01$, $p < 0.001$), while the level of perceived neighborhood disorganization ($B = -0.05$, $SE = 0.02$, $p = 0.033$) was negatively correlated with penetrative RSB in female participants. Gender differences were thus found in paraphilic behavior, which was significantly associated with penetrative RSB only in male participants, and in perceived neighborhood disorganization, which was only a significant predictor in female participants.

Several significant predictors were found for the participants' non-penetrative RSB. The participants' levels of alcohol and drug use ($B = 0.10$, $SE = 0.01$, $p < 0.001$) and paraphilic interest ($B = 0.01$, $SE = 0.01$, $p < 0.001$), and not being single ($B = -0.13$, $SE = 0.07$, $p = 0.048$) were significantly associated with their involvement in non-penetrative RSB. For male participants, levels of alcohol and drug use ($B = 0.09$, $SE = 0.01$, $p < 0.001$) and paraphilic interest ($B = 0.01$, $SE = 0.01$, $p = 0.001$), and being less religious ($B = -0.08$, $SE = 0.04$, $p = 0.028$) were positively correlated with their propensity to engage in non-penetrative RSB. For female participants, levels of alcohol and drug use ($B = 0.12$, $SE = 0.01$, $p < 0.001$), paraphilic interest ($B = 0.01$, $SE = 0.01$, $p = 0.038$), and perceived neighborhood disorganization ($B = -0.03$, $SE = 0.02$, $p = 0.046$), and not being single ($B = -0.16$, $SE = 0.08$, $p = 0.035$) were significantly associated with the extent of their non-penetrative RSB. A gender difference was thus found with perceived neighborhood disorganization only significantly associated with non-penetrative RSB among female participants.

TABLE 3 | Pearson correlations of self-reported risky sexual behavior.

Type of risky sexual behavior	PB	NB
All sample (*N* = 1171)		
Penetrative behavior (PB)	1.00	
Non-penetrative behavior (NB)	0.69**	1.00
Male (*N* = 481)		
Penetrative behavior (PB)	1.00	
Non-penetrative behavior (NB)	0.69**	1.00
Female (*N* = 679)		
Penetrative behavior (PB)	1.00	
Non-penetrative behavior (NB)	0.64**	1.00

**$p < 0.01$.

DISCUSSION

This study has offered an initial insight into the extent of RSB in a Hong Kong sample. It is important not only for its contribution to the body of knowledge on the topic, but also and more specifically for its focus on the under-researched population of Hong Kong young adults. There were two purposes of the study: (1) to explore gender differences at the mean levels in different types of RSB (i.e., general, penetrative, and non-penetrative) and psychosocial risk factors (i.e., self-control, negative temperament, the use of alcohol and other drugs, paraphilic interest, social bonds, and perceived neighborhood disorganization), and (2) to examine whether the relationships between different types of RSB and psychosocial risk factors hold when controlling for demographic characteristics (i.e., age, religiosity, and marital status). In general, male participants reported significantly more general, penetrative, and non-penetrative RSB than female participants. Nevertheless, their mean scores were relatively low. Compared to female participants, male participants had significantly higher levels of negative temperament, alcohol and drug use, and paraphilic interest but lower levels of self-control

TABLE 4 | OLS regression models of self-reported risky sexual behavior.

Predictors	General behavior			Penetrative behavior			Non-penetrative behavior		
	All sample *B* (*SE*)	Male *B* (*SE*)	Female *B* (*SE*)	All sample *B* (*SE*)	Male *B* (*SE*)	Female *B* (*SE*)	All sample *B* (*SE*)	Male *B* (*SE*)	Female *B* (*SE*)
Demographic characteristics									
Age	0.11 (0.04)**	0.18 (0.06)**	0.06 (0.04)	0.10 (0.02)***	0.13 (0.04)**	0.07 (0.03)*	0.01 (0.02)	0.05 (0.03)	−0.01 (0.02)
Religiosity	−0.14 (0.05)**	−0.27 (0.09)**	−0.06 (0.06)	−0.12 (0.03)***	−0.18 (0.06)**	−0.08 (0.04)*	−0.02 (0.02)	−0.08 (0.04)*	0.02 (0.03)
Marital status (0 = non-single, 1 = single)	−0.69 (0.15)***	−0.73 (0.27)**	−0.75 (0.17)***	−0.56 (0.10)***	−0.61 (0.18)**	−0.58 (0.11)***	−0.13 (0.07)*	−0.13 (0.12)	−0.16 (0.08)*
Psychosocial risk factors									
Self-control	−0.01 (0.01)	−0.01 (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	−0.01 (0.01)	−0.01 (0.01)	−0.01 (0.01)
Negative temperament	−0.05 (0.03)	−0.02 (0.05)	−0.05 (0.03)	−0.04 (0.02)*	−0.04 (0.03)	−0.03 (0.02)	−0.01 (0.01)	0.01 (0.02)	−0.02 (0.01)
Alcohol and drug use	0.26 (0.02)***	0.24 (0.03)***	0.29 (0.02)***	0.16 (0.01)***	0.15 (0.02)***	0.17 (0.02)***	0.10 (0.01)***	0.09 (0.01)***	0.12 (0.01)***
Paraphilic interest	0.01 (0.01)***	0.01 (0.01)***	0.01 (0.01)*	0.01 (0.01)***	0.01 (0.01)***	0.01 (0.01)	0.01 (0.01)***	0.01 (0.01)**	0.01 (0.01)*
Social bonding	−0.02 (0.01)	−0.02 (0.02)	−0.02 (0.01)	−0.01 (0.01)	−0.02 (0.01)	−0.01 (0.01)	−0.01 (0.01)	−0.01 (0.01)	−0.01 (0.01)
Disorganized neighborhood	−0.02 (0.03)	0.04 (0.05)	−0.08 (0.03)*	−0.02 (0.02)	0.01 (0.03)	−0.05 (0.02)*	−3.96 (0.01)	0.04 (0.02)	−0.03 (0.02)*
Adjusted R^2	0.25	0.25	0.27	0.23	0.23	0.24	0.20	0.19	0.22
F	43.19***	18.00***	27.51***	38.50***	16.16***	23.85***	31.33***	13.09***	20.93***

Unstandardized beta (B) and standard error (SE).
$^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

and social bonds. In other words, male participants were found to possess a higher probability than female participants to engage in RSB.

In addition, there were several noteworthy findings with respect to the role of psychosocial risk factors on the propensity to engage in RSB. Thus, the findings lend support to some major criminological theoretical propositions in explaining RSB. It is, however, should be noted that some theoretical models—i.e., self-control and social control theories—failed to find support in this study. More research is required as to whether it is merely due to the sampling strategy or the inherent lack of comprehensiveness of the theoretical framework to explain RSB. To a large extent, the male and female participants in this study shared a similar set of psychosocial risk factors for their involvement in general, penetrative, and non-penetrative RSB. The participants' use of alcohol and drugs and paraphilic interests were generally useful in explaining all types of RSB (with the exception of female participants' tendencies to engage in penetrative RSB). Put differently, using alcohol and other drugs and having paraphilic interests were found to be strong predictors of an individual's likelihood to engage in all categories of RSB. According to the routine activity and lifestyle approach, individuals are more likely to have a heightened risk of engaging in RSB if they spend substantial time in "unstructured socializing" (e.g., drinking alcohol and taking drugs) with their deviant peers (Schreck et al., 2004). This finding is also consistent with the learning approach, in which RSB is said to be learned through differential association and behavioral imitation (Akers, 1997; Warr, 2002). In the present study, the association between the use of alcohol and other drugs and RSB was particularly strong among male participants. Masculine identity is often strengthened by engaging in risky and deviant behavior (Messerschmidt, 1993). Cultural influences on males may encourage competitive pursuits that are often risky and deviant in nature, and male group membership typically emphasizes risk-taking, toughness, aggression, and physical strength (Augustyn and McGloin, 2013).

Moreover, an individual's sexual risk-taking tendency was found to be positively associated with his/her development of paraphilic interests. Previous studies have found that individuals who had paraphilic interests or had been diagnosed with paraphilias were more likely to engage in hypersexual activities, such as having multiple sexual partners, a high sexual appetite and preoccupation, and high rates of sexual behavior (Kafka and Hennen, 2003; Långström and Hanson, 2006; Kafka, 2009; Chan, 2021). Indeed, Chan (2020a) found that high levels of RSB and paraphilic interests were significantly associated with sexual offending behavior. Relative to previous studies, participants in this study reported comparatively lower level of paraphilic interests. Interestingly, female participants' paraphilic interests failed to find support for their specific involvement in penetrative RSB, although this psychosocial risk factor has demonstrated significance in general and non-penetrative RSB. Perhaps the cultural and societal norms have played a significant impact on the recognition and acceptance of behavior as normal or deviance. Asian and Middle Eastern cultures commonly adopt a higher restrictive view on sexual issues, where discussion on sex has always been and remains a taboo subject (Ho et al., 2011; Baazeem, 2016). This is particularly relevant to females in these cultures where they are expected to live up to the cultural gender role in view of the sexual conservatism within their cultural background. It is reasonable to posit that penetrative RSB may seem to be more culturally sensitive than non-penetrative behavior.

Negative temperament was found to be a significant risk factor of penetrative RSB. In other words, those who often experienced negative emotions had a higher likelihood of engaging in penetrative RSB (e.g., unprotected sex, sex with multiple partners). This finding is consistent with the literature. Studies have demonstrated that individuals who exhibited high levels of emotion regulation deficit or negative affect (e.g., neuroticism, depression, anxiety, shame, and guilt) were more likely to adopt maladaptive behavior, such as RSB, in coping with their negative emotions (Leith and Baumeister, 1996; Auerbach et al., 2007; Stuewig et al., 2015). Similarly, a positive relationship has been identified between negative emotions and the perpetration of delinquent and criminal behavior (Chui and Chan, 2012; DeLisi and Vaughn, 2014; Wolff et al., 2016), particularly in sexual offending behavior (e.g., violent sexual offenses, sexual homicides; Chan et al., 2015a; Chan and Beauregard, 2016; Chan, 2020b). Indeed, the perpetration of (penetrative) RSB has been found to be a significant predictor of subsequent sexual offending behavior (Lussier and Cale, 2013; Smallbone and Cale, 2015). Nonetheless, this finding should be studied cautiously especially when no sex difference was found. It is possible that negative temperament reached significance due to an increased sample size in the full sample.

Interestingly, perceived neighborhood disorganization was only significantly associated with RSB among female participants. Put differently, female participants who perceived their neighborhood to be disorganized (e.g., that they were living in a crime-prone environment) were more likely to engage in RSB. Previous research on deviant and criminal behavior indicates that inherently maladaptive lifestyles are likely to contribute to forming a platform for learning maladaptive behaviors [e.g., RSB and the use of alcohol and other drugs; Hoeben et al., 2016; see Chan (2019b)]. Mills (2003) asserted that "people who are exposed to violence (or criminogenic environment) are more likely to absorb pro-violence (or pro-deviance) norms and values, which, in turn, makes them more violence (or deviant) prone" (p. 88). A similar finding was also noted in Chan's (2019c) study of young people whereby pro-violence attitudes, deviant peer influence, and alcohol and drug use were significantly associated with violent, nonviolent, and general delinquent behavior. Relative to the male participants, perhaps the female participants in this study might have been exposed to more risky and deviant incidents (e.g., deviant peer association with a high prevalence of RSB) recently or in the past and that this has shaped their perception of residing in a disorganized neighborhood. Thus, this perception predicts their engagement in RSB.

Caution should be exercised in interpreting the findings of this study in view of several limitations. First, this was a cross-sectional study, and hence, the findings can only be interpreted in correlational terms. Future studies could consider adopting a longitudinal framework to better understand the causal relationships between the participants' psychosocial risk factors and their self-reported RSB. Besides, it is possible that there are other potential confounders of the associations between RSB and significant psychosocial risk factors. Future research could also examine the underlying mechanism of the target associations, such as the potentially mediating role of variables included in regression models of this study or other theoretically relevant variables. Second, this study was limited by the use of self-reported data. Social desirability and memory recall biases may lead to underreporting of RSB and other sexual interests (e.g., paraphilic interests). Thus, a measure of response bias could be considered in future studies to minimize the potential effects of reporting biases. Other potential limitations in data collection may include the possibility of underreporting, possible differences in underreporting between the sexes, differences between those who agreed to complete the questionnaire and those that did not, and issues of anonymity (e.g., level of anonymity and perceived anonymity). Moreover, sexual orientation of the participants was not controlled for in the analysis, which was found to have a substantial association between non-heterosexual orientation and engaging in RSB in previous studies (e.g., Leigh, 1990). Hence, future research could consider exploring its potential effects on RSB. Finally, the sample comprised only university students. The findings are not necessarily generalizable to the wider Hong Kong population or even to the young adult population. However, the sample can perhaps be regarded as representative of the wider population of Hong Kong university students given that the sample was recruited from all universities in Hong Kong.

Implications of the Findings

The adverse consequences of RSB should not be overlooked, and the findings of this study have important implications for practice. The public awareness of STIs, such as HIV, should be enhanced, particularly among late adolescents and young adults but also targeted much earlier in life. The school-based sexuality education in Hong Kong has long been criticized for its lack of comprehensiveness to promote an effective sexual education (Andres et al., 2021). Therefore, it is even more important that school-based prevention programs for school pupils and university students should include educational materials on the risks associated with the premature onset of sexual activities and the use of alcohol and other drugs (Staton et al., 1999). The need for specific behavioral changes, such as decreasing the number of sexual partners, decreasing alcohol consumption and drug use before sex, negotiating condom use for safer sex, and transforming attitudes about safer and more socially acceptable sexual practices (i.e., nonparaphilic activities), is a critical educational message to deliver to the younger population. Issues relevant to hypersexuality and atypical sexual interests (i.e., paraphilic interests) should also be addressed to help young people to better understand the important role of other aspects of sexuality, such as general sexual inhibition and excitation, in the development of paraphilic interests (Dawson et al., 2016). Resources for positive and prosocial self-development and counseling services should be strengthened to encourage those who need to deal with negative emotions to do so in an effective and timely manner.

Community-based preventive efforts in the same directions are also needed to target young people who are not enrolled in university or have dropped out of school (i.e., at-risk youth).

Youth and social workers in the community should strive to convey these messages using available resources, such as regular community activities and youth programs (Chan and Chui, 2012, 2015). Public seminars regarding psychological and emotional health should be conducted regularly to disseminate useful information to effectively cope with negative emotions (e.g., anger management, self-assertiveness, and general positive emotions). For individuals who are at a high risk of or are currently engaging in RSB, social norm interventions should be conducted to address misperceptions over alcohol consumption, drug use, RSB (Martens et al., 2006), and paraphilic activities (Chan, 2021). Ideally, this intervention may not only have a remedial effect by reducing the frequency with which individuals who already engage in a behavior choose to do so (e.g., RSB, use of alcohol and other drugs, paraphilic activities), but also have a preventive effect by correcting misperceptions among those who are not yet frequently engaging in such behavior. Raising their awareness and skills may also help to deter them from potential domestic (familial) and community (neighborhood) criminogenic influences.

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 Human Subjects Ethics Sub-Committee, City University of Hong Kong. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Profiles of Maladjustment and Interpersonal Risk Factors in Adolescents

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The individual's adaptation problems can lead to risky behaviors such as drug use. This study aimed to analyze the existence of different adaptation profiles (personal, school, and social) in adolescents. Thus, the study aimed to analyze the existence of significant differences in interpersonal risk factors depending on the degree of adaptation. The study participants were 1,201 students of Compulsory Secondary Education (M = 14.43, SD = 1.43), and 50.6% were girls. The TAMAI Test (multifactorial adaptation self-evaluation test) and the FRIDA questionnaire (Interpersonal Risk Factors for Drug Use in Adolescence) were used. A latent class analysis (LCA) revealed three different types of adaptation: maladjusted group, at-risk group, and adjusted group. The results showed the existence of significant differences between the different adaptation profiles based on interpersonal risk factors. The data obtained will help school and mental health plans to prevent misbehaving or risky behaviors.

Keywords: maladjustment, risk factors, adolescence, mental health, drug

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INTRODUCTION

Drug use is a topic of concern in educational groups, as it is a period when adolescents are at great risk of problematic substance use (Rial et al., 2020). The Spanish Observatory on Drugs and Addictions (2020) showed that the drugs most consumed by young people were alcohol and tobacco, followed by cannabis and hypnosedants with or without a prescription. Data binge drinking among adolescents remains a worry. It is therefore necessary to address the tools for both prevention (Fernández-Castillo et al., 2020) and intervention (Vega-González and Pérez, 2021).

One risk factor associated with substance use is social, family, and personal maladjustment (Rueda Aguilar, 2020), which is also linked to school failure (Méndez and Cerezo, 2018). Numerous studies have empirically proven the relationship between social, family, personal, and school factors, which can increase drug use in adolescents (Cerezo et al., 2013; González and Londoño, 2017; Alonso-Castillo et al., 2018; Riquelme et al., 2018; Fernández et al., 2020). Variables such as self-concept, empathy, mood, and violent behavior, among others, are risk factors for consuming substances (Rueda Aguilar, 2020).

There are multiple predictive factors of family maladjustment, including situations of family conflict (hostility, climate of conflict), a negative family climate (stress, negativity, rejection), overprotection and a lack of adequate communication, family relationship quality, and overburdening of families (Pérez de Albéniz-Garrote et al., 2018; Rueda Aguilar, 2020). Moreover, impulsivity, a lack of control (Espinosa and León, 2017), permissive, authoritarian, ambiguous, or inconsistent parenting styles that employ in-process responses to situations of disobedience, a lack of intrafamily communication (Bonnaire and Phan, 2017; Moreno et al., 2020), environments with few rules, and insufficient monitoring by an adult figure (Calero-Plaza et al., 2020) favor adolescent maladjustment in the family context. These factors cause young people who do not know how to manifest problems to react to violence or criminal behavior (Ruiz-Hernández et al., 2019) such as substance use (Rial et al., 2019). By contrast, a positive family relationship, with strong emotional development and family cohesion, will reinforce a good family adaptation that will help prevent situations of social irrigation and therefore drug use in adolescents (Mateo-Crisóstomo et al., 2018; Simón-Saiz et al., 2018). Rial et al. (2019) confirmed that some personal variables such as self-esteem have little impact on cannabis use, compared to family variables such as educating with standards and limits.

When studying adaptation, it is important to note that family adaptation can be a reciprocal factor of good social adaptation. Therefore, family dysfunction and poor parental supervision can incite antisocial and criminal behaviors (Hoeve et al., 2009) that cause social maladaptation and promote drug use (Becoña et al., 2012). In fact, drug use in the group environment is recurrent in adolescents, as they seek to feel socially adapted and link to the peer group (Rueda Aguilar, 2020). From this perspective, social maladaptation is characterized by antisocial behaviors, social mismatch, patterns of criminal behavior (Galinari et al., 2020; Méndez et al., 2021), contexts with few social norms, and even violent norms (Calero-Plaza et al., 2020). To prevent social maladaptation, it is important to enhance influential factors, such as those of the community or neighborhood and those of the surrounding environment (Cutrín et al., 2019; Méndez et al., 2021), and know how to identify group values and attitudes (Rueda Aguilar, 2020). It is also important to recall that various works on social maladaptation have confirmed that a greater incidence of both antisocial and more violent behaviors (Díaz and Moral, 2018; Teixeira and Iossi, 2019; Calero-Plaza et al., 2020) predicts an increased risk of drug use. Moreover, family aspects, such as not feeling supported or recognized by friends or peer groups, can be the cause of greater social maladjustment (Fernández et al., 2020), while social support is considered a key contextual variable for the prevention of social mismatch (Fernández et al., 2020).

Another of the concepts to be highlighted is that of school adaptation, understood as educational achievement (Mortimer et al., 2017) or success in the realization of academic, intellectual, and social factors tasks in school (Rodríguez-Fernández et al., 2016). With respect to school adaptation, factors that can propel maladjustment include poor academic performance, environmental factors such as little social support (Moreira et al., 2018), poor qualifications, a lack of academic self-efficacy, responsibility or commitment to school (Pelegrín and Garcés de Los Fayos, 2009), the influence of classmates (Mikami et al., 2017), poor teaching and family support (Fernández et al., 2020), being a repeater (Méndez and Cerezo, 2018), and violence (Calero-Plaza et al., 2020; Méndez et al., 2021). A diversity of interconnected variables is evidenced that influence social adaptation (Terrón and Hurtado, 2020) and affect one another. Therefore, managing stressful situations requires the consideration of strategies that benefit academic performance, such as support, learning skills, motivation to study, and school self-concept. These variables that encompass good school adaptation can result in good school performance (Fernández et al., 2020; Valiente-Barroso et al., 2020). In addition, it should be noted that school adaptation is linked to behavioral (such as participation in aspects of the school), emotional (such as feeling recognized or belonging to the school), and cognitive (such as actively participating in the tasks of the teaching and learning process) variables (Fredricks et al., 2004; Rodríguez-Fernández et al., 2018). On the other hand, although social maladjustment is linked to family maladjustment factors, in the case of school maladjustment, there is also a relationship between good family and social adaptation and adaptation in school (Pérez-Fuentes et al., 2015; Rodríguez-Fernández et al., 2018; Fernández et al., 2019). Furthermore, adolescents who consider that they have greater support from their social and family environments will show better academic progress.

Another important aspect of this work is the concept of personal maladjustment. Personal maladjustment is undoubtedly influenced by situations of family, social, and school maladjustment. Variables include personal dissatisfaction and affective maladjustment, psychological factors (Molero et al., 2017; Mayorga et al., 2020), self-devaluation, anxiety, hypersensitivity, guilt, pessimism (Palacio et al., 2017), emotional variables, mood, and self-perception, among others (Simón-Saiz et al., 2018). Low self-concept is one of the most important variables when discussing personal maladjustment, as it plays a decisive role in students' personal adjustment and school maladjustment (Fernández et al., 2019) as well as in their decisions. It is also associated with cognitive–behavioral variables (finding better levels of adaptation if the student presents attitudes to review thoughts and actions to deal with the novelty) and emotional (where more adapted students show skills for reducing negative emotions such as fear or frustration in uncertain situations; Zhang et al., 2020).

Finally, it can be emphasized that the different forms of maladjustment are interrelated: Good personal adaptation can be the cause and consequence of good family adaptation. Furthermore, social adaptation can cause family and personal maladjustment, and vice versa (Fernández et al., 2019). If the relationship between the different types of maladjustment is mutual, it is important to work on the three dimensions, because the more resources adolescents have, the less drug use there will be. As a result, adolescents who are not drug users present more personal resources and better psychosocial adjustment, aspects that are reflected by greater stability in family relationships and an appreciation of their family context

as united and affectionate and as a place where they can express themselves freely. This, in turn, helps families to advise and support adolescents in problematic situations of substance use (Cerezo et al., 2013; Rueda Aguilar, 2020). For adolescents, at the social level, having more resources is manifested by greater social adaptation, while having fewer social skills can be associated with greater consumption of alcohol and drugs. Personal maladjustment variables, such as levels of depression, loneliness, and unhappiness, have been understood as risk factors for substance use (Espada et al., 2018). Low self-control and emotional problems have also been linked to substance use (Oliva et al., 2019; Sánchez et al., 2019).

Given the aforementioned, this study aimed to analyze the existence of different adaptation groups (personal, school, and social) in adolescents and significant differences in interpersonal risk factors depending on the degree of adaptation.

MATERIALS AND METHODS

Participants

The study participants were 1,201 students of Compulsory Secondary Education from different geographical areas of the region of Murcia in Spain (44.6% first and second course and 55.4% third and fourth course), aged 11–18 years (M = 14.43, SD = 1.43); 50.6% were girls. The students belonged to public centers (65.8%) and private/semi-private centers (34.2%). The distribution was homogeneous in terms of gender and course (χ^2 = 5.70, p = 0.13). In the same way, the distribution was homogeneous in terms of gender and age (χ^2 = 0.42, p = 0.81). Therefore, 13.5% were girls aged 11–13, 25.6% were girls aged 14–15, and 11.5% were girls aged 16–18 (see **Table 1**). A total of 35.6% had repeated some school year. The socioeconomic level of the areas and schools was average.

Design and Procedure

The Ethics Committee of the University of Murcia (ID: 2478/2019) approved the study protocol. The data of the present work were collected as part of a larger project focused on the analysis of the intra- and interpersonal variables that influence teaching-learning. It is a descriptive cross-sectional study. The study participants were selected students from Compulsory Secondary Education in the region of Murcia, Spain. For data collection, first of all, a telephone contact was made with the school principals, followed by a meeting with the principals and school psychologists jointly from the participating schools in order to present the objectives and purpose of the research, describe the assessment instruments, and request their permission and collaboration. To encourage their cooperation, they were also told that a final report with the results of the study with result-based guidance would be provided to each center to enable measures to be applied in each school.

It was necessary to have permits and school collaboration and to obtain the informed consent of all the participants and their parents. The study instruments were administered in the classrooms of the schools in a 50-min session. Anonymity, voluntariness, and confidentiality were maintained at all times.

TABLE 1 | Sample distribution according to age and gender.

Variables	Age	11–13 age	14–15 age	16–18 age
Gender	Boys	164 (14%)	287 (24.4%)	129 (11%)
	Grils	158 (13.5%)	301 (25.6%)	135 (11.5%)

Instruments

Three Evaluation Instruments Were Used for the Study.

First, we used a sociodemographic questionnaire that measured gender (male/female), age, course repetition (yes/no), type of school (public/private/semi-private), and country of birth.

We used the FRIDA Test—Interpersonal Risk Factors for Drug Use in Adolescence (Secades et al., 2006), consisting of 90 Likert scale-type (3 or 5 points) questions with the following factors: family reaction to drug use (refers to the reaction of different members of the family to a possible use of legal or illegal drugs; thus, high values indicate a greater risk in the family for consumption), group of friends (refers to the attitude of the group of friends toward the consumption as well as the activities that the friends carry out related to drug use; thus, high values indicate a group of friends with positive attitudes toward drugs and with risky actions toward drugs), access to drugs (refers to students' perception of the ease of accessing drugs; thus, high values indicate a greater perception of access to drugs), family risks (refers to drug use and family problems; thus, the highest values indicate the existence of family conflicts and drug use in the family environment), family education on drugs (measures whether the family has given preventive educational guidelines against drug use; thus, high values indicate the lack of family education about the risks and consequences of drugs), protective activities (refers to quality family relationships, school variables that can protect against drug use; thus, high values indicate the lack of protection activities against drug use in leisure and free time, in schools, etc.), and educational style (refers to the parents' educational style; thus, high values indicate permissive educational styles). Similarly, another factor in the degree of global vulnerability is presented by the adolescent. The direct scores obtained in each factor, as well as the global index, are transformed into a scale (Secades et al., 2006). Therefore, the transformed scores indicate the degree of vulnerability that the subject presents. The whole scale had a Cronbach's α reliability index of 0.92, being 0.93 according to Secades et al. (2006). Example of item: Drugs are used in my family.

Second, we used the multifactorial adaptation self-evaluation test (TAMAI; Hernández-Guanir, 2015), which consisted of 175 dichotomous items assessing the following factors: personal maladjustment (indicative of the person's level of mismatch with themselves and the general reality or personal difficulty in accepting reality as it is), school maladjustment (refers to dissatisfaction and inappropriate behavior with respect to school reality, can manifest as: unfavorable attitudes toward learning, low school achievement, disruptive behaviors, etc.), and social maladjustment (indicates a disability or difficulties in social relationships, showing a lack of compliance with social norms, social distrust relationships, lack of social control, lack of respect for or consideration of

others, etc). The test has a Cronbach's alpha of 0.92, and it was 0.94 in our study. Example of item: I am unruly and disobedient.

Data Analysis

The LCA was estimated in the first place to classify the participants according to the scores obtained in adaptation (TAMAI). The LCA was used because it is a precise technique that allows for overcoming the limitations with the grouping of K-means (Schreiber, 2017). The Bayesian Information Criterion (BIC) and entropy values were used to evaluate the fit of the model and especially to determine the most adequate number of latent classes. Literature has shown that lower BIC and Akaike Information Criterion (AIC) values are the most adequate fit indices for choosing the best class solution (Smeets et al., 2017). In the same way, the viability theory was used together with the psychological meaning of each of the groups that represented the different adaptation profiles and that therefore maximized the differences between the classes. Therefore, the groups of students were defined based on three types of different degrees of adaptation (TAMAI) attending to the risk levels according to the values obtained in the scores transformed in the FRIDA: (a) high personal, school, and social maladjustment; (b) moderate personal, school, and social maladjustment; and (c) low personal, school, and social maladjustment. An analysis of variance (ANOVA) was performed, using *post hoc* tests with the Bonferroni method to analyze the differences between the groups and the different adaptation groups (personal, school, and social) according to the dimensions of the risk factor interpersonal skills for drug use. It was necessary to estimate partial eta-squared (ηp^2) as well as Cohen's d (1998) to determine the magnitude of the differences. We, therefore, used SSPS Statistics (version 23.0) and the Excel package (XLSTAT).

RESULTS

In **Table 2**, see descriptive statistics and Pearson's correlation between the FRIDA and the TAMAI subscales. They were mostly significant and positive so the LCA was effected.

Table 3 presents the models obtained (from two to four clusters). Model 3 presents the best and the less BIC and the AIC values, which is why it was selected. The LCA identified three different types of adaptation: (a) high personal, school, and social maladjustment (maladjusted group); (b) moderate personal, school, and social maladjustment (at-risk group); (c) low personal, school, and social maladjustment (adjusted group; see **Figure 1**).

Table 4 reports on the absolute and relative percentage of students in each class of the best model as well as the accuracy of classification in each class. Class 1 was made up of 581 students (48.4%), class 2 was made up of 546 students (45.4%), and class 3 was made up of 74 students (6.2%). With respect to the probabilities of belonging to each class, **Table 4** shows that the most precise class is class 3, which has a precision of 99.9% (see the diagonals of the table), followed by class 1, which correctly classifies 85.9% of the students.

The ANOVAs showed significant differences between the three groups of adaptation according to the dimensions of interpersonal risk factors (see **Table 5**).

In **Table 6**, see Cohen's d indices for the *post hoc* contrast groups and the differences that were found to be significant between the groups.

Post hoc comparisons reported that the maladjusted group had higher values than the adjusted group for all risk factors for drug use (group of friends, access to drugs, family risks, family education on drugs, protective activities, educational style, and global vulnerability) except for the family reaction to drug use, which was not significant.

Similarly, the maladjusted group presented higher values than the at-risk group in a group of friends, family risk, and global vulnerability. However, the at-risk group presented high values in ease of access to drugs in contrast to the maladjusted group. Family reaction to drug use, family education on drugs, protective activities, and educational styles were not significant.

TABLE 3 | The fit of the all latent class models.

Clusters	BIC	AIC	Entropy
2	9,492,709	9,426,528	0.706
3	**8,260,090**	**8,202,257**	**0.742**
4	8,339,712	8,358,272	0.651

BIC, Bayesian Information Criterion; AIC, Akaike Information Criterion. Values in bold show the selected model.

TABLE 2 | Descriptive statistics and bivariate correlations between the FRIDA and the TAMAI subscales.

Variable	Personal maladjustment	School maladjustment	Social maladjustment	*M*	*SD*
Personal maladjustment	--	--	--	7.52	5.66
School maladjustment	0.349***	1	--	11.58	6.97
Social maladjustment	0.548***	0.562***	--	8.50	5.02
Family reaction	0.135***	0.294***	0.216***	26.82	11.66
Peers	0.154***	0.354***	0.223***	19.79	5.46
Access to drugs	−0.005	−0.091**	−0.036***	23.32	10.08
Family risks	0.251***	0.279***	0.265***	25.86	6.48
Family education	0.151***	0.164***	0.175***	16.33	5.20
Protective activities	0.180***	0.314***	0.260***	47.50	10.85
Educational styles	0.136***	0.297***	0.225***	20	8.11
Global vulnerability	0.211**	0.348***	0.287***	179.62	37.13

$^{**}p < 0.01$; $^{***}p < 0.01$.

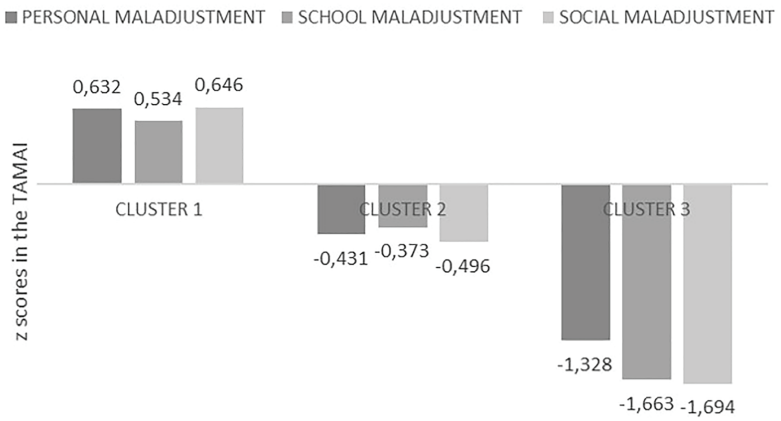

FIGURE 1 | Graphical representation of the three-cluster model.

TABLE 4 | Frequency of students in the classes and accuracy of classification in each class of the best model.

Classes	af	rf	Class 1	Class 2	Class 3
1	581	0.484	0.859	0.141	0.000
2	546	0.454	0.160	0.839	0.001
3	74	0.062	0.000	0.001	0.999

af, absolute frequency; rf, relative frequency.

On the other hand, the at-risk group presented higher values than the adjusted group in all risk factors for drug use (group of friends, access to drugs, family risks, family education on drugs, protective activities, educational style, and global vulnerability). However, differences were not found in the family's reaction to drug use.

DISCUSSION

This study made it possible to pursue the general objective of analyzing the existence of different adaptation groups in adolescents and of verifying the link between risk factors for drug use. As a result, the existence of three adaptation groups was evidenced: a high-risk profile or maladjusted group, a moderate risk profile or risk group, and a low-risk or adjusted group profile.

In this study, the LCA identified three different types of adjustment in the adolescent.

Similar to our study, other studies identify three groups of students based on interpersonal values (Gázquez et al., 2015a,b, 2016) or three adjustment groups (Spilsbury et al., 2008; McDonald et al., 2016; Sianko et al., 2016).

The results of the study confirmed that the maladjusted group had a higher maladjustment profile compared to the adjusted group, which agrees with studies such as those by Sánchez et al. (2019) and Oliva et al. (2019), who pointed out that situations of imbalance incite drug use in adolescent. Thus, the maladjusted group presented higher values than the adjusted group for all risk factors for drug use (group of friends, access to drugs, family risks, family education on drugs, protective activities, educational style, and global vulnerability; Rueda Aguilar, 2020). A group of friends with a high level of drug use is a variable that should be valued with great consideration because the peer group has high relevance in adolescence (Cerezo et al., 2013; Teixeira and Iossi, 2019; Fernández et al., 2020). Many adolescents consume substances because they feel more adapted to the group, and if the group uses, the risk factor increases which may be associated with a greater perception of access to drugs (Alfonso et al., 2009; Pérez-Fuentes et al., 2015; Rueda Aguilar, 2020; Méndez et al., 2021). High values were also reached in family factors, such as the family risk of drug use; low family education on drugs; and therefore, a lack of norms concerning drug use, a permissive educational style, a lack of protective activities in the family, and family relationships (Pérez-Fuentes et al., 2015; Calero-Plaza et al., 2020; Moreno et al., 2020; Momeñe et al., 2021). In addition, the maladjusted group obtained higher scores in a higher level of global vulnerability to drug use (Alfonso et al., 2009; Fernández et al., 2020). Therefore, the results found in the maladjusted group make it evident that programs to improve said vulnerability are very necessary. Above all, considering the data on the high-risk profile of drug use found in the study and its possible associations with other risk factors, it is important to develop prevention and intervention programs along these lines. Psychoeducational interventions based on promoting strategies that favor self-regulation for good mental, emotional, and behavioral development (Casuso-Holgado et al., 2019; Barroso et al., 2020; Fernández et al., 2020) and promote self-concept in the school context should be worked on or proposed (Valiente-Barroso et al., 2020). Moreover, working on awareness, training, and the participation of families is a very important factor in the development of good adaptation (Pérez-Fuentes et al., 2015; Moreno and Palomar, 2017).

The at-risk group was in a vulnerable situation, as it shared risk factors similar to the maladjusted group and was therefore different from the adjusted groups. This indicated a group of students with a moderate risk of drug use due to the high number of risk factors (group of friends, family risk,

TABLE 5 | Means and standard deviations obtained by the three groups of adaptation and values of the partial eta-squared (ηp^2) for each dimension of interpersonal risk factors.

	Group 1		Group 2		Group 3		Significance		
Dimensions	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F(2,1,198)***	***p***	ηp^2
Family reaction	28.88	11.31	26.07	10.25	16.19	16.70	43.91	<0.001	0.068
Peers	20.91	4.51	19.67	4.26	11.96	10.90	103.78	<0.001	0.148
Access to drugs	22.55	8.99	25.36	9.59	14.36	14.89	45.14	<0.001	0.070
Family risks	27.34	5.10	25.74	4.46	15.09	14.17	145.33	<0.001	0.195
Family education	16.99	4.50	16.62	4.34	8.88	9.02	94.39	<0.001	0.136
Protective activities	49.41	7.35	48.58	6.86	24.51	24.06	252.35	<0.01	0.296
Educational styles	21.43	7.59	19.93	7.20	9.24	10.06	84.41	<0.01	0.124
Global vulnerability	187.51	22.62	181.97	22.18	100.24	89.45	263.47	<0.01	0.305

Cluster 1 (maladjusted), Cluster 2 (at-risk), and Cluster 3 (adjusted).

TABLE 6 | Cohen's d indexes for *post hoc* contrast groups.

Dimensions	**Group1–Group 2**	**Group1–Group 3**	**Group 2–Group 3**
Family reaction	---	---	---
Peers	0.26***	1.05***	0.88***
Access to drugs	0.28***	1.60***	1.41***
Family risks	0.33***	0.83***	1.06***
Family education	n.s.	1.81***	1.66***
Protective activities	n.s.	1.56***	1.51***
Educational styles	---	2.35*	2.30***
Global vulnerability	0.20***	1.54***	1.41***

*$p < 0.05$; ***$p < 0.001$. n.s., not significance.

and global vulnerability). In addition, the at-risk group presented high values in ease of access to drugs in contrast to the maladjusted group and the adjusted group. This may indicate that the at-risk group was at risk of a possible imbalance and that the perception of the student being able to access drugs if they wanted was high (Alfonso et al., 2009). In the same way, the family can pose a risk for consumption due to risky or conflictive situations, drug use in the family environment, or low family education about the risks of drugs (Pérez-Fuentes et al., 2015; Kuntsche and Kuntsche, 2016; Calero-Plaza et al., 2020; Moreno et al., 2020). Therefore, these results are indicators that this requires action so that the moderate values do not suppose a situation of greater risk and that the student can have maladjusted behaviors and therefore put their health at risk (Cerezo et al., 2013; Molero et al., 2020). Another aspect to work on would be the promotion of emotional aspects (Méndez et al., 2019; Peña-Casares and Aguaded-Ramírez, 2021) that exert a factor of prevention and resolution of situations of imbalance, leading the risk group into substance use, as drug use can be related to the affective dimensions, or to an imbalance in the family context, where an absent parental figure can lead to a consuming descendant (Martínez et al., 2013; Pérez-Fuentes et al., 2015; Espada et al., 2018; Oliva et al., 2019; Sánchez et al., 2019). Therefore, in addition to working on values and promoting emotionality, proposals for the creation and development of safe schools could be established: As pointed out by UNESCO-IICBA (2017), the consolidation of positive environments enhances integral development (physical, social, emotional, and cognitive) in adolescents and increases prevention systems on their health.

The last group discussed is the group of students who presented low personal, school, and social maladjustment (adjusted group). This group had a low risk of drug use and possibly higher levels of adaptation. The adapted presented adequate values in relation to the group of friends, access to drugs and at the family level (low family risk, adequate family education, and low global vulnerability). As mentioned above, good adaptation in one context can be linked to good adaptation in another context. For example, good family adaptation affects good social adaptation (Alonso-Castillo et al., 2018; Riquelme et al., 2018; Fernández et al., 2020). In addition, different studies have concluded that adolescents who do not use drugs generally show more personal resources and better psychosocial adjustment than adolescents who use drugs (Espada et al., 2018; Oliva et al., 2019; Sánchez et al., 2019; Pérez-Fuentes et al., 2019) as well as better social adaptation (Teixeira and Iossi, 2019). This adjusted group may have also shown these low levels of drug use because of aspects such as those pointed out that a good family relationship or a good family context is a protective factor against risk situations in the face of drug use (Alonso-Castillo et al., 2018; Mateo-Crisóstomo et al., 2018; Simón-Saiz et al., 2018).

Given the importance highlighted throughout the work, and having exposed some alternatives to working with adolescents to enhance their adaptation and reduce the chances of using drugs emphasizing that from the school environment, it is necessary to continue building positive educational contexts that generate school commitment or student involvement in school (Pinazo, 2019) and taking into consideration the benefits of promoting norms among peers (Laninga-Wijnen et al., 2021) where the teacher has a fundamental role in promoting school adaptation, implementing activities that promote emotional development (Fernández et al., 2020). From such a vision of educational contexts that promotes integral development, research has increasingly focused on promoting factors such as resilience or self-concept (Rodríguez-Fernández et al., 2018).

This study clarified the need to work on the variables of personal, family, school, and social adaptation, due to their link with maladjusted behaviors, which lead to drug use. This coincides with numerous studies that confirm this

cause-and-effect relationship between maladjustment and variables that affect adaptation and substance abuse (Espada et al., 2018; Rueda Aguilar, 2020).

To conclude, we want to highlight that this study provides information on the adaptation profiles and risk of drug use, by giving an overview of some variables that influence this concept. A limitation of this study is that it has been a cross-sectional study focused on the use of questionnaires for students, so it would be appropriate to expand the information through interviews and even through longitudinal studies. It would also be advisable to have the opinion of the family and teachers about the perception of consumption by students. In the same way, it is necessary to develop future research to delve more deeply into different variables that were not taken into account in this research, such as family factors, including parenting styles and their relationship to their children's adaptation and situations of drug abuse, repeater schoolchildren, and more personal aspects, such as self-concept or resilience.

Finally, it should be noted that despite the stated limitations, the present work highlights the importance of using protective factors and employing different types of strategies such as personal, family, and social aspects. And above all, the approach of working on all these factors is through educational programs for the prevention of substance abuse in adolescents.

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 Ethics Committee of the University of Murcia (ID: 2478/2019) approved the study protocol. It was necessary to have permits and school collaboration and to obtain the informed consent of all the participants and their parents. The study instruments were administered in the classrooms of the schools in a 50-min session. Anonymity, voluntariness, and confidentiality were maintained at all times.

AUTHOR CONTRIBUTIONS

IM, GS, and CRE contributed to the conception and design of the review. IM, MMC, and LGA applied the search strategy. IM, CRE, GS, LGA, and MMC applied the selection criteria, completed the bias-risk assessment, and analyzed and interpreted the data. All authors contributed to the article and approved the submitted version.

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Measuring the Quality of Life in Forensic Psychiatric Hospitals

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Background: In Germany, a large proportion of mentally ill offenders spends many years in a forensic psychiatric hospital. To ensure that the highly restrictive living conditions in these closed institutions meet patient needs, research must assess and analyze patient quality of life. For this purpose, we adapted the Measuring the Quality of Prison Life questionnaire to measure the quality of life in forensic psychiatric hospitals from the patient perspective. This study aimed to assess the reliability (internal consistency) and construct validity of the adapted questionnaire.

Methods: To evaluate the questionnaire, a one-time survey was carried out at 13 forensic psychiatric hospitals in Germany. Item characteristics and internal consistency of the scale and subscales were calculated and the factor structure was tested using confirmatory factor analysis. To test of responsiveness we compared the mean quality of life between the 13 hospitals and further investigated whether the patients' evaluation of quality of life is depending on age and duration of accommodation.

Results: The analysis of the psychometric properties revealed very good item characteristics and very good to excellent internal reliability. Construct validity was demonstrated. Patient's quality of life was significantly associated with age and duration of accommodation.

Discussion: The adapted Measuring the Quality of Prison Life questionnaire is a reliable and valid instrument for measuring quality of life in forensic psychiatric hospitals and can be used in the future to compare hospitals and identify the strengths and weaknesses of each.

Keywords: quality of life, well-being, forensic psychiatry, mentally ill offenders, living conditions

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INTRODUCTION

Detaining patients in forensic psychiatric hospitals has two objectives, i.e., to treat mental illness and reduce the risk of relapse. A large proportion of forensic psychiatric patients spends many years in a closed forensic psychiatric hospital (mean duration for patients with severe mental disorders: 4.6 years, range: 0.5–16.1 years; Dessecker, 2008). In these institutions, the daily routine is firmly structured and the opportunities for independent action are very limited. These narrow framework conditions sometimes block individuating personality maturation and limit therapeutic options. Therefore, to enable patients to develop positively, we need to assess their quality of life and adapt the living conditions to their needs.

Quality of life describes people's well-being and satisfaction with their current living conditions (Lehmann, 1983). According to the World Health Organization Quality of Life Workgroup

(WHOQOL), quality of life is defined as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationships to salient features of their environment" (Whoqol Group, 1995). Most authors consider quality of life as a multidimensional concept that includes both objective (e.g., health, income) and subjective indicators (e.g., satisfaction with social relations).

Experience from hospital practice shows, that patients evaluate their quality of life in forensic psychiatric hospitals quite differently. Some experience their detainment as unpleasant and negative, whereas others find the structured environment to be beneficial and protective. Given this potential range of subjective experiences, the present study aimed to develop and evaluate a questionnaire for mentally ill offenders that measures the quality of life in forensic psychiatric hospitals. The questionnaire "Measuring the Quality of Prison Life" (MQPL) by Liebling et al. (2011), which was designed for use in correctional facilities, served as a template. Liebling et al. used a bottom-up approach, i.e. they accompanied inmates in five different prisons for a year, had numerous conversations with them and thus gained insight into the issues that were relevant to them. From their observations at the grassroots level, they created a questionnaire with over 100 items, which was subsequently evaluated and validated in various prisoner populations ($N = 1{,}147$). In this way, Liebling's working group succeeded in identifying and statistically recording the parameters that were particularly important in the prisoners' daily lives. The questionnaire is now used worldwide and results are available from England, Spain, Norway, Sweden, Australia, Kosovo, and New Zealand (e.g., Leeson et al., 2015; Skar et al., 2019).

Liebling et al. found large differences between individual prisons with regard to prisoner's well-being and their current psychological distress (Liebling, 2009; Crewe et al., 2015). For example, some institutions are experienced as being more punitive than others. Significant correlations were also found between inmates' quality of life and the suicide rates in the respective institutions (Liebling et al., 2005). A study from Norway by Johnsen et al. (2011), examined the influence of prison size on inmates' evaluation of quality of life and found that they rated it most positively in prisons with fewer than 50 inmates (Johnsen et al., 2011). Skar et al. (2019) performed a study in a prison in Kosovo to investigate whether inmates' quality of life was associated with their mental health and the level of violence. They found a significant negative relationship between anxious symptoms, physical and psychological violence and quality of life (Skar et al., 2019).

Numerous studies have examined quality of life among prison inmates, and research on quality of life in forensic psychiatric hospitals is also making progress (Radoschewski, 2000; Nieuwenhuizen et al., 2002; Schalast et al., 2008; Vorstenbosch et al., 2014; Tonkin, 2016). However, only a small proportion of the studies focus on quality of life as a multidimensional construct that covers both objective living conditions and subjective well-being. Sampson et al. (2016) compared forensic psychiatric care in 18 European countries by conducting interviews with mental health experts. They concluded that improving the well-being and quality of life of long-term housed patients was essential for treatment (Sampson et al., 2016). Two studies from the Netherlands showed that patients' own assessment of quality of life and the way staff assess patients' quality of life diverge (Schel et al., 2015; de Vries et al., 2016) and Büsselmann et al. (2020) revealed that the social aspects of quality of life of forensic psychiatric patients are associated with suicidal thoughts, the severity of depressive symptoms and hopelessness.

The aims of the present study were threefold: First, the Measuring the Quality of Prison Life questionnaire (Liebling et al., 2011) should be translated into German and adapted to the living conditions of forensic psychiatric hospitals to assess the quality of life of forensic psychiatric patients, including adding items on patient-therapist relationships. Second, for the psychometric evaluation of our adapted questionnaire, a one-time survey was carried out at 13 forensic psychiatric hospitals. The reliability of the main scale and subscales should be determined using internal consistency and the construct validity should be tested by means of a confirmatory factor analysis. Third, to test of responsiveness, it should be investigated whether significant differences can be found between different forensic hospitals or between different patient groups (older vs. younger, patients with long and patients with short length of stay).

MATERIALS AND METHODS

Sample

A total of 255 forensic psychiatric patients (25 women, 230 men) took part in the study; however the data of 25 patients were excluded from the analysis because too many values were missing. All patients were detained according to Section 63 (severe mental disorder, $n = 81$; 35%) or Section 64 (substance use disorder, $n = 149$; 65%) of the German penal code.

An overview of sociodemographic and forensic-psychiatric characteristics of the two subsamples of patients (i.e., those with severe mental disorders and those with substance use disorders) is shown in **Table 1**.

Assessment of Socio-Demographic, Hospital, and Legal Data

Patients were asked for the following information: gender, age, highest school leaving certificate, duration of actual detention, diagnosis, legal terms of detaining, index offense, and level of movement allowed.

Measuring the Quality of Life

With kind permission of the authors, we translated the MQPL questionnaire (Liebling et al., 2011) into German. The original questionnaire consists of 128 items and covers both positive and negative living conditions of inmates. Because the MQPL questionnaire is tailored to the needs of prison inmates, the items related to therapeutic help and support were inappropriate for forensic psychiatric patients and were omitted. Instead,

we drew on our own prior work, the Questionnaire for Investigating Therapeutic Alliance in Forensic Setting (FTBF; Vasic et al., 2015). The FTBF takes into account the formal and infrastructural characteristics of forensic psychiatric hospitals. We adopted items on the patient-therapist relationship and satisfaction with the therapeutic process. The adapted version, named aMQPL, consisted of 73 items, which were assigned to 14 subscales: entry in forensic psychiatry, relationship with fellow inmates, relationship with caregivers, relationship with therapists, family contact, respect, fairness, transparency of procedures and decisions, safety, quality of accommodation, therapeutic options/personal development, suicide prevention, drug consumption and treatment of foreign patients. The items were answered on a five-point-Likert scale (1 = totally disagree; 5 = totally agree). To evaluate the questionnaire, we calculated the mean score for the subscales and the total score. The higher the respective mean score was, the more positive patients rated the specific aspects of their quality of life (reflected by the subscales) or their overall quality of life (reflected by the total score).

Procedure

From February to November 2018 we recruited $N = 255$ forensic patients in 13 out of 14 Bavarian (German) forensic hospitals. The patients were informed about the aim and procedure of the study and about the fact that neither participation nor non-participation would have any advantages or disadvantages with respect to their treatment. In addition, they were not offered either payment or other forms of compensation. Subsequently, they were asked to decide whether or not they were willing to participate in this study. If they agreed to participate, patients gave written informed consent and received a sheet with contact details of the research team. They were informed that they could withdraw their consent at any time. Thus, the study was performed in accordance with the criteria of the Declaration of Helsinki. Participants completed the questionnaires in small groups in a separate room on the ward, and a research assistant was available to help.

Statistical Analysis

The data were analyzed with IBM SPSS Statistics for Windows Version 25 (Armonk, NY: IBM Corp.). Item characteristics were determined by means of item difficulties and item discriminations. Reliability was calculated via internal consistency analyses (Cronbachs' alpha). The factorial validity was examined with the help of a confirmatory factor analysis.

Analyses of variance were performed to test statistically significant differences between the 13 participating forensic psychiatric hospitals. The mean value of the respective aMQPL-subscale/total scale was used as the dependent variable; the independent variable was the affiliation to one of the 13 hospitals.

To test whether there are correlations between patients' age and quality of life, Spearman correlations were calculated separately for patients with a severe mental disorder and for patients with substance use disorders. To check if the duration of their accommodation (above and below the 50th percentile of the distribution of the mean duration) was associated with the assessment of quality of life, *t*-tests for independent groups were calculated for each aMQPL-subscale and the aMQPL-total scale.

TABLE 1 | Sociodemographic and forensic-psychiatric characteristics of the participants.

	Severe mental disorder ($n = 81$) M (*SD*; Range) % (*n*)	Substance use disorder ($n = 149$) *M* (*SD*; Range) % (*n*)
Age (years)[a]	40.2 (13.2; 19–79)	33.2 (9.0; 20–68)
Graduation[b] No graduation	17 (21%)	18 (12%)
Graduation after 9 years	37 (46%)	81 (54%)
Graduation after 10 years	12 (15%)	39 (26%)
Graduation from high school	14 (18%)	6 (7%)
Diagnosis Substance-related disorder	7 (9%)	141 (95%)
Schizophrenia	27 (33%)	0
Schizophrenia and addiction	9 (11%)	3 (2%)
Personality disorder	29 (36%)	1 (1%)
Other	9 (11%)	4 (3%)
Index Offence[c] Violent offense	42 (53%)	50 (34%)
Sexual assault	23 (29%)	2 (1%)
Offense against property	2 (3%)	24 (16%)
Arson	5 (6%)	2 (1%)
Violation of the narcotic act	1 (1%)	70 (47%)
Traffic offense	6 (8%)	1 (1%)
Treatment duration (months)[d]	71.3 (85.0; 1–360)	12.7 (10.0; 0–56)

[a]*missing data: n = 2;* [b]*missing data: n = 1;* [c]*missing data: n = 2;* [d]*missing data: n = 9. SD, standard deviation.*

RESULTS

Psychometric Evaluation of the Questionnaire

For the interpretation of item characteristics and internal reliability, we followed the guidelines by Bühner (2011): The item difficulties (in percent) should cover as wide a range as possible (0–100), since extreme difficulties also allow differentiation in peripheral areas of the covered domains. The item discrimination index corresponds to the correlation coefficient between the item response i and the total scale score. The total scale value is calculated as the sum of all items without item i. Good item discrimination indices are greater than $r_{i(t-i)} = 0.30$. Cronbach's alpha is a measure of the internal consistency of the scale or subscale. It indicates how strongly the individual items are related to each other. Cronbach's alpha should assume a value greater than $r = 0.65$.

Nine items and the 3 related subscales were excluded due to insufficient internal consistencies (Cronbach's alpha: suicide prevention = 0.335; drug use = 0.308 and treatment of foreign patients = 0.013). The results of the evaluation of the 64

TABLE 2 | Item characteristics and reliabilities of the adapted measuring the quality of prison life questionnaire.

Scale	α	Item		FL	$r_{i(t-i)}$
Entry into forensic psychiatry	0.599	1	When I first came into this hospital I felt looked after.	0.693*	0.487
		2	During my first few days in this hospital, caregivers took a personal interest in me.	0.776*	0.489
		3	The induction process in this hospital helped me to know exactly what to expect in the daily routine and when it would happen.	0.385*	0.333
		4	I felt extremely alone during my first 3 days. (–)	0.320*	0.272
Relationship with fellow inpatients	0.678	5	Fellow inpatients are like friends to me.	0.825*	0.537
		6	I trust my fellow inpatients.	0.825*	0.603
		7	My fellow inpatients take advantage of me. (–)	0.333*	0.339
		8	I have no problems with the other patients.	0.378*	0.375
Relationship with caregivers	0.843	9	Caregivers help me, when I need support.	0.731*	0.634
		10	Caregivers trust me.	0.765*	0.696
		11	I trust the caregivers.	0.883*	0.789
		12	The relationship between the caregivers and patients is good.	0.670*	0.606
Relationship with therapists	0.860	13	I get on well with my therapist.	0.805*	0.763
		14	My therapist wants the best for me.	0.840*	0.765
		15	I like going to the individual sessions.	0.717*	0.635
		16	I am afraid of my therapist. (–)	0.449*	0.447
		17	I trust my therapist.	0.868*	0.777
		18	My therapist makes decisions I don't like. (–)	0.551*	0.519
		19	My therapist takes time for me when I have an important concern, even outside of individual sessions.	0.570*	0.504
Family contact	0.488	20	The staff at this hospital help me stay in touch with my family or friends.	0.820*	0.275
		21	In this hospital, I can be visited often enough.	0.503*	0.482
		22	The visiting time is too short. (–)	0.161*	0.194
Respect	0.827	23	I've been treated respectfully in this hospital.	0.767*	0.651
		24	The atmosphere in this hospital is nice and friendly.	0.668*	0.600
		25	My concerns are taken seriously at this hospital.	0.729*	0.664
		26	Some of the treatment in this hospital is humiliating. (–)	0.535*	0.517
		27	The staff are argumentative toward the patients. (–)	0.526*	0.526
		28	I have been treated with respect at this hospital.	0.808*	0.677
Fairness	0.817	29	In this hospital, all patients are treated equally.	0.870*	0.745
		30	The house rules apply to everyone; there are no exceptions.	0.721*	0.648
		31	My rights as defined by law are respected in this hospital.	0.624*	0.494
		32	In this hospital, everyone is punished for misconduct in the same way.	0.722*	0.682
		33	All patients' rooms are checked with the same frequency.	0.500*	0.482
Transparency of procedures and decisions	0.810	34	In this hospital, decisions are not explained. (–)	0.581*	0.536

(Continued)

TABLE 2 | Continued

Scale	α	Item		FL	$r_{i(t-i)}$
		35	The rules that apply in this hospital have been explained to me.	0.594*	0.538
		36	I know exactly what is expected of me.	0.656*	0.582
		37	When important decisions are made about me, it is explained to me how they have been made.	0.759*	0.691
		38	I believe that I have no influence on the progress of my stay at the hospital. (–)	0.565*	0.492
		39	When important decisions are made about me, I am involved.	0.597*	0.538
		40	The procedures in the hospital are well-organized.	0.608*	0.476
Safety	0.800	41	The staff at this hospital make me feel safe.	0.784*	0.618
		42	The staff react quickly in case of unexpected incidents and emergencies.	0.424*	0.392
		43	Bullying among patients is not tolerated in this hospital.	0.684*	0.657
		44	Bullying of patients by staff is not tolerated in this hospital.	0.605*	0.548
		45	Patients are treated correctly in the crisis intervention room/isolation room.	0.579*	0.505
		46	I feel safe from being assaulted in this hospital.	0.683*	0.620
Quality of accommodation	0.788	47	My room is big enough.	0.499*	0.438
		48	My room is well-equipped.	0.669*	0.620
		49	The meals are good.	0.567*	0.493
		50	I have the opportunity to cook for myself.	0.270	0.226
		51	I have enough money at my personal dispotion.	0.587*	0.497
		52	The common rooms on the ward are clean and tidy.	0.429*	0.361
		53	There are enough games (ludo, table football, etc.).	0.533*	0.487
		54	The hospital offers enough opportunities to stay physically fit.	0.543*	0.475
		55	There are plenty of frequent activities (baking cookies, excursions, etc.).	0.547*	0.464
		56	I have adequate opportunities to take care of myself.	0.453*	0.405
		57	I have adequate opportunities to keep my room clean.	0.503*	0.472
Therapeutic options/Personal development	0.853	59	In this hospital, they help me avoid getting into conflict with the law after being released.	0.725*	0.638
		60	I am encouraged to confront my offenses.	0.769*	0.694
		61	I am encouraged to set goals and work toward them.	0.752*	0.660
		62	My time here in the hospital is a chance for me to change.	0.727*	0.709
		63	On the whole, I am just spending my time here instead of making use of it. (–)	0.616*	0.582
		64	I benefit from the therapies that are offered.	0.774*	0.714
		65	I regularly participate in the offered therapies.	0.410*	0.374

α, *Cronbach's alpha as indicator of internal consistency; FL, standardized factor loadings;* $^*p < 0.05$, $r_{i(t-i)}$, *item discrimination index.*

remaining items and 11 subscales can be found in **Table 2**. Item difficulties ranged between 33.8 and 64.6. The reliability of the total scale can be rated as excellent (Cronbach's alpha of the total score: $r = 0.953$).

Factor structure was tested by confirmatory factor analysis and is given [$\text{Chi}^2(1897) = 3442.143$; $p < 0.001$; Bollen-Stine bootstrap-corrected $p = 0.008$; RMSEA = 0.067; 90% confidence interval: 0.064–0.071; for interpretation: good models have values

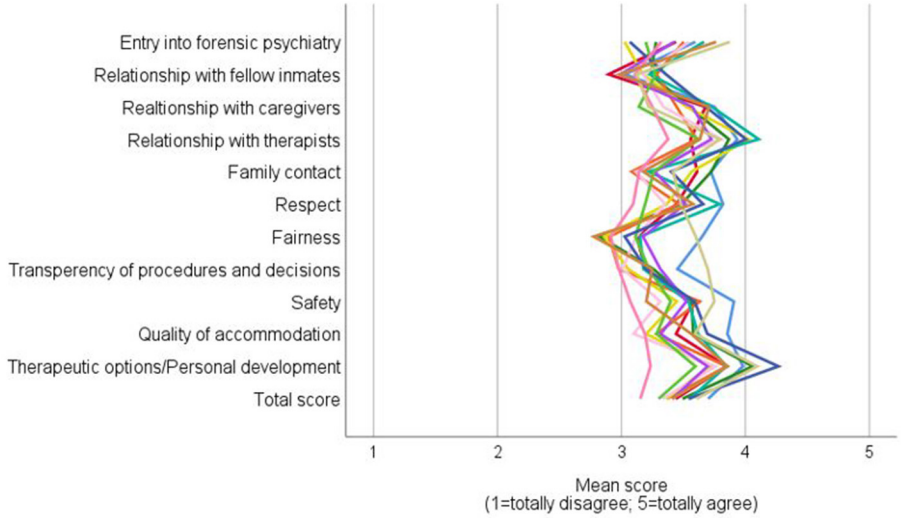

FIGURE 1 | Mean values of the 13 participating Bavarian forensic psychiatric hospitals across the individual subscales and the total score of the aMOPL.

RMSEA $\leq$ 0.08]. Significant standardized factor loadings are listed in **Table 2**.

Test of Responsiveness: Differences Between Forensic Psychiatric Hospitals

As can be seen in **Figure 1**, significant differences were found between the 13 participating forensic psychiatric hospitals in the following subscales: *e*ntry into forensic psychiatry [$F_{(12,\ 242)} = 1.993$; $p = 0.026$; part. Eta² = 0.090], fairness [$F_{(12,\ 241)} = 1.982$; $p = 0.026$; part. Eta² = 0.090], quality of accommodation [$F_{(12,\ 242)} = 4.164$; $p < 0.001$; part. Eta² = 0.171] and therapeutic options/personal development [$F_{(12,\ 241)} = 1.870$; $p = 0.039$; part. Eta² = 0.085].

Test of Responsiveness: Associations Between Quality of Life and Patients' Age and Duration of Hospital Stay

For patients with severe mental disorders, the analyses further showed, that there was a significant negative correlation between the patients' age and the subscale family contact (Spearman's $\rho = -0.222$, $p = 0.049$). For patients with substance use disorders we found significant positive correlations between the patients' age and the subscales fairness (Spearman's $\rho = 0.207$, $p = 0.011$) and quality of accommodation (Spearman's $\rho = 0.172$, $p = 0.036$).

The duration of the hospital stay also influenced quality of life. Patients with severe mental disorders, who were accommodated in a forensic psychiatric hospital for 43 months or more rated entry in forensic psychiatry [$t_{(70)} = -2.622$; $p = 0.011$; $d_{Cohen} = -0.627$], relationship with caregivers [$t_{(70)} = -2.107$; $p = 0.039$; $d_{Cohen} = -0.504$], transparency of procedures and decisions [$t_{(70)} = -3.034$; $p = 0.003$; $d_{Cohen} = -0.725$] and therapeutic options/personal development [$t_{(70)} = -2.257$; $p = 0.027$; $d_{Cohen} = -0.540$] more positive than patients who were accommodated for a shorter period of time (<43 months). Patients with substance use disorders who were accommodated for 12 or more months rated the quality of life more negatively than patients with a shorter length of stay, total score [$t_{(146)} = 2.083$; $p = 0.039$; $d_{Cohen} = 0.345$]. The same applied to the subscales relationships with therapists [$t_{(128,838)} = 2.301$; $p = 0.023$; $d_{Cohen} = 0.405$], respect [$t_{(146)} = 2.361$; $p = 0.020$; $d_{Cohen} = 0.391$], and transparency of procedures and decisions [$t_{(146)} = 3.153$; $p = 0.002$; $d_{Cohen} = 0.522$].

DISCUSSION

This study aimed to analyze the psychometric properties of a translated and adapted version of the Measuring the Quality of Prison Life questionnaire (Liebling et al., 2011). The analysis of the psychometric properties of the adapted German questionnaire revealed good to excellent values for reliability and a confirmatory factor analysis confirmed the factor structure.

We found significant differences between the participating hospitals in the subscales entry into forensic psychiatry, fairness, quality of accommodation and therapeutic options/personal development. Because the aMQPL questionnaire allows the current quality of life at individual forensic psychiatric hospitals to be assessed, the aMQPL can be used in the future both to inform staff if any areas still need to be optimized and to compare conditions between hospitals.

Furthermore, our study shows that the age of patients in forensic psychiatric hospitals affects their quality of life. Young patients with substance use disorders feel treated more unfair than older patients. This finding gives rise to the question whether younger patients' concerns may be taken not so serious than older patients' concerns. In addition, young patients with substance use disorders rate the quality of accommodation significantly more negatively than older patients. One possible explanation for this difference may be that the living conditions

and recreational opportunities available to young patients are not age-appropriate.

Patients with severe mental disorders rate their quality of life more positively the longer they have been detained in a forensic hospital (>3.5 years). The reason for that could be a therapeutically unintentional habituation to the forensic hospital. Being locked up for a long time creates helplessness, and over the years patients may become increasingly worried that they will not be able to cope with the practical demands of life outside the forensic hospital. Therapists and caregivers can try to reverse this effect of hospitalization by carefully preparing patients for discharge and relieving their worries about their new life "on the outside."

In conclusion, a high quality of life should be ensured in forensic psychiatric hospitals to promote the best possible course of therapy. And the aMQPL appears to be a suitable self-assessment instrument for evaluating patients' quality of life. The developed questionnaire can be used with two different intentions: (a) to monitor the current status and further development of an individual forensic psychiatric hospital or (b) as an instrument to compare different forensic psychiatric hospitals with each other.

Limitations

This study has some limitations. First, the sample consisted only German forensic psychiatric patients, so the results cannot be generalized to general psychiatric patients or forensic patients from other countries. Second, self-reported data can result in various biases.

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 the University Ulm, Germany. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MD, JS, and MB designed the study. MB collected the data and wrote the initial draft of the manuscript. MB, JS, and ML analyzed the data. MB, JS, and LT interpreted the data. All authors had full access to all the data in the study and take responsibility for the integrity and accuracy of the data analysis, contributed to read, and approve the final version of the manuscript.

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Improving Criminal Responsibility Determinations Using Structured Professional Judgment

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Forensic psychologists commonly utilize unstructured clinical judgment in aggregating clinical and forensic information in forming opinions. Unstructured clinical judgment is prone to evaluator bias and suboptimal levels of inter-rater reliability. This article proposes Structured Professional Judgment (SPJ) methods as a potential remedy. Following a review of canonical forensic assessment models, the prevalence of bias in forensic judgments, and inter-rater agreement in criminal responsibility (CR) determinations, this article presents a SPJ model for CR evaluations translated from violence risk assessment methodology. A systematic user-friendly methodology is described, applying procedural checklists, application of a mental state at time of the offense (MSO) model using structured data collection methods, aggregation of empirical evidence guidelines, and *post-hoc* hypothesis testing using the Analysis of Competing Hypotheses (ACH). A case study describes application of the procedural and CR decision model in a complex homicide case. The model demonstrates the power and efficacy of the application of SPJ to forensic decision-making and is relevant to other types of forensic assessment (e.g., competency to stand trial, post-acquittal release decision-making).

Keywords: criminal responsibility, forensic assessment, structured professional judgment, actuarial prediction, methamphetamine psychosis

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CRIMINAL RESPONSIBILITY EVALUATIONS

Criminal responsibility (CR) evaluations are complex forensic mental health evaluations requiring collecting, aggregating, and interpreting data from multiple sources (e.g., Rogers and Shuman, 2000; Melton et al., 2007; Acklin, 2008). Based on relevant legal standards, the examiner must engage in a multi-step sequential process: frame investigative hypotheses, collect data, establish a threshold clinical diagnosis, make a determination of the mental state at the time of the offense (MSO), aggregate data into a decision model, and render an opinion linking clinical data and legal standard (Grisso, 2003)[1]. These decisions are typically be made using clinical (holistic or informal) judgment methods (Dawes et al., 1989).

[1]Whether forensic psychologists should proffer ultimate opinion testimony is controversial (Rogers and Ewing, 2003; Buchanan, 2006; Melton et al., 2007). Following John Hinckley's attempted assassination of Ronald Reagan and subsequent acquittal, Federal Rules of Evidence Rule 704 was revised in 1984 to prevent expert testimony on mental state at the time of the offense. In Hawaii, the criminal courts order experts to provide ultimate opinions in CR examinations.

Over the last 60 years, the clinical vs. statistical debate has been ongoing. Meehl (1954) originally defined *clinical judgment* as an informal, subjective, non-quantitative mode of aggregating observations to make predictions. Informal or holistic aggregation of data is prone to judgmental biases and heuristics identified, for example, by Tversky and Kahneman (1974). A significant literature has described the short comings of clinical judgment in clinical and forensic decision-making (Faust and Ahern, 2012). Studies have demonstrated the superiority of decision-making utilizing Structured Professional Judgment (SPJ; Hart et al., 2016) and actuarial, mechanical, or algorithmic judgment methods over unstructured clinical judgment (Grove and Meehl, 1996; Grove et al., 2000).

Surveys indicate that most clinicians rely on unstructured clinical judgment in both clinical and forensic work. The predilection for unstructured clinical judgment in forensic decision-making prone to biases, heuristics, and error has provoked intense discussion in forensic psychology (Neal and Grisso, 2014a,b). The next section will examine canonical models for forensic psychological evaluations in light of the clinical-actuarial judgement controversy.

CANONICAL ASSESSMENT MODELS IN FORENSIC PSYCHOLOGY

Many commentators and critics of clinical and forensic judgment advocate for a transparent and structured approach to data gathering, aggregation, and judgment. Grisso (2003) specified components that legal competency evaluations have in common, including: (a) functional, (b) causal, (c) interactive, (d) judgmental, and (e) dispositional components. The interactive component requires a judgment about the individual's level of capacity to meet the demands of the specific situation; specifically identifying the incongruence between a person's functional ability and the degree of performance demanded by the specific context. The judgmental and dispositional components require a judgment that the person-context incongruence is of sufficient magnitude to warrant a finding of legal significance.

Heilbrun et al. (2003) formulated a set of 29 principles that serve as a conceptual and procedural framework for forensic mental health assessment (FMHA) procedures. In the effort to improve the quality of forensic reports they recommend standardization of procedures and report elements. Their proposed model includes (a) clearly stated referral question; (b) coherent report organization; (c) elimination of jargon; (d) inclusion of data relevant to forensic opinion; (e) separation of observations from inferences; (f) consideration of multiple data sources, if possible; (g) appropriate use of psychological testing; (h) consideration of alternate hypotheses; (i) data-supported opinions; and (j) and clear linkage between data and opinions. Empirical study of Heilbrun's structured principles found modest improvements in report quality and relevance (Lander and Heilbrun, 2009) but rather poor adherence to the assessment principles. Significantly, Heilbrun's model does not specify principles or procedures for data aggregation or hypothesis testing. The model as described relies on informal aggregation and unstructured clinical judgment in the linkage between data and opinions.

It is unlikely that procedural standardization alone will be sufficient to correct biases associated with unstructured clinical judgment. Forensic evaluators have been shown to utilize the same biases and heuristics common in non-professionals (Lilienfeld and Lynn, 2015). It should not be surprising that levels of agreement are poor given the complexity of forensic evaluations and the widespread reliance on unstructured clinical judgment in forensic decision making (Monahan, 2008; Sutherland et al., 2012; Hart et al., 2016).

Selection and confirmation biases may enter into the evaluation process at multiple points during the course of the evaluation. Methods for collection, aggregation, and interpretation of information are not typically described. The "gap" between data and forensic opinion is a critical juncture in decision making process (Hart et al., 2016). Even highly skilled mathematical psychologists are unsophisticated in computational decision making and utilize heuristics in addressing simple problems (Kahneman and Frederick, 2002). Review of the various authorities do not provide guidance on methods for integrating data into inferences and opinions.

Evaluators are typically advised to apply informal additive or summative models of data aggregation in opinion formation. Principle 22 of Heilbrun's model may serve as an example. "Use scientific reasoning in assessing causal connection between clinical condition and functional abilities" (Heilbrun et al., 2003, p. 335). Evaluators are advised to "describe explanations for clinical condition and functional abilities that have the most supporting evidence and least disconfirming evidence" (p. 335). The AAPL Practice Guidelines for the conduct of insanity evaluations (2014) are even less specific, advising the forensic evaluator to "consider to what degree the mental condition and its relationship to the alleged crime meets the legal standard for criminal responsibility." The reliance on *ad-hoc* clinical judgment is prone to intuitive heuristics and various biases has been severely criticized by advocates of actuarial or algorithmic decision making (Dawes et al., 1989; Hilton et al., 2006; Falzer, 2013).

BIAS IN FORENSIC MENTAL HEALTH EVALUATIONS

Following the pioneering work of Tversky and Kahneman (1974), Neal and Grisso (2014a,b) describe a detailed variety of cognitive heuristics in forensic psychological assessment, including the representativeness (conjunction fallacy, base rate neglect) and availability heuristics (confirmation bias and what you see is all there is), and anchoring bias (biased thinking tied to initial premises). They advocate general remedies without procedural specification: hypothesis testing procedures, structured methods for forensic assessment, and application of actuarial measures over unstructured clinical judgment as methods to improve reliability. When surveyed about bias in forensic mental health evaluations, experts assert that "will power" and "introspection" are potential correctives to biased

thinking. Evaluators acknowledge bias in their peer's judgments more than their own (blind spot bias). Evaluators perceive themselves as less subject to bias than their colleagues (Neal and Brodsky, 2016; Zapf et al., 2018).

Murrie and colleagues identified "adversarial allegiance" as an additional source of bias, namely, the tendency to skew scores and interpretations on forensic assessment instruments based on allegiance to the retaining party (Murrie et al., 2008, 2009, 2013). These reports sent shock waves through the FMHA community. It is not at all clear how or whether the publication of these findings has had any appreciable effect on forensic practice since practitioners are resistant to modifications of practice and are disinclined to utilize structured assessment methodologies (Vrieze and Grove, 2009; Lilienfeld et al., 2013).

INTERRATER RELIABILITY IN CLINICAL AND FORENSIC DECISION MAKING

Interrater reliability is a useful performance indicator for the efficiency, accuracy, and reproducibility of forensic judgments. "Analyses of agreement between clinicians can be of value in examining accuracy" (Faust and Ahern, 2012, p. 151). The reliability of a measure is indicative of the reproducibility of the judgment, the degree of true variance, confidence that can be placed on judgments, and the degree of error that will be introduced into the decision making task (Kraemer et al., 2002). High levels of reliability, however, are a necessary (but not sufficient) indicator of accuracy. Poor or even marginal reliability raises concerns about bias, inaccuracy, and error. The following section examines interrater reliability for two necessary components of the CR evaluation—clinical assessment for the MSO, including psychiatric diagnosis and forensic opinion.

Clinical Diagnostic Decisions

The reliability of psychiatric diagnosis has been a constant concern since the emergence of the DSMs. Clinical assessment focuses on psychiatric symptoms and diagnoses as a threshold condition for MSO legal determination. There are considerations whether reliability studies are conducted in research settings with trained raters operating under strict procedures and "field reliability" focused on real world clinical practitioners where reliability is comparatively suboptimal (Aboraya, 2007).

In research settings, for example, the interrater reliability of ICD-10 schizophrenia diagnoses using a diagnostic checklist for 100 subjects yielded $k = 0.60$; when diagnoses were amalgamated into a diagnostic entity of schizophrenia-spectrum disorders, $k = 0.98$ (Jakobsen et al., 2005). Interrater reliability for psychiatrists using the Composite International Diagnostic Interview for diagnoses of schizophrenia yielded *k*-values of 0.59 and 0.56 for DSM-IV and ICD-10, respectively (Cheniaux et al., 2009). An interrater reliability study of the schizoaffective disorder diagnosis using the Composite International Diagnostic Interview with 150 patients yielded a Cohen's $k = 0.22$ (Maj et al., 2000). Interrater reliability for DSM-5 field trials yielded poor level of agreement: schizoaffective disorder ($k = 0.50$), schizophrenia ($k = 0.46$), and attenuated psychotic symptoms syndrome ($k = 0.46$; Freedman et al., 2013). The high levels of error in these findings suggest serious problems with application of diagnostic criteria by judges.

Interrater reliability of clinical symptoms is somewhat more encouraging. Interrater reliability using the Swedish version of the Structured Clinical Interview for the Positive and Negative Syndrome Scale (SCI-PANSS) yielded intraclass correlations of 0.98–0.99 for the Positive Symptom Scale, and 0.83–0.90 with the Negative Symptom Scale. The General Psychopathology Scale yielded intraclass correlation coefficients of 0.95–0.98 (Lindström et al., 1994). Interrater reliability of a shortened 6-item PANSS in a sample of schizophrenic in- or out-patients, yielded ICCs in the good range (ICC = 0.74). ICCs for the six individual scale items ranged from 0.45 to 0.76 (Kølbæk et al., 2018). Studies of the PANSS utilizing taped observations ranged from 0.56 to 0.99 for the Positive Symptom Scale, and 0.20 to 0.90 for the Negative Symptom Scale. Total PANSS scores ranged from 0.66 to 0.71 for taped interview observations (Crittenden et al., 2009). A literature survey of interrater reliability for diagnosis of delusions in general found substantial agreement using a variety of structured interviews and the PANSS, ranging from 0.64 to 0.93. The diagnosis of bizarre delusions, however, was rather poor falling into the 0.41–0.60 range (Bell et al., 2006).

These findings indicate that the use of structured clinical measures in research settings, yields marginally reliable clinical diagnoses. The field reproducibility of diagnostic impressions is therefore weak and in some studies less than chance. Evaluation of clinical symptoms fare better than diagnostic judgments. These studies suggest that degree of confidence in clinical diagnosis under field conditions is much lower. Tempering any overly favorable assessment of the reliability of psychiatric diagnosis, however, Vanheule et al. (2014) note that since DSM-III, norms for evaluating ICC and *k* coefficients have relaxed considerably. They note that DSM-5 field trials used "unacceptably generous" norms, and conclude that diagnostic reliabilities in 2013 are not notably better than 1974.

Beyond limited field trials, scientific assessment of DSM psychiatric disorders have not been undertaken. The majority of DSM-5 diagnostic categories were not tested at all: the DSM-5 counts 347 disorder categories, but kappa coefficients were calculated for only 20 conditions (6%). Of those categories only 14% had a good or very good reliability, which means that only 4% of the DSM-5 categories have been shown to have acceptable reliability. Since the inter-rater reliability of the majority of the DSM-5 categories remains untested, this raises serious questions about diagnostic reliability in the clinical assessment of MSO evaluations for diagnoses and to a lesser extent for clinical features.

Criminal Responsibility Opinion-Making

Hawaii's three panel system for court-ordered forensic examinations has been intensively studied over the past 10 years since it offers a unique laboratory to study inter-rater reliability and examiner and judicial consensus. In felony cases, Hawaii uses the Model Penal Code (MPC) CR language focused on cognitive and volitional capacity. A Hawaii study of 150 independent CR reports conducted by court-appointed three examiner panels yielded "fair" levels of agreement (ICC

= 0.51; Fuger et al., 2013). In 23 cases (69 reports, 46%), all three examiners achieved consensus. In 26 cases (78 reports, 52%), at least two evaluators reached consensus: Psychiatrists and community-based psychologists (CBP) reached a "fair" level of agreement (ICC = 0.57, $p < 0.01$). Community-based psychologists and court-based examiners reached a "fair" level of agreement (ICC = 0.54, $p < 0.01$). Psychiatrists and court-based examiners reached consensus with "fair" levels of agreement (ICC = 0.42, $p < 0.01$). A study of Hawaii's court-appointed three panels using a separate sample aggregated agreement coefficients for CR yielded an ICC of 0.51. Average pairwise Cohen's *k* was 0.391 (Guarnera et al., 2017).

In a second more rigorous study examining five types of reliability coefficients in 150 cases in a non-crossed data measurement design, reliability of CR decisions in panels of three independent court-appointed examiners was marginal ($k = 0.39$; Acklin and Fuger, 2016). A field reliability study examining CR decision making in three examiner panels including CBP, community-based psychiatrists (PSY), and court-based psychologists (DOH) found Fleiss's $k = 0.39$. Average pairwise Cohen's kappa was $k = 0.39$. Average pairwise Cohen's *k* between PSY and CBP was 0.32, PSY and DOH was 0.45, and CBP and DOH was 0.40. Criminal responsibility field reliability studies in other jurisdictions have found similar results. Meta-analytic procedures and study space methodology applied to field reliability of insanity opinions found level of agreement for sanity opinions ($k = 0.41$; Guarnera et al., 2017). These reliability coefficients fall into "poor-fair" range of agreement and reflect lower levels of agreement than competency to stand trial decisions ($k = 0.49$).

It should not be surprising that levels of agreement in CR judgments are poor given the complexity of the evaluations, retrospective nature of MSOs, discretionary variability, and availability of information utilized, previously discussed unreliability in diagnostic classification, variability in evaluator training and skill, and of primary importance, the widespread reliance of unstructured clinical judgment (Monahan, 2008; Faust and Ahern, 2012; Sutherland et al., 2012; Hart et al., 2016).

Summarizing, CR evaluations require a clinical MSO evaluation and formulation of a forensic judgment based on the collected and aggregated data. Diagnostic studies range from poor to good for some psychosis-related constructs such as positive symptoms, including delusions. Level of agreement for forensic judgments indicates poor reproducibility and high level of error in CR decision-making (Acklin et al., 2015). These errors are not inconsequential. In considering these elements of CR evaluations—clinical status at the time of the offense, including psychiatric diagnosis, and forensic judgments—these findings highlight concerns about methodology, standardization, decision models, and presence of biases and error (Neal and Grisso, 2014a,b).

This survey of the CR behavioral science decision making identifies concerns about the reliability and objectivity of opinions proffered to courts of law. These shortcomings demand methodological reform in practice standards and methodological rigor in the performance of forensic mental health evaluations (National Research Council, 2009). In the sections that follow, in response to calls from critics of unstructured clinical judgment, an alternative decision method is described using SPJ (Hart et al., 2017) for data collection and a mechanical decision model for data aggregation will be described.

STRUCTURED PROFESSIONAL JUDGMENT METHODS IN FORENSIC PSYCHOLOGY

The emergence of SPJ (Monahan, 2008; Hart et al., 2016) as a corrective for unstructured clinical judgment (and an alternative to rigid non-discretionary actuarial algorithmic decision models) has been applied to various risk assessment methodologies (notably violence and sex offending; e.g., Sutherland et al., 2012). Structured professional judgment utilizes a model based on empirical "guidelines" that form a conceptual and empirical structure for risk assessment and management. It is proposed here that the SPJ model may make a significant contribution to standardizing, organizing, and disciplining the assessment and decision making process in non-risk assessment forensic psychology.

Structured Professional Judgment has become synonymous with a methodology developed by Hart et al. in forensic risk assessment (Hart et al., 2016). Hart et al. (2016) describes several steps in the SPJ procedure:

1) identifying the presence of a priori risk factors ("guidelines"),
2) gathering information,
3) considering the relevance of risk factors that are present,
4) developing a formulation of risk based on findings,
5) developing a risk management plan, and
6) communicating summary judgments.

Hart address the interpretive "gap" between steps 3 and 4 by specification or guidance for formulation of risk and scenario planning (Hart et al., 2016, p. 653). This aspect of SPJ methodology has been criticized for relying on informal data aggregation and mixing algorithmic and clinical judgment (Hilton et al., 2006; Falzer, 2013).

Empirical studies of risk assessment methodologies have been controversial. A meta-analysis conducted by Hanson and Morton-Bourgon (2009) obtained a rank order for decision methods they analyzed. Actuarial procedures were the most accurate overall, followed by the hybrid method mixing clinical and actuarial methods, SPJ, and finally unstructured clinical judgment. Guy (2008) examined comparative performance of risk assessment methodologies, unstructured clinical, actuarial, and SPJ. Guy's (2008) evaluation, cited in Guy et al. (2015) of all available research on the predictive validity of SPJ instruments found, consistent with previous research, that "unstructured approaches were significantly less strongly related to violence that were structured approaches either actuarial or SPJ" (p. 53). Guy et al. (2015) conclude that "empirical findings provide strong support for the SPJ model, that SPJ is at least as or more accurate than actuarial instruments, and unstructured clinical prediction" (p. 53). Findings from other meta-analyses comparing effects from SPJ and actuarial measures and violence

risk assessment generally found that effect sizes for scores from actuarial tools were similar to those derived from SPJ measures (Chevalier, 2017). While there is no clear evidence that one approach is superior to the others, application of an evidence-based structure appears to improve accuracy relative to unstructured decision-making.

In conducting a CR case, after a thorough assessment of background, offense information, and clinical examination of the defendant, clinical and forensic assessment instruments are available to assist in the process of collecting, structuring, and organizing assessment evidence. Clinical description and diagnosis of the defendant's MSO, for example, may be usefully assessed using reliable instruments such as the Positive and Negative Symptoms Scale (PANSS; Kay et al., 1987). The PANSS has an associated structured clinical interview (SCI-PANSS; Opler et al., 1992), useful in developing predictors related to delusions, hallucinations, hostility, and potential for violence. The Rorschach Test has shown powerful capacity to identify psychotic thinking (Acklin, 1992, 1999, 2008; Kleiger and Khadivi, 2015; Kleiger, 2017). In the data-opinion linkage, the Rogers Criminal Responsibility Assessment Scales (R-CRAS, 1984; Rogers and Shuman, 2000) are a very useful data aggregation measure with a built in CR decision model. The R-CRAS is specifically designed for CR assessments that assist in systematically assessing relevant factors applying behaviorally-anchored rating scales for linking evaluation findings to CR legal standards. The focus of this paper is the application of SPJ violence risk assessment model to forensic assessment of CR, by substituting empirically-based *a priori* "postulates" for risk guidelines, utilizing structured clinical and forensic assessment instruments, formal aggregation of evidence, and *post-hoc* hypothesis testing.

CRIMINAL RESPONSIBILITY PROCEDURAL CHECKLIST

__ CASE NAME:	Hawaii vs. KDC
__ CASE CAPTION:	IPC-XX-0000-XXX
__ HRS OFFENSE SPECIFICATION:	Murder in the Second Degree
__ COURT ORDER SPECIFICATION:	Criminal responsibility
__ REPORT DUE DATE:	NA

__ DIAGNOSTIC HYPOTHESES: Were the defendant's cognitive and volitional capacities substantially impaired as a result of mental disease, disorder, or defect at the time of the offense?

DATA COLLECTION (list all sources for the forensic database)

__ Records:	Medical records, arrest reports, police interrogation transcript.
__ Collaterals:	None. Telephone interview with mother.
__ Clinical:	Structured clinical interview; WASI, Rorschach Test, WRAT-4, PAI, PANSS, RCRAS

__ MECHANICAL PREDICTORS CHECKLIST (ATTACHED)

__ ACH DATA RELIABILITY CHECK/HYPOTHESIS MATRIX (ATTACHED)

FIGURE 1 | Criminal responsibility procedural checklist.

AN SPJ DECISION MODEL FOR CRIMINAL RESPONSIBILITY

Scientific method involves two primary functions: disciplined data collection and interpretation (Sawyer, 1966; Faust and Ahern, 2012). Structured data collection—including fixed or prespecified vs. variable procedures—and structured prediction make independent contributions to accuracy (Sawyer, 1966; Faust and Ahern, 2012, p. 158). Checklists have been advocated for standardizing report procedures and format (Witt, 2010). The model described here proposes the use of procedural checklists to structure and standardize data collection (**Figure 1**), structured aggregation and weighing of a priori empirical predictors according to SPJ principles, including the relevance

CRIMINAL RESPONSIBILITY PREDICTORS CHECKLIST BASED ON EVIDENCE SOURCES

PRIMARY FACTORS	Y	N	UNK	Credibility*	Relevance**
Presence of psychosis at time of offense[1]	x			5	5
Hallucinations	x			5	5
Delusions	x			5	5
Did the offense involve loss of self-control?[2]	x			5	5
Substance Intoxication at time of offense[3]	x			5	5
SUM OF PRIMARY FACTORS:	**5/5**	**0/5**	**0/5**	**25/25**	**25/25**
SUBSIDIARY FACTORS					
History of psychosis[4]	x			5	3
Current psychosis[5]	x			3	3
Past psychiatric hospitalization[6]	x			3	3
Not Treatment adherent at time of offense[7]	x			5	5
SUM OF SUBSIDIARY FACTORS:	**4/4**	**0/4**		**16/20**	**14/20**
OPINION:					
Substantial cognitive impairment	x			5	5
Substantial volitional impairment	x			5	5

*Credibility of evidence (1-low, 3-medium, 5-high); ** Relevance (1-low, 3-medium, 5-high)

EVIDENCE SOURCES

Source[1] self-report, arrest reports, audio-taped interrogation
Source[2] self-report, police records
Source[3] self- report, audio-taped police interrogation
Source[4] clinical examination, medical records, jail records
Source[5] clinical examination

FIGURE 2 | Criminal responsibility predictors checklist based on evidence sources. *Credibility of evidence (1—low, 3—medium, 5—high); **Relevance (1—low, 3—medium, 5—high). Evidence sources: [1]self-report, arrest reports, audio-taped interrogation; [2]self-report, police records; [3]self-report, audio-taped police interrogation; [4]clinical examination, medical records, jail records; [5]clinical examination; [6]medical records; [7]self-report, collateral report. Opinion: The decision model indicates that the criminal conduct involved a loss of behavioral self-control due to acute Methamphetamine Intoxication and Methamphetamine-induced psychotic disorder. There are strong suspicions that defendant was psychotic *prior* to the offense due to his previous chronic ice use, clinical history, and report of collaterals. It is more likely than not that the defendant's cognitive and volitional capacities were substantially impaired at the time of the offense as a result of methamphetamine-induced psychotic disorder and acute methamphetamine intoxication.

and credibility of collected (**Figure 2**), and *post-hoc* analysis of final opinions (**Figures 3**, **4**).

Research across a range of fields has demonstrated improved decision making accuracy for structured over holistic methods (Monahan, 2008; Faust and Ahern, 2012; Kuncel et al., 2013; Neal and Grisso, 2014a; Hart et al., 2016). Unstructured clinical judgment is degraded because judges are inconsistent in how they weigh cues, and combine, and weigh information across targets (Kuncel et al., 2013). Variable attention to salient cues and inconsistent application of weights yields inferior predictive power compared to structured combination of fixed predictors. The innovation proposed here is an application of a SPJ decision model to MSO data and forensic opinions in an effective, user-friendly procedure. In contrast to fears that a structured prediction model is rigid, cumbersome, or overly technical (which have been identified as sources of clinician resistance to structured methods; Vrieze and Grove, 2009; Lilienfeld et al., 2013), the proposed model focuses on the reduction of data collection to the most powerful predictors central to the legal standard using a simple worksheet format (Meijer et al., 2020; see **Figure 2**).

For the predictor aggregation task, simple actuarial formulae based on a few variables equal or exceed the level of accuracy achieved through clinical judgment (Dawes et al., 1989). Further, identification of robust predictors "is more important than trying to determine differential weights or discern patterns among those variables" (Faust and Ahern, 2012, p. 201). Simply adding variables together using linear composites or assigning equal unit weights is superior to attempting to optimize weights (Faust and Ahern, 2012).

Additionally, the model described here applies a *post-hoc* analysis to systematically control for confirmatory bias, using an evidence weighing model: the Analysis for Competing Hypotheses (ACH; Heuer, 1999, 2005). The ACH is a structured analytic technique developed by the CIA as a tool for analyzing complex, ambiguous data under conditions of uncertainty in intelligence analysis. The ACH matrix contains the set of evidence-based predictors derived from the scientific literature,

ACH Decision Matrix – KDC Case Application

#	Predictors	Type	Credibility	Relevance	NGRI	NOT NGRI
E1	Psychosis at Time of Offense: present	Primary Factor	HIGH	HIGH	CC	II
E2	Hallucinations at Time of Offense: present	Primary Factor	HIGH	HIGH	CC	II
E3	Delusions at Time of Offense: present	Primary Factor	HIGH	HIGH	CC	II
E4	Substance Intoxication at Time of Offense: present	Primary Factor	HIGH	HIGH	II	CC
E5	Substantial Cognitive Capacity Impairment: present	Primary Factor	HIGH	HIGH	CC	II
E6	Substantial Volitional Capacity Impairment: present	Primary Factor	HIGH	HIGH	CC	II
E7	Absence of Current Psychosis (on medications)	Subsidiary Factor	HIGH	MEDIUM	C	I
E8	History of Psychiatric Hospitalization: present	Subsidiary Factor	HIGH	HIGH	C	I
E9	Medication Adherence at Time of Offense: absent	Subsidiary Factor	HIGH	HIGH	C	I
	Weighted Sum Rating				**-4.00**	**-24.83**

FIGURE 3 | ACH decision matrix—KDC case application. CC, very consistent; C, consistent; N, neutral; NA, not available; II, Very Inconsistent; I, inconsistent. The primary hypothesis based on the court's question: Were the defendant's cognitive and/or volitional capacities substantially impaired due to mental disorder at the time of the offense (NGRI)? The logic of ACH is to *disprove* the primary hypothesis (i.e., prove the alternative hypothesis). The alternate hypothesis is that defendant's cognitive and/or volitional capacities were *not* impaired at the time of the offense (not NGRI). The weight of the evidence is against not NGRI (weighted sum rating = −24.83). Conclusion: The best explanation based on the available evidence is that KDC was not criminally responsible (Not NGRI) at the time he committed the offense.

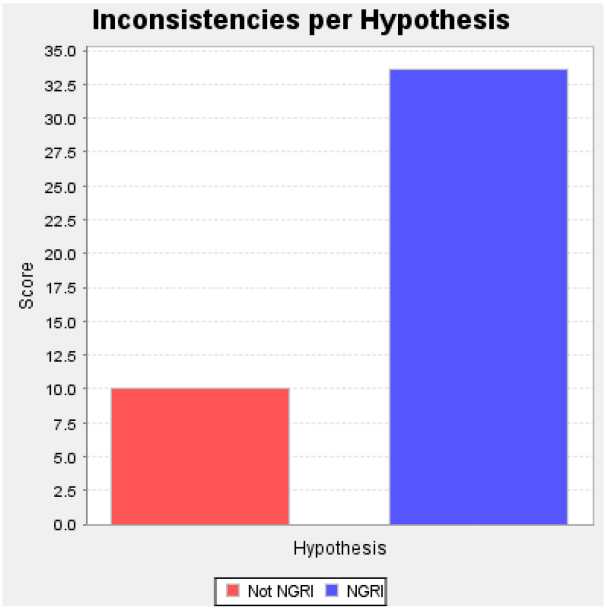

FIGURE 4 | Graphic representation of KDC case ACH.

and case specific clinical postulates which are assigned weights in a decision matrix. A computer interface allows for manipulation of variables and their respective weights. The application of the ACH to a structured clinical judgment decision model corrects concerns about unstructured clinical data aggregation and judgment. Since the methodology is designed to specifically counter confirmation biases, the model analyzes data which disconfirms the primary hypothesis (namely, that the defendant is not criminally responsible). It is also useful for an assessment of the reliability and credibility of evidence. The matrix reduces the gap between clinical and forensic data and opinions by systematically testing hypotheses in the final stage of the CR opinion process (**Figure 3**).

Based on the proposition that both structured data collection and mechanical prediction make independent contributions to accuracy (Faust and Ahern, 2012, p. 158), the proposed CR structured prediction model advocates the use of:

a) checklists for structured application for procedures (**Figure 1**);
b) structured data gathering organized around a priori predictors[2];
c) data aggregation utilizing predictors using an unweighted aggregation model (**Figure 2**); and
d) structured analytic techniques to consider evidence sources, credibility and relevance and *post-hoc* hypothesis testing using the ACH (Heuer, 1999, 2005, **Figure 3**).

[2]The predictors are derived from the forensic behavioral science research literature (Warren et al., 2004) focused on the strongest empirical indicators for criminal responsibility tied to Hawaii's two-pronged insanity statute (substantial impairment in cognitive and/or volitional capacities at the time of the offense; Hart et al., 2016).

The application of the SPJ model to CR forensic decision-making provides a systematic, individualized, and evidence-based exposition and analysis of factors supporting the forensic judgment.

CASE STUDY

KDC was referred by his public defender for a CR[3] and competency to stand trial evaluation. KDC is a 21-year old man accused of murdering 46-year old IL, a visitor to his house, by stabbing him multiple times in the chest. He killed IL as they were sitting on the lanai outside KDC's home (his mother was in an adjoining room watching TV), stabbing him suddenly and violently without warning. KDC and IL had smoked crystal methamphetamine ("ice") immediately before the stabbing, and also the day before. KDC immediately fled the scene in his mother's car "to go into the mountains" but turned himself into police several hours later after his cousin told him to "man up." IL was living in a homeless camp behind the house and he was a frequent visitor to the residence. IL knew KDC's mother and she sometimes gave him food. IL was deaf. According to KDC, IL would come over when he was not home, or when he was sleeping, and "invade" KDC's space. He showed "disrespect" by walking in the house with mud on his slippers. KDC thought IL was stealing from him. KDC admitted there had been a couple of previous hostile encounters with IL but no physical violence. He admitted that he was frightened by IL, who carried homemade weapons made of bicycle parts.

When asked why he had killed the decedent, he could not describe his thoughts or feelings, only that "something had built up" inside of him and then "I just did it." Immediately before the stabbing, he had overheard IL telling his mother that someone was hanging dogs and cats in the woods behind the house, which angered him because it upset his mother. Around 17:00 h the decedent walked to the back lanai by himself to smoke "clear." KDC discussed what IL had said to his mother. His mother thought KDC was acting "strange." From the police interrogation transcript, when asked why he killed him, KDC reported that "I just got weak." He denied feeling angry at the decedent or frustrated, "…just weak, and I could not feel my arms." The detective wrote, "He said it was a buildup of the decedent's behaviors and he just got weak and could not tolerate them anymore" and he stabbed IL multiple times in the chest.

The Emergency Department medical clearance conducted at a local hospital several hours after the stabbing indicate altered mental status (i.e., psychosis). The police interrogation and closing investigative reports conducted the next day demonstrated bizarre thinking. Jail mental health records

[3]Hawaii's two prong insanity statute is based on the ALI Model Penal Code. Hawaii Revised Statutes §704–400: Physical or mental disease, disorder, or defect excluding penal responsibility. A person is not responsible, under this Code, for conduct if at the time of the conduct as a result of physical or mental disease, disorder, or defect the person lacks substantial capacity either to appreciate the wrongfulness of the person's conduct (cognitive capacity) or to conform the person's conduct to the requirements of law (volitional capacity).

described psychotic mentation and he was started on antipsychotic medications. By the time of the examination his symptoms had remitted. Both police and ER medical reports described his behavior as "strange," that his affect was odd, and that he was talking non-sensically. KDC made an audio-recorded and transcribed statement to a police detective the next day describing the stabbing in detail. He said he was afraid that IL was going to kill him and his mother, if he did not kill him first. The mother stated that she was afraid of KDC in the days prior to the stabbing, that his thinking and behavior were strange and frightening, thinking that he might "erupt" at any minute. She reported that he had been up at night, that his manner was agitated and suspicious, that he was hearing "things," and looking outside the house saying that "someone was out there." She had observed KDC's psychotic behavior many times over a period of months. She was extremely worried that he had stopped going to treatment, was not taking his antipsychotic medications and that something bad could happen.

KDC has a well-documented history of multiple psychiatric hospitalizations, the great majority of which involved flagrantly bizarre behavior (walking in traffic, raving in public) associated with positive methamphetamine toxicology screens. The record includes records from several psychiatric hospitalizations for methamphetamine-induced psychotic disorder[4]. Prior to the time of the stabbing, he was intermittently working construction labor and participating in an IOP while on probation for earlier drug possession (marijuana) and weapons charges (carrying a knife). His mother said few weeks before he stopped going to work, attending the program, and taking his medications (Seroquel 400 mg at bedtime). His behavior deteriorated. On clinical exam, he had been in jail about 4 months. He had been prescribed Seroquel in jail but stopped taking it the previous week. He had been seen by psychiatry and mental health who described no current clinical psychosis. He was housed in the general population.

A psychological assessment indicated borderline intellectual abilities, no current clinical signs of psychosis, including negative findings on a Rorschach Test. His PAI was invalidated due to over reporting. The case material and clinical assessment material were coded using the PANSS (at time of offense and at assessment) and RCRAS. The PANSS profile indicated the presence of positive symptoms: hallucinations and or delusions at the time of the offense. The RCRAS indicated the offense involved loss of control under the influence of acute methamphetamine intoxication and chronic methamphetamine psychosis (see note 4 below). At the time of the forensic examination, his symptoms had remitted but to cessation of methamphetamine and medication compliance.

RESULTS

Figures 1–**3** illustrate the procedural checklist, decision model worksheet, and hypothesis testing matrix. **Figure 1** is the procedural checklist. **Figure 2** illustrates the structured predictive model. The aggregated decision rule makes the elements of the decision explicit. **Figure 3** illustrates the ACH *post-hoc* hypothesis testing matrix. The matrix has summary weighted scores based on degree of consistencies and inconsistencies with the primary and alternate hypotheses. Individual a priori predictors and evidence sources are rated with respect to predictor credibility and relevance. The logic of ACH is examination of data which *disprove* the primary hypothesis (that KDC was CR). **Figure 4** illustrates a graphic representation of the weight of the evidence.

In terms of the Hawaii two-prong insanity statute, the SPJ aggregation model and review of evidence presented in **Figure 2** indicates that the defendant's cognitive abilities and volitional capacities were substantially impaired by acute methamphetamine intoxication and pre-existing methamphetamine-induced psychosis. Under Hawaii statutes, voluntary intoxication does not excuse criminal conduct and is not eligible for an insanity defense.[5] However, a recent Hawaii Supreme Court decision reiterated the doctrine of permanent or "settled insanity" (the presence of persistent psychosis after acute drug intoxication has stopped) and examiners and judges had to consider whether the defendant was psychotic *prior* to the acute intoxication and commission of the crime. Given the weight of the predictors and the evidence, *post-hoc* hypothesis testing indicates a high degree of confidence may be placed in the findings, and the opinion may be proffered to a reasonable degree of psychological probability.

Based on the credibility and relevance ratings, the evidence database is sufficient to render legally admissible opinions under the Hawaii Rules of Evidence (which follow the Federal Rules of Evidence on the admissibility of expert testimony). The evidence aggregation model (**Figure 2**) yielded five positive and zero negative results on the primary factors based and four positive and zero negative results on the subsidiary factors on credible and relevant information, yielding the opinion that KDC's cognitive and volitional capacities were substantially impaired by acute methamphetamine intoxication and pre-existing methamphetamine-induced psychosis.

The final CR decision derived from the SPJ approach parallels summary risk ratings (SRR) in violence risk assessment instruments, although it does not yield a numerical value. The final CR decision may be applied to any clinically derived final judgment to yield a total score (based on the frequency weights from the primary and subsidiary predictors; **Figure 2**). While most SPJ risk measures yield a SRR of low, moderate,

[4]A substantial minority of chronic methamphetamine users develop a psychosis resembling paranoid schizophrenia (described as a toxic paranoid-hallucinatory state) which persists after cessation of acute intoxication (Sato, 1992; Acklin, 2016).

[5]HRS 702-230: Evidence of self-induced intoxication of the defendant is not admissible to negative the state of mind sufficient to establish an element of the offense. Self-induced intoxication means intoxication caused by substances which the defendant knowingly introduces into the defendant's body, the tendency of which to cause intoxication the defendant knows or ought to know. However, a recent Hawaii Supreme Court decision (Hawaii vs. Abion 146 Hawaii 230) reiterated the doctrine of permanent or "settled insanity" (the continuing presence of psychosis after drug use has stopped) and that examiners and judges had to consider whether the defendant was psychotic *prior* to using drugs. Voluntary intoxication is not a defense unless it produces permanent insanity.

or high, in the model advocated here, based on abductive reasoning (Ward and Haig, 1997), the evaluator reaches a decision with a low, moderate, or high degree of confidence in the decision based on the explanation that best supports the opinion.

The SPJ decision model has insufficient discrimination to address the challenging question whether KDC may have been suffering from a primary psychotic disorder (e.g., schizophrenia) vs. persistent methamphetamine-induced psychosis at the time of the offense (McKetin et al., 2017; Wearne and Cornish, 2018)[6]. The record does indicate the presence of a pre-exiting psychosis. The decision model explicitly describes the evidence basis, method of analysis, decision making rule, with a hypothesis testing procedure (ACH, **Figures 3**, **4**) to control for confirmation bias. These procedures integrate a local clinical scientist orientation to forensic decision-making (Stricker and Trierweiler, 1995) utilizing SPJ principles.

CONCLUSION

This paper is a pilot description of a structured prediction model for CR opinions applying the principles of SPJ and a transparent data aggregation procedure. Key issues in the CR prediction model include the (1) use of checklists to outline and standardize procedures; (2) structured data collection focused on robust *a priori* predictors, (3) reliable retrospective clinical diagnosis at the time of the offense, (4) structured data aggregation, (5) linkage between clinical, functional, and legal elements, and (6) *post-hoc* hypothesis testing of case data. The value of the structured decision model is the *a priori* specification of robust predictors, weighting of evidence using relevance and credibility ratings, application of predictors to case material, and a *post-hoc* hypothesis testing procedure to verify opinions, and reduce confirmatory bias. The model externalizes what forensic clinicians already do in an explicit structured procedure. The methodology, based on robust SPJ principles, adheres to a core empirical foundation. A similar methodology may be applied to other forensic decision-making tasks, e.g., competency to stand trial or post-acquittal conditional release.

[6]McKetin et al. (2018) examined 554 current methamphetamine users using the Composite International Diagnostic Interview finding a distinction between schizophrenia and methamphetamine-related psychotic symptoms both in terms of propensity to experience psychotic symptoms and symptom profile (p. 1).

Judgment is inevitable in the forensic decision making process. The application of SPJ methodology, including use of empirical guidelines, and rigorous hypothesis testing closes but does not eliminate the gap between evidence and decision. The SPJ methodology organizes and structures the assessment process. The aggregation of empirical predictor model yields sturdy evidence-based decisions. The ACH provides *post-hoc* control for hypotheses testing and control for confirmation biases. It makes explicit the strengths and weaknesses of the evidence and decision model, assists in the use of the model as probative evidence, and reduces but does not eliminate the gap between data and inference making.

SUMMARY AND FUTURE RESEARCH DIRECTIONS

This report provides a conceptual foundation for SPJ decision making for forensic CR opinions. The aim of the project is the "translation and dissemination of the science of risk assessment into the field where such evaluations regularly occur" (Guy et al., 2015, p. 75). The paper describes a pilot project applying the SPJ model to an actual forensic case. Further steps in developing the empirical properties of the model are necessary, including testing with practitioners, reliability and accuracy assessments, and ease with which the model can be acquired by field practitioners. This preliminary model will require empirical testing to demonstrate that forensic practitioners can be trained and apply the model to a set of insanity cases utilizing identical case information, comparing conventional unstructured clinical and SPJ methods. This will be necessary to test whether the application of a SPJ decision model accuracy of judgements and enhances level of inter-rater agreement and provides more accurate CR opinions. The model can be applied to other types of forensic mental health evaluations, (e.g., competence to stand trial, post-acquittal conditional release).

DATA AVAILABILITY STATEMENT

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

AUTHOR CONTRIBUTIONS

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

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Immigrant Patients Adapt to the Culture of Admission and Experience Less Safety in Forensic Psychiatric Care

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Patients with an immigrant background are overrepresented in forensic psychiatric hospitals. As a result, daily work is impeded by language barriers and cultural differences. Furthermore, general therapy processes have not yet been adapted to this special patient population, and little reliable knowledge is available. All immigrants go through an acculturation process, which is related to their mental well-being. Four acculturation strategies exist: integration, separation, assimilation, and marginalization. The strategy chosen depends on the extent of someone's orientation toward their country of origin and the country of admission. The current study aimed to expand knowledge of forensic patients with a migration background in Germany by evaluating their self-reported acculturation processes and associated individual and social factors, e.g., the ward climate. Therefore, we studied forensic patients with a migration background from 11 forensic hospitals in Bavaria, Germany. Besides completing the Frankfurter Acculturation Scale (FRACC) and Essen Climate Evaluation Schema (EssenCES), the participants provided information on their clinical and biographical history. We recruited 235 patients with a migration background and found that the participants oriented themselves more toward the culture of admission and less toward the country of origin than the reference sample did. Moreover, the patients experienced significantly less safety on the ward than the forensic reference sample did. A possible explanation for the patients' orientation is the lack of possibilities to adhere to their cultural traditions. Patients may feel less safe because of their limited knowledge of German and cultural misunderstandings.

Keywords: acculturation, migration background, forensic psychiatry, ward climate, integration, experienced safety

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INTRODUCTION

Germany has developed into an immigration country through various cycles of immigration, i.e., the influx of guest workers in the 1960s and 1970s, the ethnic German late repatriates from countries such as Russia between 1988 and 2000, refugees from the former Yugoslavia since 1993, and refugees from Syria and elsewhere since 2014 (Krahl and Steinböck, 2015; Statistisches Bundesamt, 2020). By 2019, the proportion of people with a migration background

had increased up to roughly one fourth (25.5%; 20.8 million) of the general German population (Statistisches Bundesamt, 2020).

Surveys show that migrants are overrepresented in forensic psychiatric hospitals compared to the general population. Bulla et al. (2018) report a rate of 35.6% for the state of Baden-Württemberg, while the proportion of migrants in the general population in this state was 28% in the same year, 2015 (Statistisches Landesamt Baden-Württemberg, n.d.). Already data from the years 1990–1999 showed increased proportions of patients with a migration background in forensic psychiatry compared to the general population (Hoffmann, 2006).

The goal of forensic psychiatric hospitals is to protect the general population by enhancing the mental health and well-being of patients so that they can be reintegrated safely into society (Müller et al., 2017). Thus, patients require appropriate medical attention and therapy. Patient needs can vary significantly depending on their diagnosis and the reason for their treatment. In general, patients in German forensic institutions are accommodated under one of two sections of the German criminal code, Section 63 and 64 (Müller et al., 2017). Section 64 is the more frequently used one and applies to patients whose criminal offense was influenced by drug abuse or -dependence and is limited to two years. Section 63 applies to patients who were found to have no or diminished responsibility for their offense because of a lack of insight and/or accountability due to mental illness, profound disturbance of consciousness, intellectual deficiency, or another mental issue (Section 20, 21 of the German criminal code). Whereas patients sentenced under Section 64 of the German criminal code all have a diagnosis of substance abuse or dependence, often combined with a comorbid disorder, patients sentenced under Section 63 have a much larger range of diagnoses, such as schizophrenia spectrum disorder, personality disorders, and learning deficits. Consequently, the therapeutic programs differ between and within wards for patients sentenced under the two sections.

Cultural background affects patient groups to a different extent, and insight and perspectives on psychological well-being differ not only between cultures but also between religions and psychological disorders. For instance, a study by Angermeyer et al. (2016) showed differences between North African and German perspectives and stigmas toward schizophrenia spectrum disorder. In national population surveys, Tunisians ascribed the disorder to psychosocial causes, whereas Germans believed that the cause was found in the brain. Moreover, Tunisians believed more frequently that the affected person bears responsibility for the onset of and recovery from the illness and that a normal life is possible after recovery. Furthermore, the inhabitants of the two countries differed in the amount of contact they desired with people with psychosis. Interestingly, Tunisians made a clear distinction between distant relationships (e.g., if the affected person is a neighbor or co-worker) and family-related relationships. In contrast, Germans reported wanting the same amount of social distance independent of the type of relationship. Overall, Angermeyer et al. (2016) showed that the two cultures differ not only in their perspective on the illness itself, including onset and recovery, but also in their stigmas and behavior toward affected persons. Hence, cultural differences seem important for psychoeducation of patients, for preparing them for reintegration into their family and society and for their associated expectations.

As mentioned above, Germany has been a destination for immigrants for several decades. People immigrate for a variety of reasons. In general, the empirical literature defines three forms of migration (Liedl et al., 2017): (1) migration can be perceived as an opportunity for better employment or life circumstances, e.g., the guest workers who migrated to Germany from Italy in the 1960s and 1970s; (2) migration can happen as a self-decided reaction to crisis situations, e.g., the refugee movements from Syria; and (3) migration can be involuntary, violent, and forced, e.g., the expulsion of the Rohingya from Myanmar. Thus, the reason for and experience of migration can vary greatly between immigrants, as can the associated challenges and stresses they experience. For instance, immigrants who are forced to leave their country because of life-threatening circumstances are more likely to have experienced traumatic events and thus are more vulnerable for developing mental health problems such as posttraumatic stress disorder (Steel et al., 2009). Overall, immigrants often have difficulties achieving socioeconomic stability and establishing social networks, which can also affect their mental health (Hofmeister, 2014).

After leaving the country of origin, the migration process continues with the acculturation process in the culture of admission. The prevailing acculturation model published by Berry (1990) proposes four different strategies with which an immigrant may acculturate to a new culture (see **Figure 1**): (1) *assimilation* describes the process in which an immigrant completely adapts to the host culture and gives up the values of the culture of origin; (2) *integration* describes the combination of adjusting to the new culture while adhering to the norms of one's culture of origin; (3) *separation* is the demarcation from the host culture and maintenance of the principles of the culture of origin; and (4) *marginalization* is the complete isolation from both the host culture and the culture of origin. Acculturation processes can lead to extremely high stress levels, also called "acculturation stress" and thus are related to immigrants' psychological well-being (Berry, 1994; Schmitz, 1994; Haasen et al., 2007).

Overall, for immigrants living in the general population, integration is associated with better psychological well-being than the other three strategies (Berry, 2006; Sam and Berry, 2006; Berry and Sabatier, 2010; Ince et al., 2014; Han et al., 2016). Selten and Cantor-Graae (2005) explain that integrated individuals have more cultural resources to rely on when coping with stress and anxiety.

By the time immigrants arrived in the country of admission, nothing can be done about the act of or reason for migration. However, the acculturation process is still adaptable, so more research is needed to identify contributing factors that may facilitate the adaptation phase and increase mental resilience. Especially in forensic psychiatric hospitals, where mental health is the top priority, knowing the role acculturation processes play is of great importance. The empirical literature on psychotherapy with patients with a migration background clearly recommends that therapists are culture- aware and knowledgeable about the different cultural perspectives on mental health and therapy (Machleidt, 2002; Behrens and Calliess, 2008; Liedl et al., 2017).

		Is it considered to be of value to maintain relationships with other groups?	
		Yes	No
Is it considered to be of value to maintain cultural identity and characteristics?	Yes	Integration	Separation
	No	Assimilation	Marginalization

FIGURE 1 | Model of four acculturation strategies. Adapted from Berry (1992).

Hence, newly gained information on acculturation strategies and related factors in forensic patients can be used to design therapy and rehabilitation plans that take acculturation processes into account.

Having a variety of cultural backgrounds, languages, and therapy perspectives on a forensic psychiatric ward takes a toll on the ward atmosphere (Hoffmann, 2006). In a study of prison inmates, Lutz et al. (2019) showed significantly more distress in migrants who had poor or no social relationships with fellow inmates and in those who were more afraid of experiencing crime. Interestingly, migrants in that study stated that they were less likely than native citizens to be victims of crimes in prison, such as being blackmailed, robbed, humiliated, sexually abused, or raped. Thus, even though migrants experienced less crime, they had a greater fear of it. According to the authors, one possible explanation might be that migrants take violence personally and interpret it as a kind of discrimination whereas native citizens attribute conflicts with others to the rough living conditions in prison.

Because few studies have examined the process and effects of acculturation in patients with a migration background in forensic psychiatric hospitals, the current study aimed to explore both the acculturation strategies of such patients and immigrants' perception of the social atmosphere on the ward in forensic institutions in Bavaria, Germany.

MATERIALS AND METHODS

Participants

Participants were forensic inpatients with a migration background. They were recruited between May 2020 and February 2021 from eleven different forensic psychiatric hospitals in the state of Bavaria, Germany.

Materials

Assessment of Sociodemographic, Clinical, and Legal Data

Participants provided sociodemographic, clinical, and legal information by completing a self-report questionnaire. The questionnaire comprised questions about age, sex, education, nationality, parents' nationality, residence status, current residence, the criminal code under which their placement in forensic psychiatry had been ordered, diagnoses, index offense and criminal record.

Frankfurt Acculturation Scale

This German scale by Bongard et al. (2020) captures acculturation strategy, according to the model from Berry (1990), on the two scales "orientation to the culture of origin" (OC) and "orientation to the culture of admission" (AC). For the purpose of constructing, analyzing, retesting and norming, 22 different subsamples have been aggregated to 4 main samples. The construction sample consisted of 305 first-generation migrants (52% female; M_{age} = 38.3 years, SD_{age} = 14.5 years), from Bosnia, Iran and South Korea. The sample for analyses contained 2,516 participants from over 45 different countries (59% female; M_{age} = 38.3 years, SD_{age} = 13.1 years). The retest-sample included 175 first- and second-generation migrants with different nationalities (61% female; M_{age} = 33.4 years, SD_{age} = 12.6 years). The retest-reliability was tested at intervals of two, four, and six weeks. The last main sample was the reference-sample. Therefore 3,079 first- and second-generation immigrants to Germany (61% female; M_{age} = 37.1 years, SD_{age} = 12.9), mostly from Turkey, Poland, Bulgaria, Iran, Bosnia, Morocco, Korea, and Latin America were evaluated.

The questionnaire consists of 20 questions, that are answered on a seven-point Likert scale (ranging from 0 = completely incorrect to 6 = completely correct). To evaluate the responses, the sum of each scale is calculated, and the dominant acculturation strategy (integration, assimilation, separation, or marginalization) is determined by a median-split technique. To interpret the results, we compared them with the results of the norming-sample reported by Bongard et al. (2020). Bongard et al. (2020) found good internal consistency (HC, α = 0.86 and AC, α = 0.85) and retest-reliability (HC, r_{tt} = 0.86, and AC, r_{tt} = 0.73) of the scale.

Essen Climate Evaluation Schema

This questionnaire, which was developed for forensic psychiatry contains 15 items that measure the ward climate with three

scales: therapeutic hold (α = 0.86), patients' cohesion and mutual support (α = 0.78), and experienced safety (α = 0.79; Schalast and Tonkin, 2016). The scale therapeutic hold contains items like "staff know patients and their personal histories very well" (Schalast and Tonkin, 2016) and measures how stable the therapeutic relationship is and if the staff is devoted to the patients (Schalast, 2008). "The patients take care of each other" (Schalast and Tonkin, 2016) is an example for an item of the patients' cohesion and mutual support-scale, which measures the existence of a therapeutic companionship (Schalast, 2008). And the third subscale experienced safety can detect how personally safe the patients feel, contrary to go through aggressiveness or violence. An example is: "there are some really quite threatening situations here." The items are rated on a five-point Likert-scale ranging from 0 (completely incorrect) to 5 (completely correct). For the analysis, sum scores are computed and interpreted by means of quintiles, which have been normed on the basis of 1,302 patients of 102 wards across 31 German forensic psychiatric hospitals. The wards had different security levels and the patients were detained according to section 63 or 64 of the German Penal Code. The factor structure was verified for forensic samples, and the convergent validity was supported by moderate correlations (r = 0.47–0.78; Schalast and Tonkin, 2016).

Procedure

The study was approved by the Ethics Committee of the University Ulm, Germany (approval no. 145/19). We then contacted all forensic psychiatric institutions in Bavaria, Germany, informed them about the content and aims of the study and asked whether they were interested in participating. If they agreed to participate, the contact person was asked to provide anonymized advance information about the patients (e.g., native language, country of origin, whether patients are literate, etc.) via e-mail. This information was used to prepare the study materials. Translations of the questionnaires were made by a professional translating agency, Toptranslation GmbH, Hamburg, Germany. Afterward, appointments for data collection were agreed upon with the institutions.

For data collection, research assistants visited the wards at the institutions, which provided a separate room for testing. Patients were informed orally about the research project and told about the applicable privacy policies and that participation was voluntary. They were given a written information sheet and sufficient time to ask questions and decide whether they were willing to participate. If patients were not literate in German but were literate in their native language or another language, they were given the information sheet, informed consent form, and questionnaires written in that language. 20% (n = 47) used the material in a translated version, mostly English, Persian and Arabic, therefore 80% (n = 188) were able to conduct the study in German. For patients who were not literate in German, their native language, or any other language, all documents were read out loud by the research assistants in German or English. This method was used in only 14% (n = 33) of the cases, 86% (n = 202) completed the questionnaires themselves in written form. Patients who were not literate in any language and did not speak or understand any spoken German or English were excluded from participation. Participants received the questionnaires only after signing the informed consent form and were able to withdraw their consent to participate at any time without giving a reason.

Data Analysis

Data were analyzed with IBM SPSS Statistics for Windows Version 27 (Armok, NY, United States, IBM Corp.). For descriptive statistics, absolute and relative frequencies, mean values, standard deviations, and ranges were calculated. Crosstabs were used to generate contingency tables and describe interactions. The current sample was compared with the sample provided in the manuals by a one-sample t-test, and subgroups were compared by t-tests for independent samples. Differences in duration of hospital stay, years in Germany, age and quotient of years in Germany/age between patients with different acculturation strategies (marginalization, separation, integration, and assimilation) were analyzed using the Kruskal–Wallis test. Further, Spearman-correlations were computed between the orientation toward the country of admission/origin and the duration of hospital stay, years in Germany, age and the quotient of years in Germany by age.

RESULTS

The sample consisted of 235 forensic inpatients with a migration background, including 186 first generation immigrants, who were not born in Germany and 49 second generation immigrants, whose parents or at least one parent was not born in Germany. A total of 60 men and 3 women were detained according to Section 63 of the German penal code (patients with severe mental disorders), and 150 men and 7 women were detained according to Section 64 (patients with substance use disorders). The sociodemographic and forensic-psychiatric characteristics of the participating patients with migration background can be seen in **Table 1**.

Acculturation

No differences were found between patients detained according to Section 63 or 64 concerning their acculturation strategy (Fishers exact test, p = 0.541), their orientation toward Germany (t (215) = −1.49, p = 0.138, M_{t_63} = 50.1 vs. M_{t_64} = 52.3), or their orientation toward their country of origin (t (216) = 1.19, p = 0.236, M_{t_63} = 43.7 vs. M_{t_64} = *42.0*). Compared with persons in the above-mentioned reference sample of Bongard et al. (2020), the patients of the current sample oriented themselves more toward the country of admission (t (229) = 2.46, p = 0.015, M_t = 51.6 vs. $M_{t,Bongard}$ = 50.0) and less toward the country of origin (t (230) = −12.04, $p < 0.001$, M_t = 42.4 vs. $M_{t,Bongard}$ = 50.0). Acculturation strategies were not different between first- and second-generation immigrants [Chi^2 (3) = 1.18, p = 0.759]. The acculturation strategies of the sample are shown in **Figure 2**.

As can be seen in **Table 2** patients with different acculturation strategies did not differ with regard to the duration of hospital stay, years in Germany, age and with regard to the quotient

TABLE 1 | Sociodemographic and forensic-psychiatric characteristics of the participants with a migration background.

	Statistics
Age[1], *M* (*SD*; range), (years)	33.1 (8.37; 19–64)
Years at school[2]	9.4 (3.42; 0–18)
Years in Germany[1], *M* (*SD*; range)	
First-generation immigrants	13.8 (10.55; 1–53)
Second-generation immigrants	29.8 (7.38; 13–48)
Years in Germany/age[3] *M* (*SD*; range)	
First-generation immigrants	0.40 (0.28; 0.03–1.00)
Second-generation immigrants	0.98 (0.07; 0.59–1.00)
Native language, *n* (%)	
Russian	41 (17)
Turkish	26 (11)
Arabic	27 (12)
Persian	18 (8)
Romanian	15 (6)
German	15 (6)
Albania	13 (6)
Polish	13 (6)
Other language (35 languages, each < 4%)	67 (29)
Further language skills, *M* (*SD*; range)	2.0 (1.19; 0–7)
Duration of hospital stay[4] (months)	15.3 (25.25; 0.5–240)
Diagnosis, n (%)	
Substance use disorder	147 (62)
Schizophrenic disorder	46 (19)
Personality disorder	20 (8)
Other diagnosis	24 (10)
Index offense[5], *n* (%)	
Homicide	13 (6)
Robbery	25 (11)
Aggravated assault	73 (32)
Sexual assault	13 (6)
Fraud/Theft	14 (6)
Arson	5 (2)
Violation of the Narcotics Act	74 (33)
Other offenses	9 (4)

[1]*Missing data: n = 1.*
[2]*Missing data: n = 5.*
[3]*Missing data: n = 2.*
[4]*Missing data: n = 13.*
[5]*Missing data: n = 11.*

years in Germany/age. There were also no significant correlations between their orientation toward Germany and the duration of hospital stay ($r_s = -0.02$), years in Germany ($r_s = 0.12$), age ($r_s = 0.03$), or the quotient years in Germany by age ($r_s = 0.10$), nor between their orientation toward their country of origin and the duration of hospital stay ($r_s = 0.03$), years in Germany ($r_s = -0.08$), age ($r_s = 0.05$), or the quotient years in Germany by age ($r_s = -0.06$).

Ward Climate

The *t*-tests revealed no significant differences between patients detained according to Section 63 or 64 in the three subscales of the Essen Climate Evaluation Schema (EssenCES): therapeutic hold [t (216) = 0.83, $p = 0.41$, $M_{63} = 12.4$ vs. $M_{64} = 12.0$], patients' cohesion and mutual support [t (216) = 1.71, $p = 0.088$, $M_{63} = 12.2$ vs. $M_{64} = 11.1$], and experienced safety [t (216) = 0.32, $p = 0.752$, $M_{63} = 6.3$ vs. $M_{64} = 6.1$]. We compared the mean ratings of our sample with the quintiles of the forensic reference sample mentioned above (Schalast and Tonkin, 2016). In the current sample, therapeutic hold was rated as average, and patients' cohesion and mutual support were rated as clearly above average; in contrast, experienced safety was rated as clearly below average (**Figure 3**).

Statistical analyses confirmed the initial impression: Patients in our sample experienced safety to a significantly lower degree than patients in the reference sample [t (230) = −22.2, $p < 0.001$, $M = 6.2$ vs. $M_{\text{Norm}} = 13.1$]. The rating of patients' cohesion and mutual support was significantly higher in our sample than in the reference sample [t (230) = 3.61, $p < 0.001$, $M = 11.4$ vs. $M_{\text{Norm}} = 10.4$], but that of therapeutic hold was not different between the two samples [t (230) = 0.42, $p = 0.673$, $M = 12.1$ vs. $M_{\text{Norm}} = 12.0$]. First- and second-generation immigrants evaluated the scale therapeutic hold differently in that the former rated it more positively than the latter [t (230) = 2.88, $p = 0.004$, $M_{1st} = 12.4$ $M_{2nd} = 10.9$]. No differences were found in the other two scales [patients' cohesion and mutual support: t (230) = 0.29, $p = 0.769$, $M_{1st} = 11.5$ vs. $M_{2nd} = 11.3$; experienced safety: t (230) = 0.23, $p = 0.817$, $M_{1st} = 6.3$ vs. $M_{2nd} = 6.1$].

DISCUSSION

In this study, we explored both the acculturation strategies of patients with a migration background and patients' perception of the social atmosphere on the ward in forensic psychiatric hospitals in Bavaria, Germany. Our findings are discussed below.

Acculturation

Patients in our study were oriented more toward the country of admission and less toward the country of origin as compared with the reference sample. A possible explanation for this difference may be the different living circumstances of inpatients with a migration background and persons with a migration background in the general population. For instance, patients in forensic institutions have limited freedom to follow their cultural traditions and customs. E.g., the preparation of traditional meals is complicated by the fact that patients often receive prepared meals or do not have access to the full range of foods. Furthermore, research showed that mass media may not only facilitate adaptation processes by importing norms and values of the host culture but also help maintain a cultural connection with the culture of origin (Barnett and McPhail, 1980). However, patients in forensic institutions, can mostly only watch German TV programs or read German newspapers; hence, they are predominantly exposed to German culture and have fewer opportunities to connect with their heritage culture. Moreover, the frequency of cross-cultural contact was shown to be predictive of the adaptation to the host culture (Clément, 1986). Although immigrants in the general population may be able to live undisturbed in subcultures, patients in institutions

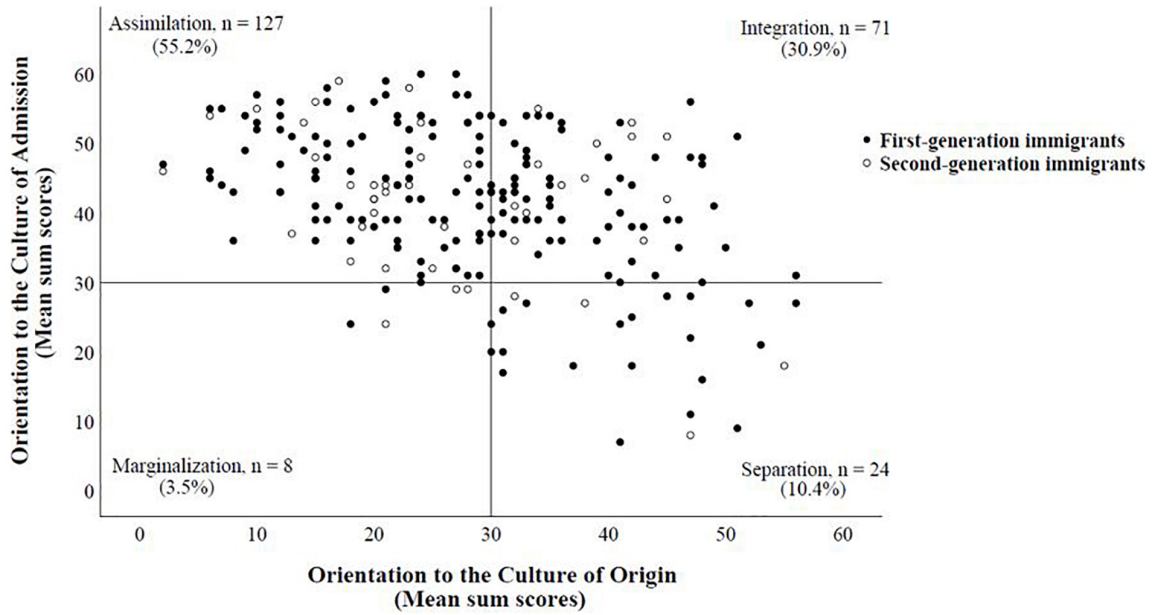

FIGURE 2 | Distribution of acculturation strategies among forensic psychiatric patients with a migration background ($N = 230$[1]). [1]Missing values: $n = 5$. Every dot represents the mean sum score of one patient, and the reference lines represent the center of the subscales on the Frankfurter Acculturation Scale (FRACC). The distance between a dot and the reference line reflects the strength of the respective acculturation strategy, i.e., the greater the distance, the stronger the respective acculturation strategy.

TABLE 2 | Differences in duration of hospital stay, years in Germany, age and quotient of years in Germany/age between patients with different acculturation strategies (marginalization, separation, integration, and assimilation).

	Marginalization *M* (*SD*)	Separation *M* (*SD*)	Integration *M* (*SD*)	Assimiliation *M* (*SD*)	Statistics Kruskal–Wallis-*H* *df* = 2
Duration of hospital stay (months)	16.89 (15.36)	15.08 (10.42)	15.89 (10.77)	18.09 (12.52)	2.32 $p = 0.509$
Years in Germany	11.50 (9.34)	16.15 (25.01)	19.70 (37.20)	13.11 (16.60)	0.31 $p = 0.959$
Age (years)	34.00 (8.32)	32.54 (7.03)	32.34 (9.06)	33.48 (8.19)	1.10 $p = 0.573$
Quotient (years in Germany/age)	0.52 (0.43)	0.48 (0.36)	0.50 (0.33)	0.54 (0.36)	1.05 $p = 0.790$

such as forensic psychiatric hospitals are forced to engage in the new culture and are at least approached in the language of the country of admission. Consequently, the inevitable contact with the host culture and the decreased opportunity to adhere to cultural traditions may result in inpatients with a migration background adapting more to the host culture than their counterparts living in the general population.

Ward Climate

The level of safety experienced by the patients in our sample was clearly below average compared with the forensic reference sample. In general, people tend to feel less safe, when they are unable to speak the language of the host country properly (Kearns and Whitley, 2015). Thus, patients with a migration background may not be able to understand, or explain a situation appropriately, and if necessary, defend themselves adequately. However, this theory does not fully explain our results, because we found no differences in the assessment of safety between first- and second-generation immigrants. Therefore, not only language difficulties but also culture-related misunderstandings could contribute to the patients feeling less safe (Kalengayi et al., 2016). These misunderstandings are the result of the underlying difficulties of living in a foreign cultural environment. Moreover, changes of culture *per se* increase migrants' overall stress (Bustamante et al., 2018) and could therefore lead to insecurity. Furthermore, racist experiences cannot be ruled out (Bhatia, 2020); institutional racism acts as a stressor (Bhugra, 2000) and may result in less experienced safety. In order to find out whether the lower experienced safety is due to cultural misunderstandings, qualitative interviews should be conducted with the patients. In doing so, the interviewers could also elicit whether and, if so, how often patients are exposed to racist

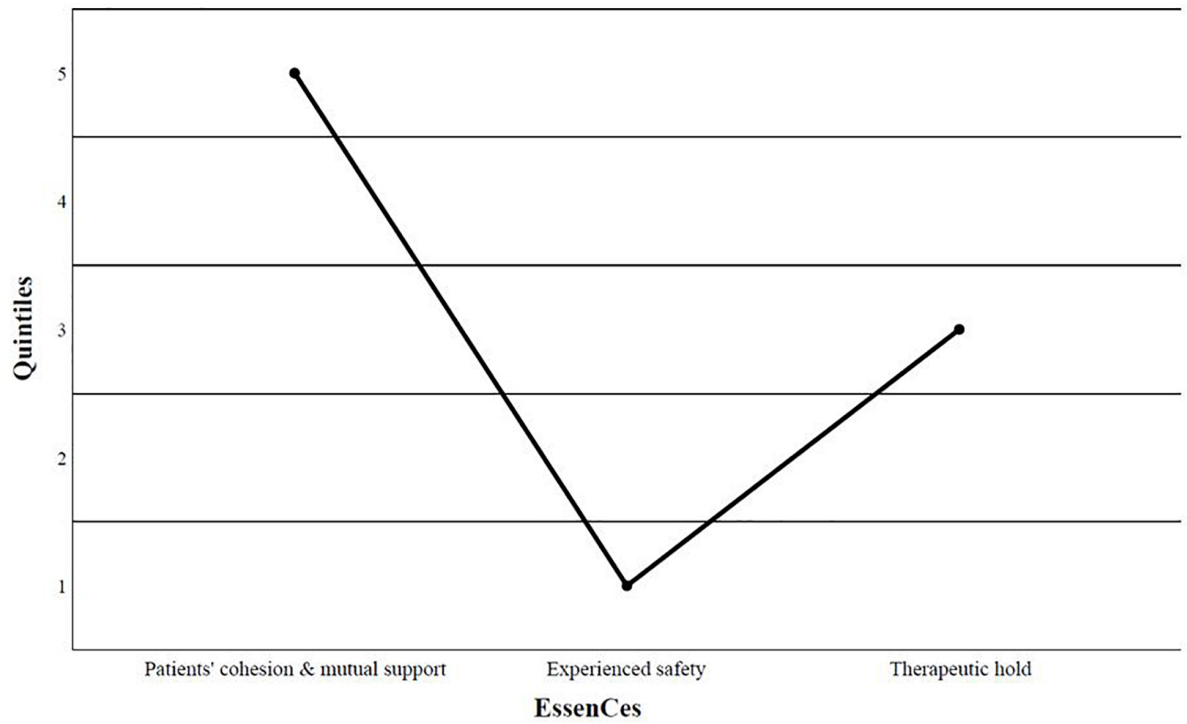

FIGURE 3 | Classification of the ward climate according to the qiiintiles of the forensic reference sample of Schalast and Tonkin (2016), (*N* = 236). Q1 = clearly below average, Q2 = somewhat below average, Q3 = average, Q4 = somewhat above average, Q5 = clearly above average.

experiences. In the literature it is described that the security level of psychiatric hospitals is another factor influencing individual experiences of safety (Efkemann et al., 2019). Efkemann et al. (2019) examined hospitals, with different ward settings and door policies, and were able to show that involuntarily committed patients rated the EssenCES' subscale "experiences safety" higher in an open setting compared to a facultatively locked and a locked setting. Others examined the impact of patient characteristics and were able to show that female gender or diagnosis of personality disorders or psychosis are associated with higher scores of experienced safety (Dickens et al., 2014). These factors should be considered in further studies with migrants.

Patients' cohesion and mutual support reported by patients with a migration background was significantly higher than in the reference sample and was clearly above average. This finding may be explained by a lack of trust of migrants toward official services and foreign health services as a result of their experiences (Priebe et al., 2016), which means that they may have to rely more on fellow patients. To test these hypotheses, patients' reasons for high cohesion would need to be explicitly asked. Another reason for the high scores in the patients' cohesion scale could also be that patients with a migration background seek more contact with fellow patients and form more friendships than others because their society of origin is oriented more toward collectivism in contrast to individualistic societies like Germany. This question could be answered in the context of a survey exploring the degree to which people in a society are integrated into groups (Hofstede, 1993). There was no difference in the measures of the therapeutic hold, meaning that patients with a migration background feel as supported by the therapists as the norm sample. This could be taken as a sign that therapists want to give every patient the same level of support, regardless of their migration background.

Limitations

This study has some limitations. First, all data were collected via self-report, which is likely to be influenced by social desirability bias and amnestic disorders. Social desirability is an important issue in studies conducted in forensic psychiatry and even more so in studies with persons with a migration background (Heeren et al., 2016). Even if participants were informed numerous times that the study was pseudonymized and that no personal data will be published, patients frequently expressed the fear that their answers will become known to the treatment team or other officials. Furthermore, the questionnaires used in the study posed a challenge for some of the patients, e.g., the Frankfurter Acculturation Scale (FRACC) seven-point Likert-scale was difficult to understand and participants therefore sometimes simplified it by only using 0 (completely incorrect), 3 (neither here nor there) and 6 (completely correct).

Recommendations for Future Studies

Further research is necessary to clarify the mechanisms behind the findings, as the interpretations mentioned, can only be considered as suggestions. For future studies it would be

useful to simplify the questionnaires, as the seven-point Likert-scale was sometimes too difficult. Furthermore, the support of translators would be beneficial. On the one hand, to standardize the procedure and on the other hand, also patients with no alphabetization or oral German or English knowledge, could be interviewed then. To clarify the questions if either language or cultural misunderstandings are the reason for the unsafe feeling of patients with a migration background and if these patients rely more on other patients because of a lack of trust in officials, tailored questions should be added in future studies.

CONCLUSION

Studies on acculturation stress research showed that a balanced relationship between orientation to the culture of origin and the host culture is to be strived for (i.e., *integration* in the above-mentioned model from Berry, 1990). Therefore, therapists and caregivers should help migrants to integrate rather than just assimilate because maintaining ties to their culture of origin can also give patients security and support. It is important not only to accompany patients on their journey from the culture of origin to the host culture but also to help ensure that resources from both cultures are combined. Thus, patients with a migration background should form a bicultural identity. Concrete approaches to the integration of migrants in psychiatric care have been formulated by various authors (Machleidt, 2002; De Jong and Van Ommeren, 2005); however, their feasibility in forensic psychiatry would have to be examined in a next step.

Evaluating the current conditions on a forensic ward with a social climate scale does not automatically bring about any improvement by itself. However, it may be a starting point for discussing the situation and may help to mitigate problems of migrants in forensic psychiatry. Training that prepares staff to de-escalate critical situations has been shown to be valuable because it can encourage greater feelings of safety amongst patients (Hollin and Howells, 1989). Another beneficial measure may be for staff to systematically explore ways of helping patients with a migration background settle conflicts (Schalast and Tonkin, 2016).

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation. Requests to access the datasets should be directed to JS, judith.streb@uni-ulm.de.

ETHICS STATEMENT

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

AUTHOR CONTRIBUTIONS

MD and JS designed the study. LT and JG collected the data. LT, JG, and ML analyzed the data. LT, JG, and MB interpreted the data. LT wrote the initial draft of the manuscript. All authors had full access to all the data in the study and took responsibility for the integrity and accuracy of the data analysis, and read and approved the final version of the manuscript.

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Differences Between Readmitted and Non-readmitted Women in an Italian Forensic Unit: A Retrospective Study

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The main objective of this study was to compare readmitted (RW) and non-readmitted (NRW) female psychiatric patients after being conditionally or unconditionally released from Italian inpatient forensic psychiatry services, in order to identify variables that were significantly linked with readmission. This study included all patients who were discharged from the female Residences for the Execution of the Security Measure (REMS) of Castiglione delle Stiviere from January 2008 to June 2015 who were not readmitted until December 31, 2018 (48). In addition, data were collected on female patients who were discharged from the same REMS before 2008 and readmitted from January 2008 to December 2018 (42). A key finding of our study was that the readmission into a female REMS was positively associated with the presence of substance use disorders (SUD) and a primary diagnosis on Axis II. To a lesser extent, younger age, being unconditionally discharged when first released, having had a shorter length of inpatient stay and having committed a crime against property for the first REMS admission was also variables that were apparently linked with readmission. The present research continues the previous research on gender-specific mentally ill offenders. Hence, the decision to proceed separately with a sample of men only and one of women only. For all these reasons, young female patients with personality disorder and SUD perhaps should remain longer in REMS and be released with conditions. In most European countries, the length of stay depends on the clinical condition and risk assessment, with some exceptions where the courts set a maximum length of stay at the outset, as in Italy. All the factors listed above influence the risk assessment. Finally, from integrating these findings into the increasing international literature on conditional release and considering the recent changes in the Italian forensic treatment model, we recommend continuing research on individual risk and protective factors as well as risk assessment instruments on conditionally and unconditionally released inpatients with genders studied separately.

Keywords: discharge, female forensic psychiatry inmates, readmitted, non-readmitted, personality disorders, substance use

INTRODUCTION

The Italian Forensic Mental Health System

In the past 6 years, research on conditional release has continued to increase (Vitacco et al., 2014; Green et al., 2016), yet conditionally released female insanity acquittees continue to be understudied. Outcomes in conditional release are of special interest in Italy where the country has replaced its large forensic psychiatric hospitals *Ospedale Psichiatrico Giudiziario* (OPG) with small local secure treatment facilities *Residenze per l'Esecuzione delle Misure di Sicurezza* (REMS). After the closure in Italy of the psychiatric hospitals (*Ospedale Psichiatrico* = OP) occurred more than 40 years ago, this new model is in harmony with the care model of general psychiatry. The REMS is essentially residential community, which is integrated within the larger community model of general psychiatry. The Law 9/2012 ordered in fact the closing of OPGs and the change to a model of care based on regional residential units in the community using only clinical staff incorporated into the public mental health services (Carabellese and Felthous, 2016; Scarpa et al., 2017). Because Italy chose an approach to the care of mentally ill patients that is different from the other European countries (closure of psychiatric hospitals, short hospitalizations, on average 15 days, outpatient rehabilitation and resocialization activities, economic and working support for the patient, social and economic support for families, and resistance against stigma), during these years, Italian psychiatrists acquired specialized skills that characterize the operating practices to which they apply as: Some of the strengths of the current Italian mental healthcare model include the widespread public outpatient psychiatric services throughout the country and direct access to the public general psychiatric services for patients, interventions by the family, and social environment and attention to other protective prognostic factors (the quality and variety of intra- and extra-family relationships, working and living independence, the regularity and frequency of contacts with the services that support the patient, and the constancy of care).

These strengths are useful in the treatment of mentally ill individuals in Italy and equally so, it was thought, of socially dangerous mentally ill individuals who are treated in the community. It was hoped that attention to such protective factors would contribute to a reduction in the risk of future criminal behavior in mentally ill offenders and promote their social reintegration into their home environments. There is evidence in the literature (Catalano et al., 1998; Furstenberg et al., 1999) that suggests that some psycho-social factors exert a protective effect. In addition, some patients can be efficaciously influenced through intervention, while in other cases, intervention is more complex and less effective. An assessment of this kind, however, implies not only in-depth knowledge of the patient's profile, but also the identification of all those variables (family, social, and context-related) that can influence the patient's behavioral choices (Carabellese et al., 2015). But, of course, there could be some weaknesses, foremost the fact that after the OP closures clinical psychiatrists did not manage violence risk assessment. Moreover, because this new forensic treatment system had not been tried before, its actual benefits and liabilities remained still untested.

The REMSs are residences with low to medium security compared with forensic facilities in other European countries. The REMSs are small residences where patients live assisted by health personnel 24 h a day. Inside the REMS, patients participate in therapeutic, treatment, and rehabilitation activities: They regularly are treated with pharmacotherapy under the supervision of health personnel, individual psychotherapy activities, and/or of groups, they take care of their personal hygiene. Those with substance use problems naturally are provided with more specific treatment plans, and they participate in psychoeducational activities in which their family members are also involved. Extra-clinical activities are many and include the acquisition of social skills, from the simplest (buying daily consumer goods) to the most complex ones (knowing how to use public transportation, participating in cultural, educational, and job training activities). They also include participation in physical activities and, as long as there are no specific prohibitions, they are allowed to spend time outside of the facility with their family. The importance of comprehensiveness of therapeutic interventions in forensic psychiatry is highlighted in the EPA guidelines (Völlm et al., 2018). By law, internment in REMS is a custodial security measure which is "extreme and exceptional" and in any case, Law 81 of 2014 limits the maximum duration of internment in REMS to the maximum time of imprisonment had the offender been found guilty of the crime and sentenced.

In December 2018 in 30 out of 31 REMS existing in all 20 regions of Italy (Region is the first administrative body of the State), there were 604 committed inpatients, 80 of whom were women (Catanesi et al., 2019) less than half of total inpatients in the six OPGs before their closures. The number of REMS per region depends on the population of the individual region; thus, some regions only have one REMS and others have several.

Admission into a REMS can only take place for offenders acquitted because of a finding of *infermità*, i.e., insanity, a mental disorder, and compulsory referral by the Judge of Preliminary Investigations (*Giudice delle Indagini Preliminari*) or the Surveillance Court (*Magistrato di Sorveglianza*) or, but only as a provisional security measure, by the prosecutor. The security measure is usually adopted after the evaluation by at least one forensic psychiatrist, sometimes two or three, chosen at the discretion of the judge.

When the patient restricted to REMS is considered by the REMS psychiatrists to have been rehabilitated, or no longer at risk of criminal recidivism, the psychiatrists propose to the judge that patient be discharged from the REMS. At that point, the custodial security measure can be revoked completely, and the patient becomes free again. If, on the other hand, health professionals believe that the risk of the patient's criminal recidivism still persists, although reduced, the patient can be discharged from REMS but subjected to a non-custodial security measure, the *libertà vigilata*, "Conditional Release."

Upon discharge from a REMS, many patients are subject to conditions under the law of the Penal Code (*Codice Penale,* art. 228). The judge, usually of the Surveillance Court, is the

only authority that can also apply this other security measure. On conditional release, patients must leave the REMS, but if they violate the restrictions decided by the Court they may be readmitted. Restrictions with which the patient must comply and which are written into the conditional release order are medication compliance, collaborating with supervision from mental health services, continuing to pursue the planned resocialization and rehabilitation activities, living in a specific location, not going to other places, respecting certain rules, and certain prohibitions (such as not taking illicit substances, for example, not staying away from one's residence beyond a certain time in the evening, not associating with individuals who have committed crimes, and not leaving the city in which they live).

In the Lombardy Region, there is the REMS of Castiglione delle Stiviere, where in the past, there was one of the six Italian OPGs. REMS in Castiglione delle Stiviere actually consists of eight REMSs, with a total of 160 beds, one of which admits only women. REMS of Castiglione delle Stiviere serves all of Lombardy (more than 10 million inhabitants). As far as we are aware, in Italy, there are no other REMS for only women like that of Castiglione delle Stiviere. However, Castiglione has a long tradition in this regard, having managed since 1975 the only section in OPG for all socially dangerous women that existed in Italy until the end of 2014. This section remained open until March 2015, when all OPGs were definitively closed and it continued to be the only one in Italy to have socially dangerous women until then. By June 30, 2010, the Ministry of Justice had 95 women in the female section of the OPG of Castigione delle Stiviere out of a total of 1552 inpatients: 1457 men and 95 women. During the closing of the OPGs, inpatients were progressively transferred to the REMSs. The numbers of patients inside the six OPGs fell progressively until their final closures; at the end of 2014, there were 672 inpatients in the six OPGs.

Despite the fact that women occupied 10–12% of the regional secure beds, there remains a shortage of clinical and legal data on females in REMS. At the same time, it is important to underscore how women confined in the OPG and currently in the REMS are always very few compared to men and the specific aspects related to gender only in recent years have been investigated by our group (Carabellese et al., 2018, 2019a,b, 2020).

Data in the international literature pertain mainly to male patients and in a few investigations conducted on new forensic facilities in Italy (De Girolamo et al., 2016; Scocco et al., 2019; Carpiniello et al., 2020).

In line with our previous surveys, in order to better investigate any gender factors related to REMS readmissions, in such a unique and recently established forensic treatment model as is the Italian model, we also wanted to investigate the sample of women separately.

As for significant outcomes in forensic services, the average length of stay of these patients in forensic hospitals is 3 years, but the death rate, the readmission rate, and the reoffending rate show substantially high diversity worldwide (Fazel et al., 2016). Comparisons between international studies are problematic because of variations in many essential specifics, including settings, laws, descriptions of populations, outcome measures, and follow-up periods (Lund et al., 2012; Di Lorito et al., 2017; Mandarelli et al., 2019; Slamanig et al., 2021). Notwithstanding this, there is some evidence that patients discharged from forensic psychiatric services have lower rates of criminal recidivism than comparative groups (Hayes et al., 2014; Charette et al., 2015; Norko et al., 2016). This is to be balanced against the realization that for some crimes, as recently published data revealed, forensic inpatients remain in isolation longer than mentally healthy perpetrators of similar offenses (Gosek et al., 2021).

In Italy, only two studies were published that focused on this topic (Russo, 1994; Fioritti et al., 2001) and both before the recent changes briefly described. Moreover, only the first one analyzed patients discharged from the High Security Hospital (OPG) of Barcellona Pozzo di Gotto in Sicily and then readmitted to the same hospital after committing a new crime. The other was a preliminary study on the process of closing the Italian OPGs.

In light of the context of treatment of the forensic and general psychiatric treatment model briefly described above, the main objective of this present study was to identify variables in female patients that are significantly linked with readmission to REMS. The initial hypothesis was that the use of substances, a personality disorder, the length of stay in REMS, and discharge without conditional release are risk factors for REMS readmission. Another goal we proposed was to ascertain any gender specificities in discharged patients that we believed could be better appreciated by studying women from men given their enormous numerical disparity. In order to confirm this, we compared female psychiatric patients who were readmitted and those who were not readmitted after having been conditionally or unconditionally released from the REMS.

International Studies

Characteristics of Women in Secure Inpatient Facilities

Although not clearly mental illness acquittees, admission characteristics of women in secure inpatient facilities in the United Kingdom were compared with those of male inpatients by Archer and colleagues (Archer et al., 2016). Women admitted to these facilities had fewer previous convictions, more previous psychiatric hospitalizations, and were more likely to have been transferred from a hospital than a prison. Women were more likely to have been charged or convicted of arson. Whereas males were more likely to have been diagnosed with schizophrenia and co-occurring substance misuse, the more commonly diagnosed mental disorders among female inpatients were major depressive disorder, borderline, and other personality disorders. In comparison with male inpatients, women were more likely to have had a history or physical and sexual abuse (Archer et al., 2016).

Adverse Outcomes Following Discharge From Secure Psychiatric Hospitals

Fazel and colleagues recently reported a follow-up review and meta-analysis of patients discharged from secure psychiatric

hospitals in which they registered adverse outcomes. This study systematically reviewed 35 studies from 10 countries with a total of 12,056 patients, 53% of whom had been violent offenders. They found the crude death rate for all causes of mortality to be 1,538 per 100,000 person years with a crude rate of suicide of 325 per 100,000 persons years (the types of hospital readmission were not further specified), a readmission rate of 7,208 per 100,000 person years, and crude reoffending rate of 4,484 per 100,000 person years (Fazel et al., 2016). This study identified significant post-discharge risks, of which death and suicide are especially concerning in this population but did not distinguish whether discharges occurred within the context of stepdown and conditional release programs.

Maden and colleagues compared men and women's reoffending rates following discharge from medium-secure units (Maden et al., 2006). Although not designated as such, one could infer that these were mostly medium-secure hospital units, not ordinary prison facilities. The legal statuses of these offenders were not specified. Included in the study were 843 men (88%) and 116 women (12%) from 34 units. They were followed for 12 months following discharge or transfer, except that reconviction data were extended for 2 years. This was not a study of success or failure following discharge but provided useful information about potential gender differences in male and female offenders who are treated following their release.

In this study, gender differences were identified upon admission to the units. Women self-reported prior physical and sexual abuse and self-harm more frequently than men. They were also more likely to have been admitted with a personality disorder and to have been treated psychiatrically than men. Their index offenses were less likely to have been property or sexual crimes, and they were less likely to have been convicted previously two or more times and to have served prior prison sentences in comparison with the male offenders.

Women were less likely to be re-convicted following discharge than men. Independent predictors of reconviction were age, self-harm, history of drug problems, and prior convictions. These findings were consistent with the literature showing that history of self-harm is associated with a lower risk of reconviction, whereas sexual abuse is associated with a higher risk as is a history of alcohol and drug abuse (Maden et al., 2004). Also consistent with prior studies is the predictive value of previous convictions; female offenders less often have this history (Maden et al., 2006).

Female Insanity Acquittees

An early attempt to examine female insanity acquittees apart from males was the series of studies reported by Rogers and colleagues on Oregon State's Psychiatry Security Review Board (Rogers et al., 1986). The PSRB provided a comprehensive and continuous system for monitoring and managing insanity acquittees who were discharged from the hospital on conditional release. Women were conditionally released at a significantly higher rate. A larger percentage of women had been charged with misdemeanors, but for those charged with a felony the offense was homicide or attempted homicide. As was observed in our prior studies (Carabellese et al., 2019a), female insanity acquittees were underrepresented among those whose crimes that involved strangers. During the study period, a higher percentage of female insanity acquittees was discharged (Rogers et al., 1986).

Female Insanity Acquittees Placed on Conditional Release

To our knowledge, the first and most comprehensive follow-up study of female insanity acquittees placed on conditional release was that by Vitacco and colleagues. The investigators studied 76 female insanity acquittees who were conditionally released in the State of Wisconsin over a 7 years period. Individual subjects were followed for 3–7 years. Forty-one of the females (53.9%) had been found NGRI for a violent offense, 6 (7.9%) for murder. A formal psychological risk assessment instrument was not used for determining level of supervision. Common diagnoses were schizophrenia (44.7%), bipolar disorder (23.7%), and depression (11.8%), but personality disorders (39.5%) and comorbid substance abuse (34.2%) were also found.

A significant finding, using logistic regression and conditional release as the dependent variable, was that the conditional release of females who required short-term hospitalization was more likely to be revoked based on violating the terms of the conditional release or non-violent criminal activity ($p = 0.002$). Based on this finding, the authors recommend a strategy of increasing mandated mental health services at the first sign of exacerbation and before hospital care becomes necessary. Although most of these females had been found NGRI for a violent offense, none of their conditional release revocations were based upon a violent offense. Most (68.4%) successfully maintained their conditional release. Of those who had their conditional release revoked, six were released again and five of these had their conditional release revoked again (Vitacco et al., 2011). Since this report, other studies confirmed that a history of conditional release revocation is a predictor of future CR revocation.

Age and diagnosis alone were not predictive of CR revocation; however, a model that included these factors (age, mood disorder, number of charges, short-term hospitalization, and supervision level) was weakly associated and accounted for 15.8% of the variance [wald = 9.82, $X^2(5) = 13.08$, $p = 0.02$; Vitacco et al., 2011].

Studies of Insanity Acquittees Who Were Conditional Released

Comparison with other outcome studies of insanity acquittees placed on conditional release is difficult because of differences in dependent and independent variables, lengths of study periods, and variability in the detailed descriptions of the studied subjects and the stepdown, and conditional release procedures. Moreover, the nature and extent of the inpatient and outpatient treatment are typically not described. Female insanity acquittees who are conditionally or unconditionally released are vastly understudied.

In a retrospective study, Green and colleagues examined 142 insanity acquittees who had been transferred from a forensic hospital in New York state within 10 years. Of the 40 who were recommitted, 12.5% were female; of the 102 non-recommitted, 30.4%. Having applied the HCR-20, the investigators found that only the Historical scale was associated with recommitment; however, only a few individual items within this scale were risk factors for recommitment. Those factors which were informative in predicting recommitment over 10 and 3 years periods were less serious major mental illness, relationship problems, problems with substance use, negative attitude, and prior supervision failure.

Lund and colleagues conducted a 2 years study on mentally disordered male offenders in Sweden, 152 of whom were treated in a forensic psychiatric facility (FPT), 116 in prison, and 50 with non-custodial sanctions. Only those who were in the FPT and placed on conditional release showed significantly lower rates of criminal recidivism. Similar to the present study is findings of female insanity acquittees, recidivism was significantly more common in offenders with either a substance abuse or personality disorder than with psychotic or other mental disorders alone. Also predictive of recidivism was age at index crime and number of prior criminal offenses. The authors found that the level of supervision was more predictive of post-release success than individual factors (Lund et al., 2012).

Manguno-Mire and colleagues followed 193 individuals (151 males and 42 females) who were placed on conditional release having been found incompetent to stand trial. Their definition of an "incident" included psychosis relapse, substance abuse relapse, treatment non-adherence, or becoming absent from follow-up, rule, or curfew violation and arrest (Bertman-Pate et al., 2004). Seventy percent of these individuals maintained their conditional release. Success was predicted by the individual's financial resources, not having a personality disorder and having few incidents. Striking was the difference in number of days until first incident between those placed on conditional release from jail versus from the forensic security hospital (67 vs. 575 days; Manguno-Mire et al., 2014).

Although in contrast to the earlier study by the New Orleans Forensic Aftercare Clinic, which found no difference in time to first incident, between security hospital and jail discharged individuals (Bertman-Pate et al., 2004), this recent finding suggests that where individuals were last in inpatient treatment can affect the success of conditional release.

For 356 insanity acquittees placed on conditional release upon discharge from forensic hospitals in the state of Maryland, Marshall and colleagues compared those readmitted to the forensic hospital voluntarily ($n = 83$) with those readmitted involuntarily ($n = 112$). Females constituted 22% of the subjects. Insanity acquittees with fewer arrests ($p = 0.001$) and fewer instances of treatment non-compliance ($p = 0.04$) were more likely to have been readmitted voluntarily; thus, arrests and treatment non-compliance predicted involuntary readmission. A third group of insanity acquittees was not readmitted to a forensic hospital ($n = 161$). When compared with all who had been readmitted, either voluntarily or involuntarily, this group appears to have adjusted better to community living as suggested by significantly fewer community psychiatric admissions ($p = 0.035$) and longer duration in the community before any psychiatric readmissions ($p < 0.001$) (Marshall et al., 2014).

A study of large sample size was the Canadian National Trajectory project which examined 1,800 men and women in three provinces over 3 years. Rates of recidivism varied between provinces (10, 9, and 22%). In all three provinces, those who were released and then followed under the supervision of review boards and those whose index offenses were less severe were less likely to reoffend (Charette et al., 2015).

Monson and colleagues studied the outcome of insanity acquittees discharged from the hospital from January 1, 1985 to December 31, 1998. Of the 201 patients discharged during this period, sufficient records existed on 125 for inclusion. Three factors were shown to be sufficiently predictive of revocation of conditional release: minority status, diagnosis of substance abuse, and prior criminal history (Monson et al., 2001).

The state of Missouri uses a stepdown, conditional release program that has been well described by Reynolds (2016). This system does not use a structured risk assessment instrument to inform conditional release decisions. Of the 110 forensic outpatients on conditional release who were supervised by the Northwest Missouri Psychiatric Rehabilitation Center over a 3 years period, only 7% required rehospitalization. Most of these rehospitalizations were voluntary and did not require revocation of their conditional release. Only one person was convicted of a criminal offense (stealing) and elopement was also rare as well as brief (Reynolds, 2016).

Unique for its exceptionally long period of retrospective follow-up, the study by Norko and colleagues included 365 insanity acquittees in the state of Connecticut who had been supervised by the Psychiatry Security Review Board during a period of over 30 years. Of the 177 individuals placed on conditional release, the study registered revocation of CR by the PSRB, arrests while on CR, and arrests after discharge from supervision by the PSRB. Of those individuals discharged from CR (215), 16 percent were rearrested. Community supervision on CR and duration of commitment to the PSRB significantly reduced the risk of rearrest among those who were eventually released from PSRB supervision (Norko et al., 2016).

In a recent study of 101 conditionally discharged patients in England, Jewell and colleagues applied Cox regression survival analyses to identify factors associated with recall from conditional release. Of patients discharged between 2007 and 2013 and followed over an average of 811 days, 45 (44.5%) were recalled to the hospital. Factors associated with a shorter time until recalled were younger age, non-white ethnicity, history of substance abuse, early childhood maladjustment, depot medication, and having been known to mental health services. Remarkably, treatment with clozapine reduced the risk of recall (Jewell et al., 2018).

Substance Use Disorder and Conditional Release

Although not all studies of conditionally released patients included substance use as a variable, the afore mentioned study by Green

and colleagues found problems with substance use to be an informative factor from the HCR-20 with regard to recommitment (Green et al., 2014). Lund's study in Sweden showed substance use disorder (SUD) was significantly more common in mentally disordered offenders released from a FPT than other mental disorders alone including psychotic disorders (Lund et al., 2012). In the England study by Jewell et al., history of substance abuse was significantly associated with recall from conditional release (Jewell et al., 2018). The national UK study by Maden et al. (2006) found reoffending after discharge from medium security units to be associated with a history of drug problems. Of studies that included substance abuse, this factor has consistently been associated with failure on conditional release (Cohen et al., 1988; Callahan and Silver, 1998; Monson et al., 2001; Vitacco et al., 2008, 2014; Green et al., 2014). Apart from conditional release of insanity acquittees, substance abuse is one of the strongest predictors of general criminal recidivism among mentally disordered offenders (Bonta et al., 1998) and, together with a history of violence, of future violent behavior (Swanson, 1994; Swanson et al., 2000; Douglas and Skeem, 2005; Conroy and Murrie, 2007, Hanson, 2009, see generally Tabernik and Vitacco, 2016).

Tabernik and Vitacco postulated several explanations for the association between substance use and failure at conditional release: The association of substance use with forms of criminal conduct, the potential for substance use to exacerbate a mental disorder, and substance use *per se* can be reason enough to revoke conditional release (Tabernik and Vitacco, 2016). We should add a possible association with medication non-compliance and the potential for substance use alone inducing a mental state that predisposes the individual to criminal conduct or rule violation (e.g., intoxication or substance induced psychotic disorder).

Formal Risk Assessment

Risk assessment informs decisions on conditional release. Four approaches to assessing aggressive and violent behavior which have relevance to risk assessment are as: clinical, actuarial, behavioral, and phenomenological (Felthous, 2010, 2013). Each has its own strengths, specific applications, and limitations. Today structured professional judgment (Murrie and Agee, 2018) is commonly recommended. This approach incorporates but does not completely rely on a risk assessment instrument. Structured risk assessments include the Classification of Violence Risk (Monahan et al., 2006), the Violence Risk Appraisal Guide (Quinsey et al., 2006), and the HCR-20. The Psychopathy Checklist-Revised (PCL-R, Hare, 1991) is shown to predict criminal recidivism (Hare, 2007, 2020 in press).

Most outcome studies of conditional release do not assess the utility and predictive validity of risk assessment instruments. Of those that have included a risk assessment instrument, the HCR-20 has received studied attention (Douglas, 2014). Performance results thus far have been mixed. As already noted, Green et al. found significant associations with revocation of conditional release with the Historical scale specific items on the Historical scale but not on the Clinical or the Risk scale (Green et al., 2014). In the study by Vitacco et al. (2014), only factors under Risk predicted failure on conditional release, previous failure on conditional release, and poor hospital treatment adherence. Demographic and criminologic factors were not significantly associated with CR failure. Three items were significantly associated with earlier revocation: previous failure on conditional release, number of prior charges for violent offenses, and total number of charges (Vitacco et al., 2014). In a subsequent study of 116 forensic inpatients who were assessed with the HCR-20 prior to conditional release from state forensic facilities, of which 39 were released and returned, 19 were released but not readmitted, and 58 were not released during the seven year study period. In this study, higher scores on the Risk management scale predicted either non-release, or if released, readmission (Vitacco et al., 2016).

Vitacco et al. (2016) point out the following factors as having been predictive of CR failure without administration of a formal risk assessment: substance use, personality disorder, treatment non-compliance, deficient financial support, and need for increased mental health services in the community (Vitacco et al., 2016). More recently, new approaches were described that can be used to facilitate the process of risk assessment, as, for example, the web-based tools like FoVOx (Cornish et al., 2019) or the telepsychiatry (Kennedy et al., 2021).

In the Italian forensic treatment model, little attention has been given to the use of validated assessment tools in general and standard risk assessment instruments have not yet been translated and validated for the Italian population. For example, consider that the HCR 20 V3 was not published in Italian until 2019 (Caretti et al., 2019). It is therefore evident that the judgments on the discharge of patients from REMSs are above all clinical and based on the experience acquired in the treatment of patients with mental disorders who have not committed crimes.

MATERIALS AND METHODS

Sample and Study Setting

The study sample consisted of all patients who were discharged from the female OPG section and, after its closure, the female REMS of Castiglione delle Stiviere from January 2008 to June 2015 and who were not readmitted before December 31, 2018, allowing a minimum of 42 months follow-up, with a range from 3½ to 10 years. In addition, data were collected on female patients who were discharged from the same REMS before 2008 and readmitted from January 2008 to December 2018. We examined a database of electronic clinical records of all the patients. The data were anonymized. Demographic, clinical, and legal data were routinely collected upon admission and during inpatient care. Individuals who died during their stay in the REMS were excluded.

Ethics

This research was conducted in compliance with the rules established by the Ethical Committee for the facility, which approved the study in advance.

Variables

We compared non-readmitted women (NRW) to readmitted women (RW) for each of these variables: Primary diagnosis at first discharge: Axis I vs. Axis II; SUD; crime against the person vs. property crime; conditional release (CR) or unconditional release (NCR); median length of stay; and mean age at first discharge.

Data Sources

At the time of their first discharge, all patients were given a clinical diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders IV Edition Text Revision (DSM-IV-TR, American Psychiatric Association, 2000). The following psychiatric diagnoses at first discharge were investigated as: schizophrenia spectrum disorders (SSD), mood disorders (MD), SUD, personality disorders (PD), and learning disability (LD). The diagnoses of patients were further divided into Axis I and Axis II according to the DSM-IV TR criteria.

Readmission was defined as re-entry into the REMS after having been discharged (whether or not conditionally). SUD was considered as a primary diagnosis or as a comorbidity because of the increased risk of mortality and because comorbid substance use and personality disorder increases the risk of violent offending (Fazel et al., 2016). In addition, neuropsychiatric factors and above all SUD are the most important risk factors for interpersonal violence in the general population (Fazel et al., 2018).

Reoffending was described as readmission into a REMS for any kind of crime (violent and non-violent) that resulted in a new verdict. Violent reoffending was defined as a crime that was a serious threat to the victim and that resulted in a new verdict. Crimes at first admission were classified as crimes against the person, which included as: Homicide and attempted homicide; aggravated and common assault, sexual offenses, assaulting an officer, kidnapping, threats, and harassment; property crimes, which included as: robbery and arson; and non-violent crimes, such as burglary, traffic and drug offenses, extortion, and revocation of conditional discharge. The difference between crimes against the person and against property was examined because offenders convicted of drug and non-violent offenses have higher rates of reoffending compared to serious offenders (Coid et al., 2009). Unconditional release is the release without judicial restrictions because the patient was deemed to no longer be at risk of reoffending.

Statistical Analysis

To determine whether there was a statistically significant association between two variables, we first computed the Pearson's non-parametric chi-squared test between readmitted (/non-readmitted) and nominal variables (primary diagnosis at first discharge, substance use, and crime against – the person/property – conditional release). Then, we computed the Mann-Whitney test between readmitted/non-readmitted and the scale variables (length of stay in months and age in years at first discharge). The chi-squared test was used to verify the null hypothesis that the two variables were independent. We chose a significance level of 0.05; then, we disproved the null hypothesis of independence when the value of p was lower than 0.05. For significance of results, we used the Cramer's V, which is a measure of dependence between two nominal variables. It uses values from 0, in the case of independence, to 1, in the case of maximum dependence. The Mann-Whitney test verified the null hypothesis that the medians of the chosen scale variables were equal between readmitted and non-readmitted.

Chi-Square Test and ANOVA

To compare female psychiatric patients who were readmitted with those who were not readmitted after having been conditionally or unconditionally released from the REMS, and thereby the interaction between readmission/non-readmission and release status, a 2×2 factorial design defined as "Condition" was created that was composed of four groups: Group 1: readmitted, conditionally released, Group 2: readmitted, unconditionally released, Group 3: non-readmitted, conditionally released, and Group 4: non-readmitted, unconditionally released.

First, the associations between "Condition" and the three qualitative variables "Primary Diagnosis at first discharge," "Substance Use: yes/no," and "Crime against the person vs. Crime against property" were evaluated. Because of these qualitative variables, it was not possible to carry out a two-way ANOVA, therefore, a chi-square test was performed between the variable of interest and the four categories resulting from the intersection between Conditional Discharge and Readmission. The crosstabs were then constructed to perform the chi-square test and evaluate the Cramer V index if the chi-square test was statistically significant.

It was possible to carry out a two-way ANOVA only for the quantitative variables "length of stay" and "age at first discharge" with the two factors "Conditional Release: yes/no" and "Readmission: yes/no." We then evaluated whether there was an effect on each quantitative variable due to the main effects of the two factors and if there was an interaction between the two factors.

Logistic Regression

A binary logistic regression was carried out which had the Readmission variable (Yes = 1, No = 0) as its dependent variable and the remaining variables, i.e., Primary Diagnosis at first discharge, Substance Use, Crime against, Length of stay (months), Age (years) at first discharge, and Conditional Release (as independent variables). The qualitative variables were introduced in the form of dummy variables. The goal of logistic regression was to determine whether and which variables have a statistically significant effect on the probability of being Readmission Yes compared to Readmission No. The dummy variables were parameterized and the null model contains only the constant between the independent variables. The Nagelkerke's Pseudo R-squared index equal to 0.531 could explain over 50% of the overall variability of the phenomenon.

RESULTS

Between 2008 and 2018, three female patients died during their residence in the OPG female section or after its closure, in the REMS, two of whom committed suicide. The number of women discharged during a period of time of 7 years and 6 months and not readmitted after an average follow-up time of 78.9 months was 48, while that of readmitted women during 11 years was 42 after an average follow-up time of 44 months. In this sample, compared to studies in other western countries (Tully et al., 2019), there was a low representation of ethnic minorities (11.9% non-white ethnicity in NRW and 10.4% in RW). Among women who were readmitted for crimes against the person were three patients readmitted for attempted homicide, two for assault, one for sexual offenses, and 10 for threats and harassment. As for property and non-violent crimes, 19 were readmitted for revocation of conditional discharge, five for robbery, one for burglary, and one for traffic and drug offenses. The clinical and criminal characteristics of NRW and RW (90 patients in total) are shown in **Table 1**.

TABLE 1 | Clinical and legal characteristics of discharged patients.

		Non-readmitted women n %	Readmitted women n%
Primary diagnosis at first discharge	Schizophrenia spectrum disorders *	28 (59%)	15 (35%)
	Mood Disorders *	3 (6%)	0 (0%)
	Substance use disorders *	1 (2%)	1 (3%)
	Personality disorders **	13 (27%)	24 (57%)
	Learning disability **	3 (6%)	2 (5%)
	Total	48 (100%)	42 (100%)
Substance use disorder(s)	Yes	3(6%)	17 (40%)
	No	45 (94%)	25 (60%)
	Total	48 (100%)	42 (100%)
Type of index offense at first discharge	Homicide and attempted homicide +	12 (25%)	7 (17%)
	Aggravated and Common Assault +	5 (11%)	7 (17%)
	Sexual offenses +	1 (2%)	0 (0%)
	Assaulting an officer +	1 (2%)	0 (0%)
	Kidnapping +	2 (4%)	1 (2%)
	Threats and harassment +	14 (29%)	6 (14%)
	Robbery ++	3 (6%)	7 (17%)
	Arson ++	0 (0%)	2 (5%)
	Non-violent crime only ++	10 (21%)	12 (28%)
	Total	48 (100%)	42 (100%)
Conditional release	Yes	34 (70.8%)	20 (47.6%)
	No	14 (29.2%)	22 (52.4%)
	Total	48 (100%)	42 (100%)

*Clinical and legal characteristics of 48 women discharged between January 2008 and June 2015 from the female REMS of Castiglione delle Stiviere and who were readmitted before December 31, 2018 and 42 women discharged before 2008 and readmitted between January 2008 and December 2018. * = Axis I; ** = Axis II; + = Crime against person; and ++ = Crime against Property.*

Primary Diagnosis at First Discharge

The primary diagnoses of NRW at first discharge were on Axis I in 67% of cases and in 33% on Axis II, while was 38% of cases Axis I and 62% Axis II in RW (see **Table 1**). Being readmitted or not readmitted was associated on the axis of the primary diagnosis at first discharge. Among the readmitted, those with an Axis I primary diagnosis were readmitted less than the general readmitted frequency (33.4% < 46.7%), while those with an Axis II primary diagnosis were readmitted more than the general readmitted frequency (62% > 46.7%). Cramer's V was equal to 0.239, so there was a weakly significant association between the two variables.

Regarding the interaction between Condition and Primary diagnosis at first discharge, Groups 1 and 2 showed higher percentages (respectively 60 and 54.5%) of Axis 2 diagnoses compared to the Groups 3 and 4. To evaluate the significance of this association, a chi-square test it was performed. The chi-square test was, albeit slightly, not statistically significant ($p = 0.150$); therefore, it could not be excluded that the difference in percentages of Primary Diagnosis at first discharge in the various subgroups could be due to chance.

Finally, on logistic regression, the effect of the independent variable Primary Diagnosis at first discharge on the dependent variable Readmission was found to be not statistically significant.

Substance Use Disorders: Presence Vs. Absence

Substance use disorders was present in 6% of cases in NRW and in 40% of RW (see **Table 1**). Being readmitted or not readmitted depended on whether or not subjects had a SUD. Cramer's V was equal to 0.432, so there was a moderate dependence between the two variables.

As regards the intersection between Condition (Readmission and Conditional Release) and Substance Use: yes/no, Group 1 (readmitted, conditionally released) had the higher percentage (60%) compared to Groups 2, 3, and 4 (see **Table 2**). The chi-square test turned out to be statistically significant at 0.001 level ($p < 0.001$); therefore, it was possible to conclude that there was a statistically significant association between the Condition and Substance Use: In this case, we observed that Group 1 had a clearly higher percentage of "yes" than the other Groups.

Length of First Stay

The median length of inpatient treatment was 26.3 months for NRW and 9.6 months for RW. Being readmitted or not readmitted was associated with the length of inpatient treatment. Those who were not readmitted had been treated in the REMS significantly longer than those who were readmitted (see **Figure 1**).

As regards the quantitative variable Length of first stay in the ANOVA analysis, the effects which were statistically significant

TABLE 2 | Crosstab – condition (readmission, conditional release) and substance use.

			Substance use		Total
			No	Yes	
Condition	Conditionally Released + Not Readmitted (Group 3)	Count	33	1	34
		% within Condition	97.1%	2.9%	100.0%
	Unconditionally Released + Not Readmitted (Group 4)	Count	12	2	14
		% within Condition	85.7%	14.3%	100.0%
	Conditionally Released + Readmitted (Group 1)	Count	8	12	20
		% within Condition	40.0%	60.0%	100.0%
	Unconditionally Released + Readmitted (Group 2)	Count	16	6	22
		% within Condition	72.7%	27,0.3%	100.0%
Total		Count	69	21	90
		% within Condition	76.7%	23.3%	100.0%

can be observed in the table Tests of Between-Subjects Effects (**Table 3**). The main effect of Readmission turned out to be statistically significant at level 0.01 ($p = 0.007$) while the interaction effect Condition (Readmission and Conditional Release) turned out to be statistically significant at level 0.10 ($p = 0.056$). The main effect of Conditional Release was instead not significant.

The differences in the main effects were observed by evaluating the Estimated Marginal Means (see **Figure 2**). There were two completely opposite trends: as regards the Readmission group "no," there was a significantly higher value of Length of first Stay when Conditional Release was "no" compared to when Conditional Release was "yes." On the contrary as regards the Readmission group "yes," there was a lower value of Length of first stay when Conditional Release was "no" compared to when Conditional Release was "yes." The fact that the two lines were non-parallel was confirmation of the significance of the interaction effect between Readmission and Conditional Release.

Mean Age at First Discharge

The mean age at first discharge was 45 years for the NRW and 38.2 years for the readmitted women. Being readmitted or not readmitted depended on the age at first discharge. Those who were not readmitted were, on average, significantly older than those who were readmitted (see **Figure 3**).

In the ANOVA analysis, the effects that were statistically significant were evaluated by looking at the Tests of Between-Subjects Effects (see **Table 4**). It can be noted how only the main effect of Readmission proved to be statistically significant at the level of 0.01 ($p = 0.008$).

The differences in the main effects can be observed by evaluating the Estimated Marginal Means (see **Figure 4**). It can be noted that there were two completely opposite trends: as regards the Readmission group "no," there was a higher value of Age (years) at first discharge when Conditional Release was "yes" compared to what Conditional Release was "no." On the contrary as regards the Readmission group "yes," there was a higher value of Age (years) at first discharge when Conditional Release was "no" than what Conditional Release was "yes." The fact that the two straight lines are not parallel, however, indicates an interaction effect but, not sufficiently strong, to be statistically significant.

Crimes Against Person/Against Property

In NRW, 73% of cases committed a crime against a person and 27% a crime against property, while in RW, 50% of cases committed a crime against person and 50% against property (at first admission; see **Table 1**). Being readmitted or not readmitted depended on whether the crime was against a person or property. Those who committed a crime against a person were readmitted less than the general frequency of readmission (37.5% < 46.7%), while those who committed a crime against property were readmitted more often than all who were readmitted (61.8% > 46.7%). Cramer's V was equal to 0.236, so the two variables were only somewhat dependent.

As far the association between Condition (Readmission and Conditional Release) and Crime against the person vs. Crime against property was concerned, the chi-square test turned out to be, albeit slightly, not statistically significant ($p = 0.128$). It was not possible therefore to exclude that the difference in percentages of Crime against in the various subgroups may be due to chance.

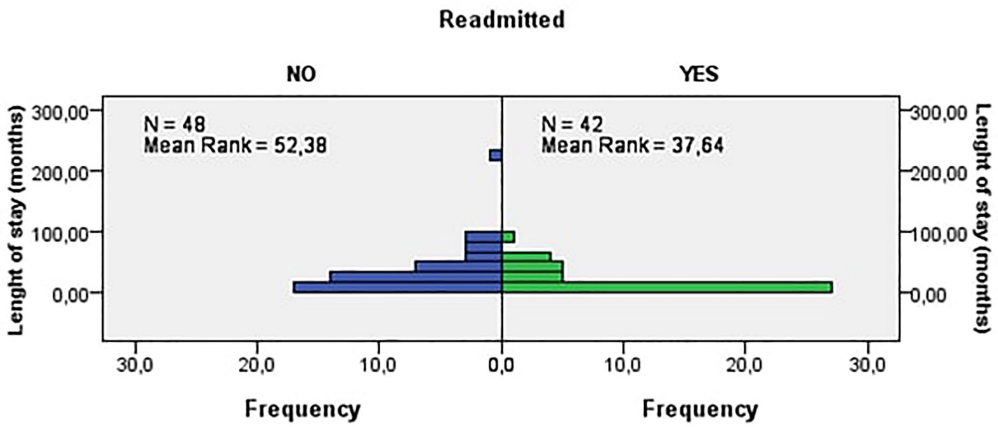
Conditional Release Versus Unconditional Release at First Discharge

70.8% of NRW and 46.7% of RW (at the first discharge) were discharged on CR (see **Table 1**). Being readmitted or not readmitted depended on whether or not the person was discharged on conditional release. Cramer's V was equal to 0.236, so the two variables were only somewhat dependent.

DISCUSSION

This is the first study in Italy aimed at comparing two groups of female patients discharged from a FPT: Those who were placed on conditional release and those who were discharged unconditionally.

A key finding of our study was that the readmission into a female REMS depended on the presence of SUD, a primary diagnosis on Axis II, younger age, being unconditionally



Total N	90
Mann-Whitney U	678,000
Wilcoxon W	1.581,000
Test Statistic	678,000
Standard Error	123,632
Standardized Test Statistic	-2,669
Asymptotic Sig. (2-sided test)	,008

FIGURE 1 | Length of inpatient treatment (months). The Mann-Whitney test refuses the null hypothesis that the distribution of length of stay (months) is the same across the categories of readmitted at a significance level of 0.01 (value of p <0.01). Thus, being readmitted or not readmitted depends on the length of stay. Those who were not readmitted had, on average, significantly longer lengths of stay than those who were readmitted.

TABLE 3 | Tests of between-subjects effects **–** dependent variable: length of stay (months).

Source	Type III sum of squares	df	Mean Square	F	Sig.	Partial eta squared
Corrected model	9213,896[a]	3	3071.299	3.225	0.026	0.101
Intercept	67783,593	1	67783.593	71.172	0.000	0.453
Conditional release	472,127	1	472.127	0.496	0.483	0.006
Readmission	7236,313	1	7236,313	7.598	0.007	0.081
Conditional release * readmission	3579,128	1	3579.128	3.758	0.056	0.042
Error	81905,851	86	952.394			
Total	158512,900	90				
Corrected total	91119,746	89				

[a]*R-Squared = 0.101 (Adjusted R-Squared = 0.070).*

discharged at the first discharge, having had a shorter length of stay and having committed a crime against property for the first REMS admission but did not depending on a primary diagnosis on Axis II. Also, we found that the median length of treatment in this REMS was shorter in comparison with the international lengths of inpatient treatment.

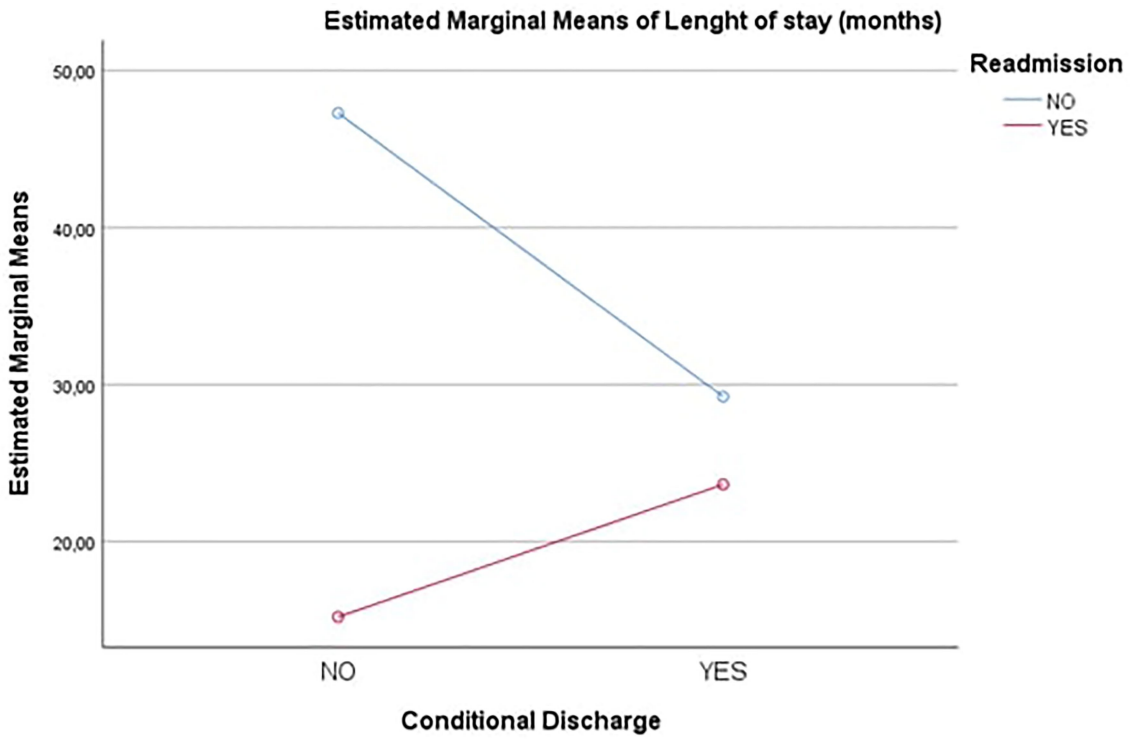


FIGURE 2 | Estimated marginal means – Length of stay (months). Conditional Discharge = Conditional Release.

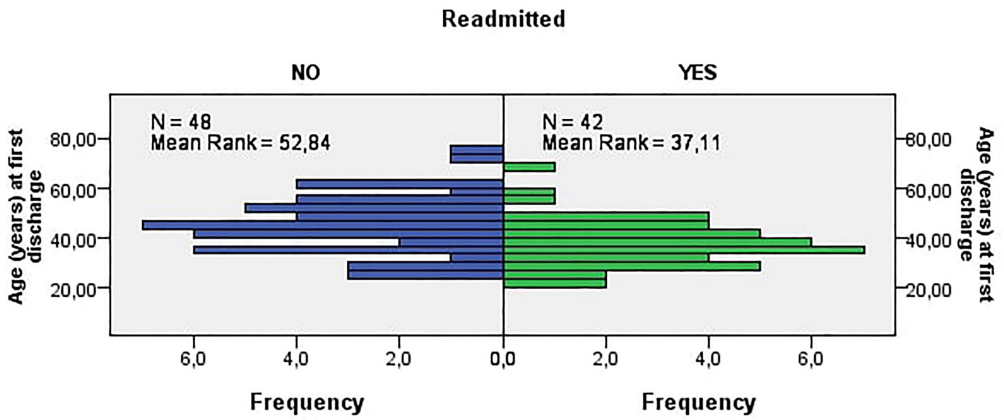
On Logistic Regression, in facts, by observing the estimated coefficients in **Table 5**, it can be seen that the statistically significant variables were Substance Use, Length of first stay and Conditional Release at level 0.001 ($p < 0.001$), and the variables Crime against and Age (years) at first discharge at level 0.10 ($p < 0.10$). Only the Primary Diagnosis at first discharge variable was not statistically significant. Looking at the Odds Ratio (Exp column (b)), the following comments can be made as:

- The use of substances increased the probability of having Readmission Yes by about 23 times compared to Readmission No.
- Having a Crime against "property" compared to "person" increased the probability of having Readmission Yes by 180% compared to Readmission No.
- For each additional month inpatient treatment (Length of stay), the probability of Readmission Yes decreased by 3% compared to Readmission No.
- For each additional year of Age (years) at first discharge, the probability of having Readmission Yes decreased by about 5% compared to Readmission No.
- Being "Conditionally Released" compared to "Unconditionally Released" reduced the probability of having Readmission Yes by 79% compared to Readmission No.

Finally, it should be mentioned that the model thereby specified has a much better percentage of correct predictions than the null model. We can therefore state that the variables introduced, with the exception of "Primary Diagnosis at first discharge," were able to effectively explain the phenomenon of interest (Readmission) and to predict with good results the Readmission category (yes/no).

Therefore, the logistic regression confirmed that there was a statistically significant association between each of the five variables Substance Use Disorders: presence/absence, Length of first stay, Mean age at first discharge, Crimes against person/property and Conditional Release/Unconditional Release at first discharge, and the Readmission/Non-readmission variable, but not between the latter and the Primary diagnosis at first discharge variable.

From further analysis, the intersection between the Conditional Release variable and Readmission variable allowed us to make other observations. For the qualitative variables, Primary Diagnosis at first discharge, Substance Use Disorders, and Crime against person/property, the chi-square test showed that the only variable to be significant for the Readmission was the use of substances in the conditionally released females. This difference, found in women conditionally released and not in those unconditionally released, could be linked to the fact that most women with the presence of SUD were conditionally released and therefore this confirmed that, despite the application of the highest form of legal protection at discharge, the presence of SUD is a major risk factor for readmission to a forensic facility. In regard to the quantitative variables Length of first stay, and Age at first discharge, ANOVA highlighted that for unconditionally released women the factor that mainly affected



Total N	90
Mann-Whitney U	655,500
Wilcoxon W	1.558,500
Test Statistic	655,500
Standard Error	123,641
Standardized Test Statistic	-2,851
Asymptotic Sig. (2-sided test)	,004

FIGURE 3 | Age (years) at first discharge. The test refuses the null hypothesis that the distribution of the age (years) at first discharge is the same across the categories of readmitted at a significance level of 0.01 (value of $p < 0.01$). Thus, being readmitted or not readmitted depends on the age at first discharge. Those who were not readmitted were, on average, significantly older than those who were readmitted.

TABLE 4 | Tests of between-subjects effects – dependent variable: Age (years) at first discharge.

Source	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared
Corrected model	1322.788[a]	3	440.929	3773	0.013	0.116
Intercept	138960.803	1	138960.803	1189.124	0.000	0.933
Conditional release	30.922	1	30.922	0.265	0.608	0.003
Readmission	859,894	1	859.894	7.358	0.008	0.079
Conditional release * readmission	238.530	1	238.530	2.041	0.157	0.023
Error	10049.942	86	116.860			
Total	168632.690	90				
Corrected total	11372.730	89				

[a]*R Squared = 0.116 (Adjusted R Squared = 0.085).*

the readmission was the duration of inpatient treatment, which was significatively longer in non-readmitted compared than to readmitted patients. As for the readmitted women, the difference in length of inpatient treatment did not show significant differences between those conditionally and unconditionally released.

Our similarly conducted study of males, who were conditionally and unconditionally discharged from an Italian

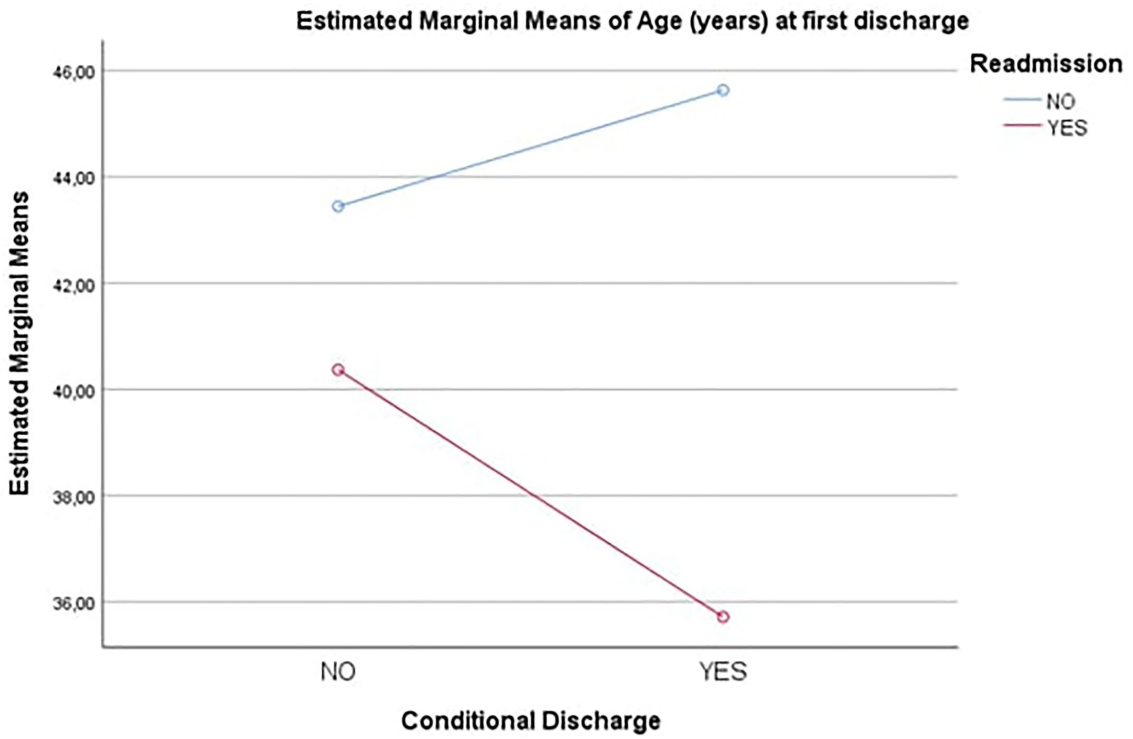


FIGURE 4 | Estimated marginal means – Age (years) at first discharge. Conditional Discharge = Conditional Release.

TABLE 5 | Logistic regression – variables in the equation.

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Primary diagnosis at first discharge (1)	0.387	0.577	0.451	1	0.502	1.473
	Substance Use (1)	3.161	0.915	11.935	1	0.001	23.604
	Crime against (1)	1.033	0.595	3.015	1	0.082	2.809
	Length of stay (months)	–0.029	0.011	7.475	1	0.006	0.971
	Age (years) at first discharge	–0.050	0.027	3.429	1	0.064	0.951
	Conditional release (1)	–1.543	0.589	6.861	1	0.009	0.214
	Constant	2.372	1.266	3.511	1	0.061	10.718

[a]*Variable(s) entered on step 1: Primary Diagnosis at first discharge, Substance Use, Crime against, Length of stay (months), Age (years) at first discharge, and Conditional Release.*

REMS (Rossetto et al., unpublished), afforded a unique opportunity for gender comparison. In both males and females, SUD was associated with readmission. In male patients, a diagnosis of personality disorder was associated with readmission and similarly in females, an Axis II diagnosis was associated with readmission. Younger age was positively associated *with readmission* in males and weakly associated in females. In females, consistent with international studies, unconditional discharge and shorter lengths of inpatient treatment were associated with readmission, whereas these parameters were not associated with readmission in our study of readmission of male patients. Crime against property was also weakly associated with the readmission of females, but not males. In the present study, SUD was significantly correlated with readmission of female insanity acquittees released from a security facility. In our companion study of male insanity acquittees, SUD was also associated with readmission.

Limitations

This study has some important limitations. First, the data were collected retrospectively from an historical cohort. Second, the sample sizes were relatively small, as the subjects came from a comparatively small female REMS population. Moreover, we were unable to assess other clinical factors, such as secondary diagnosis, personality traits, different classes of illegal substance use, social support, adherence with medication, and readmission in psychiatric wards, which are of significant importance to offenders with mental illness (Grann et al., 2008).

Finally, during the study period, we did not obtain clinical and legal information on those who were not readmitted due to the impossibility of accessing clinical and legal databases external to the REMS. Therefore, we were unable to examine the three important outcome measures of mortality, readmission, and violent and non-violent reoffending.

Interpretation

Some variables should be taken into consideration in the decision-making process that leads to discharge from forensic units, respecting the principle that each patient should be treated at a level of therapeutic security not higher than necessary (Kennedy, 2002). A longer length of treatment in forensic inpatient units and the use of restrictions on discharge are associated with a lower rate of reoffending (Lund et al., 2012; Charette et al., 2015; Jeandarme et al., 2016; Norko et al., 2016), even in female patients (Tully et al., 2019). This is of particular importance in Italy, because the law provides that the duration of the security measure in REMS must be as short as possible and in any case, no longer than the maximum duration of the custodial sentence provided for that offense (excluding offenses for which life imprisonment is a sentencing option) and also considering that the use of risk assessment tools in Italy has been very limited so far.

The number of cases of violently reoffending in females was numerically small, consistent with international literature (Maden et al., 2006), although it was not possible to calculate the rate of reoffending (violent and non-violent).

The finding that crime against property is significantly higher in RW compared to NRW is consistent with literature. With regard to the crime that led to the first admission, the percentage of attempted homicides and homicides was higher among NRW with respect to the RW.

An accurate assessment and risk management should be performed on young women with a diagnosis of personality disorder and substance abuse, because these are the patients who have the greatest risk of being readmitted into a forensic facility. The underestimation of the risk of recidivism and readmission is favored by the non-use in a systematic way of internationally validated instruments for risk assessment and management that constitute an important support for the formation of structured professional judgment. Among these instruments, we can include, for example, the HCR-20 (Douglas et al., 2014) and the DUNDRUM-quartet (O'Dwyer et al., 2011) which seems particularly suitable for the Italian reality. In female patients, without the use of these tools, it can be hypothesized that there is a tendency for clinicians to consider female patients at lower risk of violent recurrence than men. For example, psychopathic females are predominantly diagnosed as having a personality disorder according to DSM-IV-TR (Carabellese et al., 2018).

Conclusion

Young female patients with personality disorders and substance use require special attention to risk assessment and may need longer treatment in the REMS as well as a well-structured outpatient program including continued substance use rehabilitation and relapse prevention as well as additional specific restrictions when released conditionally. Patients discharged from REMS should be monitored long term in order to measure rates of mortality, readmission, and reoffending. There is evidence in the literature to suggest that some psycho-social factors exert a protective effect. This finding has a direct and immediate impact and requires to be fully considered in order to draw up adequate individual treatment programs; and even more in Italy, where the forensic and general psychiatric public facilities, mainly based on a community model, do not imply long-term internment, but only a short-term one both in forensic treatment and in general psychiatry. Not to be overlooked in future research is the nature and extent of inpatient and outpatient treatment and measures for integrating discharged patients back into the community.

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 Poli-REMS Castiglione delle Stiviere, ASST Mantova, Italy. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors took part in the process of creating this manuscript, satisfying the criteria provided by the editorial standards in relation to authorship. Specifically, IR, FF, and MG gave a more substantial contribute in the writing process, and AF was involved in the conception of the manuscript and gave substantial contributes during the reviewing process, other than being the corresponding author. FC, GV, and FC, were involved in the writing process and in the final approvation of the manuscript. LP gave her contribute in the drafting of the manuscript, specially during the reviewing process. Finally, MC, was dedicated to the analysis and interpretation of data. All authors contributed to the article and approved the submitted version.

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Fetal alcohol spectrum disorder and Risk-Need-Responsivity Model: A guide for criminal justice and forensic mental health professionals

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Fetal alcohol spectrum disorder (FASD) is an umbrella term used to describe a range of significant neurodevelopmental, brain-based disorders and impairments that result from prenatal alcohol exposure. FASD is a high prevalence but underdiagnosed group of disorders affecting between 17 and 36% of individuals in criminal justice settings. Despite being a high-impact disorder associated with lifelong impairments with a significant need for services and interventions, little research has been completed on how to best support individuals with these conditions in criminal justice settings. This article proposes a renewed focus on applying and adapting the Risk-Need-Responsivity (RNR) approach to individuals with FASD in criminal justice settings. This will assist in better determining the needs and interventions likely to effect change and reduce recidivism for this prominent criminal justice-based population. The RNR approach has been used with multiple corrections populations to determine the need and most appropriate interventions, as well as how to best allocate scarce resources. As the prevalence of FASD becomes better understood and recognized, evidence-based approaches to addressing this specific sub-population are necessary to effect change and reduce recidivism and ongoing involvement in the criminal justice system.

KEYWORDS

fetal alcohol spectrum disorder, risk need responsivity model, criminal justice, forensic mental health, recidivism

Fetal alcohol spectrum disorder

Fetal alcohol spectrum disorder (FASD) describes the pervasive cluster of severe neurodevelopment impairments which can arise from prenatal maternal alcohol exposure (Streissguth et al., 1996; May et al., 2018; Pervin et al., 2022). Individuals with this condition can experience impairments across a range of different brain-based domains including cognition, memory, executive functioning, affect, and adaptive functioning (Cook et al., 2016; Mattson et al., 2019). To add to the complexity of this life-long and complex disorder, the brain domains impacted can vary from individual to individual, making it near impossible to identify a specific profile that typically characterizes the condition.

The authors of this article have a collective experience of several decades of working and living with those who have or are suspected of having FASD. This collective experience includes clinical treatment settings, forensic assessment and treatment settings, caregiving of those with FASD in a professional role and a parental role, as well as research specific to the various consequences of prenatal alcohol exposure. Additionally, some of the authors have expertise in the Risk, Needs, and Responsivity model and the use of this model with complex populations. Through this vast collective experience, the authors are providing a proposal of the use of the Risk-Need-Responsivity Model as it would be understood in relation to FASD, as well as practical application information and implications for the RNR model with those who have FASD to reduce recidivism and involvement in the criminal justice system. It builds upon previous work by authors such as Pei and Burke (2018), by providing practical examples of each of the elements in the RNR model and how this may manifest for individuals with FASD. This includes a literature review of both the RNR model and FASD to understand how the two areas of focus can be understood. Additionally, this article is provided to promote further research on the RNR model for those diagnosed with or suspected of having FASD and to encourage training on and implementation of a model that may properly support the complex needs of this under-recognized and over-represented population in the criminal justice system.

The prevalence of FASD in the general population varies between 1 and 10% in Western countries (Roozen et al., 2016; Lange et al., 2017; Shölin et al., 2021), but this prevalence increases dramatically to between 17 and 36% in correctional settings (Fast et al., 1999; Bower et al., 2018; McLachlan et al., 2018, 2020; Popova et al., 2021). Although specific facial features are commonly recognized as being associated with prenatal alcohol exposure, the majority of individuals exposed to alcohol prenatally do not exhibit these associated facial features, further contributing to the underdiagnosis and lack of identification of FASD (Popova et al., 2021). With severe impairments in executive functioning including difficulties linking cause and effect, poor organizational skills, and high levels of impulsivity accompanied by deficits in other areas such as problem solving, social skills, attention, and memory, it is not difficult to see how individuals with FASD might find themselves disproportionately represented in criminal justice populations. Such impairments are likely to contribute to individuals engaging in behaviors that lead to incarcerations but then impact significantly on their participation and understanding of legal processes once in the system. If not addressed, the neurodevelopmental impairments that contributed to their incarceration remain unchanged throughout their time in custody causing further difficulties and increasing their chances of recidivism upon release. The likelihood of this occurring is exacerbated when proper services are not in place (Wartnik and Brown, 2016). In fact, these same deficits make individuals with FASD vulnerable to other risks while involved in the criminal justice system (e.g., learning maladaptive coping skills, misunderstanding expectations, and an inability to remember rules resulting in infractions/violations, poor interpersonal boundaries, and victimization).

When interviewing individuals in the criminal justice system, knowledge of potential indicators, or "red flags," of FASD is helpful to determine if more specific screening should be completed. In addition to the above-described deficits (e.g., executive function deficits, communication problems, impulsivity, etc.), there is historical information that is important to note. A few potential indicators of FASD include (but are not limited to): maternal history of significant alcohol and/or substance use; history of out-of-home placement as a child; history of ADHD or learning disorder/ special education; specific deficits in math; history of seizures; history of growth problems; lower intellectual functioning; hyperactivity; stubbornness; irritability; risk-taking; problems following multiple-step directions; problems attending appointments; inability to manage money; inappropriate affect; and appears socially and developmentally younger than their chronological age (except for some types of speech in which they can appear superficially proficient).

Although the question of competency to stand trial for persons with FASD has been raised (Brown et al., 2017b, 2018), the suitability to undergo assessment and to have one's case plan formulated without adequate FASD considerations has not (Douds et al., 2013). In contemporary corrections in the United States, the level of services provided to individuals during incarceration as well as during probation or parole in the community may be determined through use of the Risk-Need-Responsivity Model (Wormith and Zidenberg, 2018). Understanding this model and its application to individuals with FASD is key to ensuring that appropriate service provision occurs, ultimately increasing the chances of "successful" sentence completion and reducing recidivism.

The Risk-Need-Responsivity Model

The Risk-Need-Responsivity (RNR) model was developed by Andrews et al. in the 1990's in order to provide an evidence-based framework for the assessment and interventions offered to offenders. Overall, this model aims to tailor the intensity of

interventions for detainees based on an accurate assessment of the risk factors contributing their offending behaviors and their areas of need and then addressing these, thus reducing recidivism. Their approach to the assessment and treatment of criminal offenders is widely considered the premier model of supervision for correctional agencies around the world (Andrews et al., 2011; Looman and Abracen, 2013; Gearhart and Tucker, 2020). The model is comprised of three core principles: The Risk Principle, the Criminogenic Need Principle, and the Responsivity Principle.

The *Risk Principle* asserts that treatment and intervention resources should be allocated in accordance with the likelihood that a given person will recidivate, with more resources being allocated to "high risk" individuals as determined by the use of a validated risk assessment tool, and fewer resources being allocated to "low risk" individuals. This was a shift from inflexible blanket approaches previously adopted by probation and parole officers. Prior to this, the frequency of client contacts and the degree of resources directed to an individual client were based on the offenses they had committed (e.g., sexual offense, burglary, and assault) rather than an assessment of their recidivism risk and individual needs. The allocation of resources in this way has since been found to be problematic as underlying criminal behavior does not factor strongly into the prediction of risk. Andrews and Bonta (2006) found that allocating resources to "low risk" individuals with the aim of reducing recidivism while being not only ineffective may, in fact, increase recidivism risk as a result of a range of factors such as increased exposure to high-risk offenders. For example, under previous supervision approaches, a low-risk offender who is employed does not have drug and alcohol dependence issues, and has strong family and community supports may have been required to attend a twice-weekly cognitive behavioral interventions (CBI) group as a result of their offending behavior. That attendance would take them from paid employment and disrupt their existing supports, placing them in an environment with much higher-risk peers. Aside from learning the course curriculum, participants may also be influenced by the antisocial attitudes and behaviors of other group members. Therefore, when the Risk Principle is not implemented, agencies may be expending finances to inadvertently increase recidivism due to allocating and supervising low-risk, medium-risk, and high-risk individuals to ineffective levels and types of intervention.

When applied appropriately, the Risk Principle is more akin to approaches common in other fields such as a medical triage. Hospital emergency rooms are very adept at triaging patients and allocating those with the highest level of medical need to immediate and intense intervention while deprioritizing those with less severe, non-life-threatening conditions. If the same principles are applied to the corrections setting, clients with the highest risk of re-offending would be given priority in regard to supervision and resources such as programing. Those with lower risk of recidivism would still receive services but at a lower intensity.

The second factor to consider in the Risk-Need-Responsivity Model is that of *Criminogenic Need Principle*. The concept of need postulates that each individual has their own unique range of risk factors that contributed to their offending. If these risk factors are identified and managed, then offending rates and recidivism will decrease. Risk factors will vary from individual to individual and it is these risk factors that should be targeted by interventions. Low-risk offenders will have fewer criminogenic needs and, therefore, will require fewer resources. However, accurate assessment is needed in order to determine this and to appropriately triage the level and type of intervention most appropriate.

Criminogenic needs can be thought of as 'drivers of crime.' Accordingly, the Need Principle asserts that the most effective way to promote reductions in recidivism is to concentrate efforts into those variables which correlate most strongly with criminality, steering clear of non-criminogenic variables. Through meta-analysis of a wide range of correctional treatment programs, variables correlating most strongly to re-offending have been identified and clustered into eight different domains or silos, often referred to as the *Central Eight*. These are reflected below in Table 1 (Bonta and Andrews, 2007).

According to this theory, the greater the number of criminogenic needs targeted successfully, the greater the impact on decreasing subsequent recidivism. This also speaks to the necessity of accurate assessment. Well-intentioned and poorly informed practitioners may design inadequate or misdirected treatment/ intervention plans due to inaccurate assessment. For example, if an individual is at risk to re-offend due to the fact that they are high in the domains of alcohol/drug use and negative companions, addressing those areas of need will result in a correlating decrease in the risk of re-offending. However, if non-criminogenic needs are targeted, the risk of recidivism increases. Unfortunately, popular targets of change, such as trauma and low-self-esteem, are non-criminogenic. The probability of recidivism also increases by way inaccurate assessment. For example, assigning risk where there is none, or not assigning risk when it is warranted.

In addition to an assessment of the individual's risks, identifying protective factors can also assist in a more thorough and accurate assessment. Protective factors, such as a positive and supportive family, stable employment, stable housing, community involvement, etc. may provide a base for managing risk factors and a strengths-based approach to treatment and supervision planning. Protective factors can then be developed or enhanced in addition to targeting risk factors for reduced recidivism.

The *Responsivity Principle* is arguably the most elusive of the three principles in part because it is actually comprised of two subcomponents. General responsivity indicates that cognitive-social learning techniques are the most effective in dealing with criminogenic needs. Specific responsivity speaks of tailoring the delivery of services to match the individual characteristics of the client. Specific responsivity can be thought of as "creating the ideal learning environment" for each individual (Bourgon and Bonta, 2014). This is particularly important in considering the specific deficits (as described above) for individuals with FASD, including

TABLE 1 The Central Eight Risk/Need Factors.

Criminogenic variable	Synopsis
Criminal History	One of the best predictors of future behavior is past behavior. This entails a variety of criminal activity in multiple settings. Included within this domain would be the volume of offenses as well as documented rule infractions while on correctional supervision (e.g., probation violations). Although one's history cannot be altered, a high-risk score in this area is reflective of low self-regulation.
Pro-criminal attitudes	Within this domain are variables such as an individual's core values and beliefs. Risk is typically reflective of attitudes favorable to crime and anti-social behavior. This can manifest itself *via* rationalizations, minimizations, and making favorable comparisons. Examples include, "They have insurance," "nobody got hurt," "everybody in this neighborhood carries a gun."
Pro-criminal associates	This domain does not merely focus on the presence of anti-social friends and associates, but also a void when it comes to pro-social connections.
Antisocial Personality Pattern	This domain captures characteristics such as adventurous pleasure seeking, impulsivity, a callous disregard for others, and being restlessly aggressive.
Family/Marital	Core in assessing risk in this domain is an examination of the quality of the relationship in question. What are the rules and expectation which have been established as to delinquent behavior? What is the strength of the bond in question?
School/Work	This domain considers the quality of the satisfaction from school/ work, their ability to succeed in these settings, as well as interpersonal relationships within the setting of either school or work. Higher risk is determined when there are lower levels of performance and satisfaction with school or work.
Substance Abuse	Consider not just past but current issues with alcohol and/or drugs. Current issues tend to be more predictive than past issues, although both carry weight in this domain.
Leisure/Recreation	This category focuses on a lack of involvement in prosocial leisure pursuits. These tend to buffer against risk and augment positive connections.

learning problems, communication challenges, information processing deficits, social skills deficits, and executive functioning deficits.

To date, the Responsivity Principle remains the least researched of the three core principles of the RNR model (Cohen and Whetzel, 2014). This is particularly true with specialty populations, such as those with FASD, that have little direct evidence-based intervention research (Pei and Burke, 2018). Although the Responsivity Principle has traditionally been viewed as more of an afterthought by practitioners, non-adherence to this principle results in practitioners ignoring sound cognitive behavioral interventions and/or delivering services in such a way as to not resonate with the client's learning style, cultural needs or necessary accommodations (Bonta et al., 2011).

The more that the RNR principles are adhered to in practice, the further recidivism risk decreases (Bonta and Andrews, 2007). This model has not only been found to be useful in having an impact on recidivism amongst adult male offenders, but also in preventing community violence (Dowden and Andrews, 2000), sexual offending (Hanson et al., 2009), institutional infractions (French and Gendreau, 2006), gang involvement (DiPlacido et al., 2006), young offenders (Andrews et al., 1990; Dowden and Andrews, 1999a), women offenders (Dowden and Andrews, 1999b), and mentally ill offenders (Andrews et al., 2001). When implemented correctly, adherence to the RNR model has been found to result in a decrease of up to 35% in recidivism rates (Bonta and Andrews, 2007). Conversely, the research reflects that non-adherence to the principles of Risk, Need, and Responsivity goes beyond ineffectiveness. Indeed, it can be harmful to client outcomes (Lowenkamp and Latessa, 2002).

Applying the RNR model in FASD

Little research has been completed with regard to appropriate interventions in general for those with FASD (Pei and Burke, 2018; Shölin et al., 2021). Given the unique symptomatology and sequelae of FASD (e.g., often with an IQ higher than those with intellectual disability but with adaptive functioning deficits in the extremely low range making standard screening less likely to detect their deficits) and the disproportionate number of individuals with FASD or suspected of having FASD involved in the criminal justice system, examination of the application of the RNR model specifically to people with FASD is warranted and yet has been largely neglected in research. In theory, applying the RNR model to inherently high-risk populations may significantly decrease recidivism by improving assessment and treatment efficacy. However, the current research literature on this diagnostic group is limited with little information available regarding accurately assessing risk, identifying criminogenic needs, and in relation to the overall application of the RNR model to individuals with FASD (Pei and Burke, 2018).

With regard to the Risk Principle, longitudinal research is needed to establish risk and protective factors for different forms of recidivism in persons diagnosed with FASD. The absence of a risk factor, if replaced by its pro-social doppelganger, can be considered a protective factor. That is, if in the absence of negative peers, there is a determination of prosocial friends and associated, that area of one's life can be considered a protective factor. If rather than a checkered history around employment, one has a healthy job history that can be deemed a protective factor.

These protective factors can act as a buffer against risk, and should be augmented *via* the case planning process. Rather than simply endeavoring to extinguish risk, the practitioners should also build protective factors in their client's lives. To be clear, the absence of a single risk item does not automatically equate to a protective factor. Rather, if the practitioner feels that in considering an entire criminogenic domain, i.e., family, that there exist exceptionally positive circumstances, then these factors, by virtue of their presence, may serve as protective factors. That is, if in the absence of negative peers, there is a determination that the attachment to the prosocial peers is sufficiently strong enough to serve as a model for prosocial behavior, it may be considered a buffer against risk. Research suggests that individuals diagnosed with FASD are more likely to demonstrate the *Central Eight* risk factors, including: A history of criminal behavior, antisocial cognitions, antisocial peers, antisocial personality pattern, family and/or marital discord, poor school or work performance, few positive leisure or recreational activities, and substance abuse (Conry et al., 1997; Streissguth, 1997; Bonta and Andrews, 2007; Rasmussen and Wyper, 2007; Spohr et al., 2007; Fast and Conroy, 2009; Rogers et al., 2013). Research may reveal additional risk factors linked specifically to the underlying deficits associated with FASD. Pei and Burke (2018), for instance, describe difficulties with executive functioning, including inhibition, decision-making, working memory, integration of information, and cognitive flexibility as possible sources of risk. However, the risk profile of individuals with FASD will vary according to the unique patterns of brain injury associated with prenatal alcohol exposure found in each individual with FASD. Thus, an individualized and thorough assessment of a person's risk is key to appropriate planning using the RNR model. Novick Brown and associates (Fabian, 2021) have provided specific information about assessing individuals with FASD in forensic settings, including the use of risk assessment measures. Specifically, Fabian (2021) reports that some risk assessment measures allow for clinicians to account for prenatal alcohol exposure under categories such as "major mental disorder" while other measures have no such consideration. Fabian further comments that certain risk measures that do not account for neurodevelopmental disorders, intellectual disability, and neuropsychological impairments in executive functioning may be inappropriate for use with those with FASD, as those measures "are not empirically equipped to assess violence risk…" in such individuals (p. 359). Common risk assessment measures may fail to capture variance that is specifically related to FASD, which may result in underestimation of risk and misalignment in treatment and management plans that fail to account for specific needs that could be otherwise addressed (Pei and Burke, 2018). Further research specific to this issue is necessary.

Information on *protective factors*, which directly reduce or moderate the likelihood of future recidivism (e.g., self-esteem, high intelligence, strong social support, and problem-solving abilities), should also be measured (Turner et al., 2007). While not necessarily validated specifically for an FASD population, some possible measures of protective factors may include the Structured Assessment of Violence Risk in Youth (SAVRY; Borum et al., 2006) or the Structured Assessment of Protective Factors (SAPROF; De Vogel et al., 2009), available in both adult and youth versions. Both measures have been studied with many different populations and may assist with structuring an assessment of individuals with FASD, although additional research needs to be conducted to determine the applicability of these measures with this population and if there are additional relevant factors specific to FASD not included in these measures.

Multivariate modeling studies may be able to identify a parsimonious set of factors which best predict recidivism risk in individuals with FASD. This set of factors can then be cross-validated on new samples and the model's predictivity, validity, and reliability compared to available "gold standard" recidivism risk/needs assessment tools, including the Level of Service/Case Management Inventory (LS/CMI; Andrews et al., 2004), the Federal Post-Conviction Risk Assessment (PCRA; Johnson et al., 2011), and the Ohio Risk Assessment System (ORAS; Latessa et al., 2009). For a review of the most commonly used and best-validated recidivism risk/needs assessment tools, see the handbook by Hamilton et al. (2018). To date, none of these instruments has been validated on adult offenders diagnosed with FASD, although promising preliminary findings have been discovered for the use of risk/needs assessment tools with young offenders with FASD (McLachlan et al., 2018). Using scientific processes to identify accurate and reliable risk and protective assessment procedures is a critical step in effectively applying the RNR model to persons diagnosed with FASD.

With regard to the Need Principle, further research is needed to establish best practice investigative interviewing guidelines for individuals diagnosed with FASD. As our team has discussed elsewhere (Brown et al., 2016; Watts and Brown, 2016), this clinical population is vulnerable to suggestibility and confabulation such that false testimony and even false confessions can be unintentionally provided to interviewers (Brown et al., 2022). These issues are important to consider when assessing an individual's needs, to ensure accurate assessment and planning for responsivity. *Suggestibility* is a personality trait with a cognitive component which makes an individual susceptible to being manipulated in various contexts, whereas *confabulation* refers to the unintentional fabrication or distortion of memories (Fotopoulou et al., 2007; Brown, 2017). For clinicians, this means using FASD-informed interviewing techniques, collecting information from collateral contacts, and optimizing the interviewing environment to minimize pressure is critical to obtaining truthful responses which can then be used to make diagnostic and treatment decisions.

In the authors' experience, although methods of interviewing during a risk assessment constitute a portion of forensic training, FASD and the phenomenon of confabulation and suggestibility are rarely emphasized, if covered at all. Often times, the criminal justice practitioners view themselves more as a collector of information than a client-centered assessor endeavoring to formulate the ideal case plan for their client. It is often noted that

the more the assessment interview resembles an interrogation, the less accurate it will be. This may increase the risk of suggestibility. According to Gudjonsson (1987) interrogative suggestibility can take place when the interviewee is being interviewed about recollections and experiences from their past by a person in a position of authority, and when the interview occurs within the context of a closed and stressful social interaction (Gudjonsson and Clark, 1986; Gudjonsson, 1987).

Unfortunately, limited research has been conducted on suggestibility and confabulation in persons diagnosed with FASD in the criminal justice system, despite the fact that obtaining incorrect information about a client's offense chain (i.e., the series of events which led up to the index offense being committed) means that the person's risk may be incorrectly assessed and the Need Principle will not be adhered to. In addition, further research is necessary to determine if and how clinical and forensic-based interviewing approaches need to be modified to be of greatest utility when interviewing individuals diagnosed with FASD.

With regard to the Responsivity Principle, research has not been conducted to evaluate which symptoms of FASD addressed during the assessment and treatment process most improves outcomes. Although this principle is the least commonly addressed of the RNR model (as noted above), it is arguably the most important for this diagnostic population, given the numerous cognitive and adaptive impairments associated with prenatal alcohol exposure. Given the over-representation of this population in the criminal justice system, addressing the Responsivity Principle adequately for those with FASD is essential to supporting this population in reducing further criminal justice contacts and alleviating the burdens on a system that is currently ill-prepared to effect change in individuals with FASD.

A first step in better understanding this principle with individuals with FASD would be to first investigate the factors which may limit or enhance responsivity in individuals with FASD. Recall that General Responsivity calls for the use of cognitive behavioral approaches to deal with criminogenic need. Whereas Specific Responsivity can be thought of as tailoring the delivering of interventions in a manner which creates an optimal learning environment (Bourgon and Bonta, 2014). For example, traditional, large, talk-based groups may not be as effective with individuals who have FASD who process information more slowly, struggle with effective communication, and have lagging social skills. It would be erroneous to assume that the factors which enhance and decrease responsibility in the general population are the same factors that apply to those with atypical brain development and brain-based injuries. Secondly, based on a greater understanding of the aforementioned factors, the application of cognitive behavioral approaches to individuals with these issues is needed but traditional approaches may not be as effective with this population (Verbrugge, 2003; Burd et al., 2010). Certain patterns of impairment, for example those with below average IQ's or those with high levels of emotional dysregulation and impulsivity, may not respond to cognitive behavioral approaches in the same way as individuals without those impairments despite still meeting criteria for the same diagnosis. Unfortunately, FASD has a highly individualized pattern of impairment, making broad generalization difficult and access to more individualized services essential.

As previously noted, the general Responsivity Principle indicates cognitive-social learning techniques are the most effective at addressing criminogenic needs. In practice, these approaches have been the most frequently studied but rarely have they been examined on young people with severe neurodevelopmental impairment. Given that cognitive and adaptive impairments are required to obtain a FASD diagnosis, further exploration of this at the broader diagnostic but then individual levels are required. Despite this, with or without diagnosis, individuals with FASD will likely be directed into cognitive behavioral interventions due to a lack of viable alternatives and limited system resources.

If these sequelae of severe neurodevelopmental impairment are not taken into account, the suggestibility and confabulation characteristic of this population may result in inaccurate assessments and intervention recommendations due to the over- or under-endorsement of both historical as well as clinical factors (e.g., the identification of psychopathic traits such as pathological lying, not taking responsibility for actions, or impulsivity when these are often behavioral symptoms of underlying brain injury characteristic of FASD rather than characterological traits). It is important that clinicians working with this population for both assessment and intervention, have specialized knowledge and training to best serve the needs of those with FASD. Indeed, the entirety of the RNR model arguably rests on accurate assessment of criminogenic need and responsivity issues. Although not originally incorporated into the RNR model, assessment of protective factors has more frequently become expected as a part of comprehensive assessment. However, more research is needed on the impact of protective factors in the RNR model generally and more specifically with regard to the application to those with FASD.

Informed interviewing involving individuals with an FASD is very important. Risk assessment interviews are not merely questionnaires completed by corrections personnel. It is an opportunity to gather additional important information about the individual such as the person's ability to process information, understand and communicate language, demonstrate memory abilities, attend to and answer the question asked, demonstrate their ability to provide a coherent narrative, etc. There is a recognized risk of false confessions in individuals with FASD, increased even more when certain interview styles are implemented. Their impairments (e.g., communication deficits, inability to anticipate consequences, tendency to be overly trusting with authority, eager to please when in a stressful situation) may result in improperly obtained confessions on the part of the police or other criminal justice professionals (Allely and Mukherjee, 2019). Corrections officials, probation and parole officers, forensic clinicians, and others conducting risk/need assessment with a FASD client may be in a sense improperly obtaining false

confessions while attempting to ascertain their client's criminogenic needs. Within the realm of criminal justice, persons with FASD are readily manipulated by others (Greenspan and Driscoll, 2016). Although the degree of overt manipulation on the part of the assessor during the assessment interview process is unknown, any degree of unconscious bias could be aggravated with an FASD client, who is more susceptible to manipulation.

To decrease bias and unintentional manipulation, more research is needed to determine the degree of FASD awareness in probation and parole officers, those most likely to conduct risk/need assessments for their caseloads. One indication that there is a dearth of knowledge in the criminal justice field in this area is a survey of public defenders, which revealed that less than 20 % of respondents reported having received training as to the impairments experienced by their FASD clients (Brown et al., 2017a). Other studies of the knowledge about FASD in criminal justice professional populations also indicate a significant lack of training in this area (Brown and Singh, 2016; Mutch et al., 2016; Brown et al., 2019). This lack of FASD knowledge significantly impacts the criminal justice professional's ability to identify the necessary information for adequately implementing the RNR model with this population.

Fetal alcohol spectrum disorder as assessed in the context of RNR

From the perspective of the FASD population, it may be beneficial to look at the symptoms commonly associated with FASD (e.g., executive functioning deficits, adaptive functioning deficits, academic/learning deficits, and self-regulation deficits) as a starting point, as they relate to the RNR model. By examining the various brain domain impairments of FASD, a more in-depth analysis may be fostered. One such brain impartment is that of executive functioning. Deficits associated with executive functioning may be reflected in the criminogenic needs of Criminal History, Pro-Criminal Attitudes, and Anti-Social Personality Pattern. Low self-regulation and impulsivity are captured within the domain of Criminal History in RNR risk/need assessments, yet an individual's criminal history is traditionally viewed as a "static" factor.

Another impairment of FASD is that of Adaptive Functioning. This may result in difficulties with reading and writing, which of course would be captured in the criminogenic domain of Education/Employment. Cognition, another FASD brain impairment, could be linked once again to the criminogenic domains of Pro-Criminal Attitudes and Anti-Social Personality Pattern. Cognitive deficits could also be aligned with deficits around Education/Employment.

The following provides a summary of the recognized areas of impairment that are common in individuals with FASD (Bower and Elliott, 2016) and how these may impact on accurate assessment as well as suitability for interventions. Each of these areas of impairment, typically manifested to some degree by those with prenatal alcohol exposure, should be assessed as part of the Risk Principle and then accommodated within the planning for the Needs and Responsivity Principles. Because each individual will manifest these impairments differently, as noted above, individualized planning using the RNR model will be most effective to address these impairments.

Implementation and training

Although establishing a correctional assessment and treatment workflow following the RNR principles is an important first step in establishing appropriate interventions to reduce recidivism among individuals diagnosed with FASD, the simple implementation of such a workflow does not mean that it will be adhered to in practice. This lack of implementation *fidelity* is commonplace for a variety of reasons including lack of program funding, lack of trained staff, poor cooperation from the individual, etc. This can result in risk/needs assessment tools being administered but not used to target criminogenic needs in a responsive manner, rendering the tools under- or ineffective. For example, Singh et al. (2013) found that a minority of risk factors identified using a risk/needs assessment tool were actually addressed in treatment for adolescent offenders in the United States. For a literature review of studies on the assessment of fidelity and methods of maximizing it, see the work of Mowbrey et al. (2003). Furthermore, the application of assessments in these settings is particularly problematic as it gives the perception that these factors are being taken into account in treatment planning when, in fact, they are not.

In order to faithfully implement the RNR principles into correctional practices, evidence-based training programs are needed (Dyck et al., 2018). Research has found that such training programs can enhance clinicians' perceived confidence in conducting risk/needs assessments, knowledge about available assessment tools, and documentation of recommended interventions, especially if training is multimodal (McNiel et al., 2008; Reynolds and Miles, 2009; Storey et al., 2011). Supervised practice assessing for and developing appropriate interventions may assist the real-life application of the RNR model. Reynolds and Miles (2009) have also identified that training delivered by both qualified as well as trainee staff is just as effective in increasing the quality of risk/needs assessments.

Any such training should be supplemented by in-person or online continuing education in the signs and symptoms of FASD, and how they may impact the effectiveness of otherwise evidence-based assessment and treatment techniques. In addition to stressing the importance of assessors being cognizant of FASD in the populations they serve, staff need to be made aware of the various recommendations to best factor this information into their practices. Studies have found that providing "booster" sessions every 2–3 years following an initial training can be helpful in knowledge retention (Hamilton et al., 2018). These boosters may involve practice

examples such as showing participants a recorded mock interview, allowing them to evaluate the interviewee, and then reviewing their evaluations. There are strategies which can be utilized in the interview process for the criminal justice professional to embrace to improve information gathering (Brown et al., 2016), and these same practices could be extended to the risk assessment interview process. The probation officer conducting a risk/need assessment on an individual with suspected or confirmed FASD should be aware of the fact that their client will generally function at a higher level if interviewed in a structured and predictable environment. This includes minimizing stimuli and distractions as well as tailoring the questions to the person's developmental abilities.

Best practice assessment interviewing

When conducting a risk assessment interview with an individual with diagnosed or

suspected FASD, it is considered a best practice in risk assessment interviewing to begin the

process with a structuring statement. This statement should include the following:

1. Note the purpose of the interview, explain that collateral information will be collected, and advise that if interested, the client can receive the assessor's feedback.
2. Describe how the client will be asked a series of information-gathering questions.
3 Explain how the interview will conclude, such as follow-up questions or forms filling in any gaps.

This structure is particularly important for individuals with FASD who often lack the.

understanding of the purpose of why an interview would be conducted in this setting and who cannot intuit this structure themselves. Without a clearly articulated structure, the FASD client may easily become confused and overwhelmed which may present as anger, withdrawal, frustration, or irritability, and behavioral symptoms which could be misinterpreted as risk factors. Sufficient time must be given to persons with FASD to process what is being asked of them so that they may have time to generate a coherent and organized response (Brown et al., 2020).

Table 2 provides a range of strategies that assist in conducting a risk assessment for an individual with diagnosed or suspected FASD (Brown et al., 2014, 2016), specifically in order to reduce the risk of confabulation and suggestibility. Individuals with FASD have increased vulnerability to both confabulation and suggestibility, as previously mentioned, and reducing the risk of these occurring at the onset is vital as any incorrect or inaccurate information that occurs here may well be carried through to all other stages and form the basis for unhelpful interventions.

Beyond a well-crafted structuring statement, the practitioner conducting the risk-need-responsivity assessment should approach the interview as a conversation rather than an interrogation. As Brown and colleagues note, steps can be easily taken when working with individuals with FASD to reduce the risk of inaccuracies associated with traits such as confabulation and suggestibility. Many of these approaches are simple (e.g., the use of open-ended questions, asking only one question at a time, using simple concrete language) but challenging to implement consistently. Finally, to further increase the accuracy of the client responses, even more, due diligence should be given to confirming the responses provided and gathering collateral information. This includes repeating responses back to the interviewee to make sure the response recorded is accurate. Additionally, the assessor should have the interviewee repeat any information provided in their own words to ensure comprehension.

Summary

Fetal alcohol spectrum disorders are a significantly misunderstood but prevalent problem in the criminal justice system. While 1–10% of the general population meet criteria for an FASD, 17–36% of individuals in the criminal justice system meet the criteria. Many have not yet been identified due to the lack of knowledge about FASD by criminal justice professionals and the lack of adequate screening and assessment. This article provided information to propose a renewed focus on applying and adapting the Risk-Need-Responsivity (RNR) approach to individuals with FASD in criminal justice settings by adequately assessing their needs and adapting interventions following the RNR model for individualized intervention to best meet their needs and reduce recidivism. Despite basic research about the prevalence of FASD in criminal justice populations, further research is needed to explore the reasons for this high prevalence rate, as well as to identify risk/needs assessment, treatment approaches, and interviewing guidelines and their applicability for this highly vulnerable clinical population when encountered in forensic settings.

The Risk-Need-Responsivity Model is a well-established evidence-based approach to lower recidivism with justice involved individuals. The efficacy of the model rests on the three interwoven principles of Risk, Need, and Responsivity. The key to success though lies in the fidelity to each of these principles while accounting for individual differences due to FASD. All three of these principles lose potency if FASD considerations are not taken into consideration in their application. Accurate risk assessments should include FASD-specific symptoms and functioning to ensure the person is not over- or under-supervised which would result in either increased recidivism or the unnecessary use of valuable resources. Both of these supervision

TABLE 2 Strategies to address the potential presence of confabulation and suggestibility.

Strategy	Illustration	Effect
Utilization of a Structuring Statement	State the purpose of the interview, note that collateral contacts will be utilized, and the interview will conclude with an offer of feedback. Tell them it is okay to say if they do not know information.	A firm structuring statement will help take ambiguity out of the relationship. This will lend to higher accuracy and a decreased likelihood the client feels that they need to deceive or fill in information they do not know.
Foreshadow the upcoming series of information-gathering questions.	*Many of the questions you are about to be asked may feel very personal and too much, but the reason we do this is to collect correct information about you and your life now as well as in the past. We know with this information we can help pick the right things to help you. We ask these same questions of everyone.*	The interview will feel less like an interrogation and more like a conversation. This will contribute to more truthful replies.
Explain how the interview will conclude.	*When we are done talking, I may have to go back and ask a few more questions about things that I forgot to ask earlier.* If there was information gathered that may have been the result of suggestibility, double checking these inconsistencies will mitigate the effect.	
Ask open-ended questions.	*Tell me about the first time you drank some alcohol or smoked some pot. Tell me about what happened after that. Tell me about any drugs and alcohol you have used in your life, before and now.*	Closed-ended questions invite the respondent to give yes/no replies, stifling the conversation. Open-ended questions evoke more from the interviewee.
Ask only one question at a time.	*Tell me about how you get on with your parents.*	Clustering of questions may confuse the interviewee and lead to confabulation of replies. The interviewee may also become overwhelmed, further increasing their difficulty in organizing information.
Use simple, concrete language with short questions.	*Tell me about the jobs you have had including any jobs you have now.*	See above.
Avoid judgment or accusatory phrases.	*What did your parents say about that decision?*	Endeavor to reduce defensiveness throughout the interview.
Remind them that you will be collecting information from other sources to confirm the information they provide.	*To be transparent, know that I will make an effort to confirm as much of the information you provided me through other contacts such as friends, family, employers,* etc.	This will safeguard against inaccurate client replies resulting from suggestibility and/or confabulation.

outcomes are in contrast to the Risk principle. If inaccurate assessment results in a misattribution of the client's area of risk, the Need Principle foretells of missed opportunities at treatment and higher recidivism rates. Finally, adherence to the Responsivity principle is maintained by crafting and creating a learning environment which takes into account all the aspects of FASD (see Table 3).

The danger of not following RNR principles and accounting for FASD features here is twofold. Even practitioners and agencies which adhere to the principles of RNR with the utmost fidelity fail to adequately capture the risk and needs of clients with FASD if they are not adequately knowledgeable and informed. The current state of training simply does not address this population, nor the complexity their disorder brings to the equation. The inability to accurately assess the FASD clientele then leads to a myriad of case plan shortcomings. Not only does the inaccurate determination of risk level lead to improper supervision of the client, but the change targets being incorporated into the case plan may not have been authoritative.

In summary, the aim of this article has been to review the Risk-Need-Responsivity Model and propose its applicability to offenders diagnosed with FASD. Practical examples of how FASD may impact on each element have been explored as potential areas of challenge and areas for further research have been highlighted. The following represents a summary of the six key points of the article:

1. The Risk-Need-Responsivity (RNR) Model is an evidence-based framework designed to reduce future recidivism in general offender populations.
2. Although applied to those with FASD in practice due to their over-representation in criminal justice settings, little research has been conducted specifically on this population and how the RNR principles may best be applied to those with FASD.
3. Further research is needed to establish a risk assessment process which can accurately and reliably predict recidivism among individuals diagnosed with FASD and specifically take into account the vulnerabilities that arise as a result of their severe neurodevelopmental impairments.
4. Best practice interviewing guidelines for individuals diagnosed with FASD need to be established so that the benefits of increasingly accurate information, including the gathering of collateral information, can be allowed to flow through to the provision of more appropriate and successful interventions.

TABLE 3 Fetal alcohol spectrum disorder (FASD) features.

Brain domain of impairment in FASD and central eight impact	Example of possible impact on assessment of risk/need	Example of possible impact on implementation of services (Responsivity)
Executive functioning(may contribute to: criminal history, pro-criminal attitudes, pro-criminal associates, antisocial personality patterns, family relationships, school/work performance, substance abuse, and leisure/ recreation pursuits)	Difficulties in organizing history and thoughts in a coherent and sequential manner, unable to understand the implications of providing certain information, impulsivity may impact on what information is shared and how, agreeing to incorrect information just to get the process over	Difficulties in organizing regular and consistent attendance, impulsivity may impact in a group setting by saying things they later regret or doing things without thinking them through; difficulty planning time and resources to complete homework or other tasks
Adaptive functioning including social skills(may contribute to: criminal history, pro-criminal associates, antisocial personality pattern, family relationships, school/ work pursuits, substance abuse, and leisure/ recreation pursuits)	Difficulties completing paperwork accurately including questionnaires, social desirability effects with the interviewer leading to provision of an inaccurate history, may give an inaccurate account of their skills, abilities, and supports	Difficulties with reading, writing and completing forms, difficulties interacting with other participants in a group setting, highly vulnerable to manipulation and exploitation by others, strong desire to fit in and be accepted by others, focus on being liked and fitting in with peer rather than course content, trying to look knowledgeable/ informed
Cognition(may contribute to: criminal history, pro-criminal attitudes, antisocial personality patterns, school/ work pursuits)	Inaccurate historian of events, difficulties understanding what information is required and relevantLimited understanding of assessment tasks and questions, unable to answer questions in a short-time frame due to slow processing speed, agreeing to things that they do not understand	Lacking problem-solving skills, slow to process and understand information while not identifying this to others, difficulties linking the intervention with other situations outside the intervention (being very concrete), learning not generalizing to other situations; difficulty understanding material/ skills presentedDifficulties understanding the requirements of orders, difficulties understanding training or group materials, interventions moving too fast to process information, difficulties with problem-solving novel and unexpected situations
Attention(may contribute to: pro-criminal attitudes, antisocial personality pattern, family relationships, school/ work pursuits, leisure/ recreation pursuits)	Difficulties attending to interview processes leading to leaving out important information, missing key pieces of information about processes leading to reduced comprehension and understanding	Difficulties keeping up with the pace of programs, easily distracted and distractible to others, missing key messages and information, difficulties tracking time for appropriate and consistent attendance
Affect and Emotional Regulation(may contribute to: pro-criminal attitudes, pro-criminal associates, antisocial personality patterns, family relationships, school/ work, substance abuse, leisure/ recreation pursuits)	Difficulty comprehending information and processes due to feeling emotionally overwhelmed, anxiety may contribute to accepting incorrect information or being unable to speak up, anger outbursts when having difficulty understanding or communicating	Difficulty working in groups, difficulties managing emotions when triggered in group setting, mood issues exacerbated by demands
Memory(may contribute to: criminal history, pro-criminal associates, antisocial personality patterns, family relationships, school/ work, leisure/ recreation pursuits)	Inaccurate history giving, tendency to fill in gaps in memory with inaccurate information (i.e., confabulation), heightened suggestibility	Difficulties retaining information and learning materials, vulnerability to suggestions from others, confusion, and frustration
Language(may contribute to: criminal history, pro-criminal attitudes, pro-criminal associates, antisocial personality pattern, family relationships, school/ work, leisure/ recreation pursuits)	Difficulties understanding what is being asked of them or the repercussions of this, difficulty expressing themselves and being able to give comprehensive and accurate answers, saying they understand when they do not, agreeing to things that they do not understand	Difficulties understanding the content of courses or training, failure to speak up about not understanding, excessive talkativeness without substantial content, ability to parrot back information without a deeper understanding or appropriate application
Academic performance(may contribute to: criminal history, pro-criminal associates, school/ work, leisure/ recreation pursuits)	Difficulties reading and writing and completing paperwork associated with assessment	Difficulties with reading and writing in completing courses or training materials, difficulties completing other paperwork associated with the conditions of their orders, becoming frustrated and easily overwhelmed with learning tasks, dropping out or becoming disruptive when tasks become too difficult
Motor Skills(may contribute to: criminal history, school/ work, leisure/ recreation pursuits)	Difficulties with physically completing forms and questionnaires due to poor fine and visuo-motor skills	Difficulties with writing down training materials, non-compliance with completing forms and paperwork, anger and frustration

(Continued)

TABLE 3 (Continued)

Brain domain of impairment in FASD and central eight impact	Example of possible impact on assessment of risk/need	Example of possible impact on implementation of services (Responsivity)
Brain Structure Abnormalities(may contribute to: school/ work, leisure/ recreation pursuits)	Hearing loss, seizures can interfere with accurate assessment, and visual difficulties	Hearing loss interferes with communication, seizures can interfere with participation in training and interventions, not wanting to speak up and draw attention to themselves, and increased medical needs interfere with attendance
Sensory(may contribute to: criminal history, pro-criminal attitudes, antisocial personality pattern, family relationships, school/ work, substance abuse, leisure/ recreation pursuits)	Giving inaccurate responses due to sensory overload, perceived non-compliance, sensory overstimulation can contribute to emotional dysregulation or difficulty with attention/ concentration	Sensory overload in intervention settings – too much noise, too many people, etc., perceived non-compliance related to distraction, frustration, and withdrawal or aggressive behaviors

5. Criminal justice and forensic mental health professionals need to be knowledgeable of and responsive to the cognitive and adaptive impairments associated with prenatal alcohol exposure.
6. Training is critical to the faithful implementation of risk/need assessment and treatment approaches in the general criminal justice population and even more so with the FASD population given their highly complex presentations and heightened vulnerabilities.

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

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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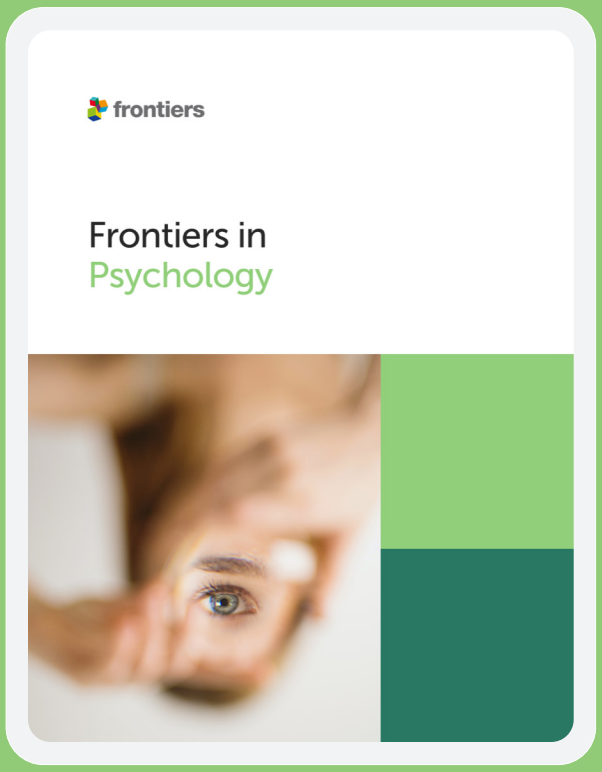

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