

The Global Impact of Multisystemic Vulnerabilities on Criminal Variety: A Cross-Continental Study in Young Adults

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Abstract

Previous research has shown a robust association between different childhood and adolescent vulnerabilities and youth offending. However, these investigations have primarily focused on youths from high-income Western countries. Consequently, the generalizability of these findings to better inform global justice policies remains uncertain. This study aimed to address this gap by examining the relationship between individual, familial, and contextual vulnerabilities and criminal versatility during young adulthood, accounting for sociodemographic factors and cross-national differences. Data were derived from a diverse sample of 4,182 young adults (67% female; mean age = 18.96;

SD=0.81) residing in 10 countries across 5 continents who participated in the *International Study of Pro/Antisocial Behavior in Young Adults*. The Psychosocial and Family Vulnerability Questionnaire and the Adverse Childhood Experiences questionnaire were used to assess social and family adversity, and past-year criminal diversity was measured with the Criminal Variety Index. Results indicate that child maltreatment, substance abuse, and delinquent peers are global risk factors for criminal variety. Moreover, they are independent across males and females and among youths living in countries that are ranked differently on the Human Development Index (HDI). In addition, some childhood vulnerabilities showed different predictive ability across sexes (e.g., school failure), and across countries ranked differently on the HDI (e.g., family dysfunction). These findings suggest that certain childhood factors contribute to criminal behavior through transcultural mechanisms. Moreover, they highlight the importance of developing evidence-based policies that focus on transcultural risk factors to globally prevent criminal behavior.

Keywords

cross-national study, risk factors, criminal behavior, non-WEIRD countries, young adulthood

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Introduction

Criminal behavior has consistently remained a significant concern, imposing substantial social, economic, and financial costs to society worldwide (Chalfin, 2016; Wickramasekera et al., 2015). It is well-established that both experiences of victimization and criminal perpetration are associated with a greater risk of a wide range of detrimental effects, including poor physical and psychological health outcomes (Semenza et al., 2021), as well as a greater risk of re-victimization (Finkelhor et al., 2007). According to Cohen and Piquero's (2009) study conducted in the United States, the potential cost savings associated with identifying and preventing one high-risk youth from becoming a chronic offender are estimated to range from \$2.6 to \$5.3 million. These findings suggest that by adequately identifying and early addressing the factors that promote the involvement and persistence of deviant behavior, criminal careers may be substantially curtailed.

Multisystemic Vulnerabilities Impacting on Criminal Behavior

A considerable body of research indicates that a network of multisystemic factors is involved in the onset, maintenance, and persistence of serious and lifelong criminal behavior (for reviews, see Basto-Pereira & Farrington, 2022; Farrington et al., 2009; Leschied et al., 2008). For instance, Widom (1989) showed that a victim of child maltreatment can have an increased risk for future arrests during adolescence (+53%) and adulthood (+38%). A later meta-analysis supported this longitudinal association, and also concluded that victims of any form of abuse or neglect may have higher rates of youth aggression (Braga et al., 2017). In a subsequent meta-analysis, Braga et al. (2018) demonstrated that the pervasive and enduring effects of child maltreatment on antisocial behavior can last up to the age of 50 years. The lack of effective parental supervision, failing to provide sufficient informal social control and, consequently, failing to establish a secure parent-child attachment, appears to be some of the underlying mechanisms that promote offending (Flanagan et al., 2019; Sampson & Laub, 2003).

It is also important to take into account the fact that multiple dysfunctional parenting patterns and dynamics are replicated later in life, particularly during the transition to adulthood. This transition, known as young adulthood and spanning ages 18 to 29, is a crucial period for social role changes and behavioral adjustments (Moffitt, 2006; Stolzenberg & D'Alessio, 2008). Therefore, this period may serve as a breeding ground for the development of risk factors associated with a range of psychosocial problems throughout adulthood (Basto-Pereira & Farrington, 2022). This is particularly the case

for alcohol and other drug misuse, which shows sharp increases in rates during late adolescence and young adulthood (Masten et al., 2008). Alcohol and other drug misuse are intertwined, and their relationship with crime is intricate and dependent on multiple life domains. In such cases, substance use can be an intrinsic element of a broader deviant lifestyle, which includes association with deviant peers, exposure to deprived contexts, and involvement in illegal or risk-taking activities (Bennett et al., 2008). Moreover, altered states of consciousness, as a result of substance abuse, increase the conformity toward deviant peers' initiatives and decrease impulse control, increasing risk for offending (Allahverdi-pour et al., 2006). In the advanced stages of alcohol or drug dependence, the risk of offending can be exacerbated by the need to finance increasing levels of dependency (Boles & Miotto, 2003).

Aside from substance abuse, other forms of mental health difficulties might be relevant for a broader comprehension of criminal behavior. However, this relationship is less clear and substantially more complex (Basto-Pereira & Farrington, 2022). For example, studies have shown that depression and somatization are associated with a gradual increase of antisocial behaviors (Vermeiren et al., 2002a). Conversely, other studies have proposed that depressive and somatic symptoms serve as protective factors against future antisocial behavior (Ritakallio et al., 2008), in situations where criminal behavior can decrease due to apathy and diminished energy (Vermeiren et al., 2002b). Thus, additional research is required to disentangle the role of mental health problems in criminal behavior, particularly across different developmental stages.

Peers also play an influential role in the onset and maintenance of criminal behavior in adolescence and young adulthood (Han & Park, 2022; Moffitt, 1993; Seddig, 2020). Socializing with deviant peers offers role models and opportunities for misconduct, while also fostering a reinforcing atmosphere that facilitates engagement in various illicit activities (Thornberry et al., 1994). Closely intertwined with the peer context, school trajectories and employment become critical settings for diminishing or fostering opportunities for a deviant life. For instance, emotional and behavioral engagement in school predicts decreases in youth delinquency (Hirschfield & Gasper, 2011). Strong bonds between adolescents and their teachers, as well as a sense of engagement to school, can facilitate the internalization of social norms and provide a protective barrier against the detrimental influence of criminal activity and disadvantaged neighborhoods (Crosnoe et al., 2002).

It is important to highlight that none of these factors are completely independent of sex, age, or even cultural and social norms. For instance, it is recognized that the relevance of different risk factors varies across males and females and throughout the life course (Scott & Brown, 2018). Laub and

Sampson (2003) argued that, during childhood and adolescence, a network of psychosocial factors (e.g., family and socioeconomic vulnerabilities), intertwined with individual characteristics (e.g., impulsivity), can provide a framework to better comprehend the involvement of criminal trajectories in criminal pathways. In contrast, during adulthood, criminal involvement is maintained by poor social bonds with the community, and the desistance from crime can be promoted by strengthening those bonds (e.g., employment, marriage; Laub & Sampson, 2003). In addition, a recent systematic review of meta-analyses (Basto-Pereira & Farrington, 2022) suggested that parenting vulnerabilities are pivotal factors to promote the onset of a criminal career, while persistence in crime during adolescence is better explained by a network of multisystemic factors that goes beyond family, including addiction, delinquent peers, occupation, and mental health.

Shortcomings in the Literature

The most significant shortcoming in the current research is the lack of representativeness of individuals living in different parts of the globe, particularly from countries with substantially different social, legal, and cultural norms. Most studies that have contributed to informing crime policies and interventions are based on data from a very exclusive segment of the world's population, mainly Anglo-Saxon Western societies (Braga et al., 2017; Nivette, 2021). Nonetheless, as Schmidt et al. (2020b) suggested, dynamic risk factors are always dependent on social and cultural norms. There is a notable scarcity of studies addressing offending prediction in highly diverse cross-cultural contexts (Carroll et al., 2023). In addition, the limited number of cross-national studies conducted in this field primarily relied on official records and only combined data from two or three Western countries (Farrington et al., 2017). These are significant and relevant limitations to the literature, especially given the fact that previous studies based on self-reports suggest that official records represent only the tip of the iceberg (Farrington et al., 2014).

Similarly, a recent systematic review by Murray et al. (2018) concluded that the number of individual studies that have examined predictors of youth violence in low- and middle-income countries is also very scarce. Nonetheless, there is some evidence demonstrating the level of similarity between the correlates found in low- and middle-income countries and high-income countries (de Ribera et al., 2019). However, there are challenges in drawing solid conclusions from this work due to the limited number of studies identified, the high level of heterogeneity in samples and methodologies, and the reduced number of factors tested across these countries (Murray et al., 2018).

It is also important to consider that most studies in the criminology field have failed to include female participants or have failed to independently analyze the female sex in mixed gender samples. Yet, a limited number of research suggests there are significant differences in risk factors for crime among males and females. In this regard, a recent meta-analysis of longitudinal studies has shown that some risk factors (such as, family substance abuse and alcohol abuse) were strongly associated with persistence in crime among female participants (Scott & Brown, 2018).

The Current Study

Taking into account that more than three-quarters of the world population lives in non-Western regions or low- or middle-income countries (Sumner, 2010), our current knowledge about crime predictors is extremely limited and poses the questions: Is the current literature on developmental crime predictors only valid for wealthy Western countries? Can we adequately inform about prevention and intervention against criminal behavior based on these studies?

The International Study of Pro/Antisocial Behavior in Young Adults was created to overcome this significant gap in the literature and contribute to informed global policies for crime prevention (Basto-Pereira et al., 2020). This is a cross-national collaborative initiative that involves self-report data collection of young adults living in 10 countries in Europe, Africa, South America, Australia, and Asia. The study focuses on the transitional period between adolescence and young adulthood, when criminal behaviors tend to peak, and when the possible desistance of crime may commence, as well as the embrace of a conventional lifestyle (Laub & Sampson, 2003). In addition, this research project evaluates criminal variety. Criminal variety (or versatility) is considered to be one of the most robust indicators of criminal behavior, because, as highlighted by some authors (Hirschi & Gottfredson, 2002; Sanches et al., 2016; van Ruitenburg & Ruiters, 2023), it integrates both frequency and severity of various deviant behaviors. Moreover, self-reported data on criminal variety may offer a more accurate view of criminal careers when compared to official records of criminal convictions (Piquero et al., 2007). Lastly, the use of self-report criminal variety indexes (CVI), as the one used in this study, facilitates the cross-cultural comparisons, as official crime statistics are hardly comparable across countries, due to the different legal backgrounds across countries (Campistol & Aebi, 2018).

Hence, the main objective of the current study is to examine whether different individual (e.g., addiction), familial (e.g., household dysfunction), and contextual (e.g., peers) vulnerabilities are associated with criminal variety in

young adults living in 10 vastly diverse countries, after accounting for sex, age, justice status, and cross-national differences. Findings from this study will contribute to the development of more universal, effective assessment, and intervention strategies, as well as policies aimed at preventing crime across cultures.

Methods

Participants

The sample included data from the *International Study of Pro/Antisocial Behavior in Young Adults* (Basto-Pereira et al., 2020). This research initiative comprised data from 4,182 participants aged between 18 and 20 years (mean age = 18.96; $SD=0.81$) and living in 10 countries (Mozambique, South Africa, Iraq, Palestine, Thailand, France, Portugal, Spain, Brazil, and Australia), across five continents, between 2018 and 2019. Sixty-seven percent of the global sample were female ($n=2,805$). A more detailed description of sociodemographic characteristics, psychosocial vulnerabilities, and criminal variety for each country and the global sample is provided in Table 1.

Measures

Psychosocial and Family Situation Questionnaire. This questionnaire was created to evaluate sociodemographic characteristics, current and past psychosocial factors, as well as familial vulnerabilities (Basto-Pereira et al., 2020). Psychosocial vulnerabilities were assessed through questions regarding the number of friends/peers who have a history of arrest, alcohol (alcohol intoxication or inebriation), and other drug misuse (illegal drugs) within the past 12 months, and the current presence of any relevant self-reported mental health condition, which may include depression, personality disorders, social phobia, etc. Questions related to previous problems with the justice system concerned adult and juvenile detentions or arrests, as well as problems with the police. Finally, familial context was addressed through questions concerning (a) being raised by a single parent in childhood or adolescence and (b) being raised in a foster home. In general, this questionnaire has a dichotomous response style, with the exception of the questions pertaining to deviant friends' networks, with a numerical discrete response (later trichotomized into zero, one, and two or more friends with a history of arrest). In addition, any alcohol or other drug misuse during the previous 12 months was evaluated using a Likert response style to assess frequency (0=did not happen;

Table I. Sociodemographic Characteristics, Psychological and Social Vulnerabilities, and Criminal Variety Scores.

Variables	Portugal		Spain		France		Iraq		Palestine		Thailand		Australia		Brazil		Mozambique		South Africa		Total		
	N	%	n	%	N	%	N	%	n	%	N	%	N	%	n	%	N	%	n	%	n	%	
Sex																							
M	228	37.01	181	37.55	71	14.55	156	38.90	49	22.37	113	26.90	149	26.75	112	55.72	175	43.75	143	35.93	1,377	32.90	0
F	388	62.99	301	62.45	417	85.45	245	61.10	170	77.63	307	73.10	408	73.25	89	44.28	225	56.25	255	64.07	2,805	67.10	0
Age (M/SD)	18.87	0.82	18.91	0.77	19.11	0.81	18.88	0.74	19.11	0.78	19.20	0.75	18.91	0.82	18.57	0.77	18.93	0.85	19.07	0.84	18.96	0.81	0
Schooling and occupation																							
Years of schooling (M/SD)	11.40	1.29	12.53	1.10	12.95	1.80	12.08	0.32	12.63	0.98	12.38	0.87	12.62	1.74	13.87	2.24	11.16	1.71	11.65	0.68	12.23	1.53	55
School failure	289	47.07	164	34.38	89	18.31	91	22.75	5	2.28	239	56.90	82	14.72	33	16.42	244	62.40	119	31.90	1,355	32.75	44
Lack of occupation	17	2.76	26	5.41	5	1.03	1	2.5	3	1.37	2	.48	27	4.85	1	.50	38	9.52	23	5.85	143	3.43	12
Peers																							
NAF	563	92.75	445	93.49	455	95.39	380	97.44	208	95.41	398	94.76	523	93.90	178	90.82	337	89.39	278	74.93	3,765	92.08	93
0	26	4.28	20	4.20	13	2.73	6	1.54	3	1.38	8	1.90	19	3.41	6	3.06	22	5.84	33	8.89	156	3.82	
≥2	18	2.97	11	2.31	9	1.89	4	1.03	7	3.21	14	3.33	15	2.69	12	6.12	18	4.77	60	16.17	168	4.11	
Family factors																							
Single parent	138	22.44	58	12.11	98	20.29	228	59.38	169	77.17	116	27.62	82	14.72	60	29.85	166	42.03	162	40.91	1,277	30.80	33
Foster home	11	1.79	8	1.66	10	2.05	2	.50	1	.46	1	.24	5	.90	0	.00	25	6.27	63	15.99	126	3.00	7
Child maltreatment																							
0	425	73.53	320	67.51	286	59.58	218	56.92	84	41.38	253	60.24	266	56.96	95	51.08	100	30.77	103	29.51	2,150	55.60	317
1	90	15.57	93	19.62	113	23.54	81	21.15	64	31.53	96	22.86	101	21.63	46	24.73	115	35.38	65	18.62	864	22.40	
≥2	63	10.90	61	12.87	81	16.88	84	21.93	55	27.09	71	16.90	100	21.41	45	24.19	110	33.85	181	51.86	851	22.00	
Family dysfunction																							
0	266	43.68	236	48.96	178	36.70	293	73.80	128	58.72	212	50.48	160	29.41	59	29.50	108	27.62	64	16.54	1,704	41.20	49
1	171	28.08	149	30.91	145	29.90	72	18.14	51	23.39	123	29.29	165	30.33	61	30.50	102	26.09	98	25.32	1,137	27.50	
≥2	172	28.24	97	20.12	162	33.40	32	8.06	39	17.89	85	20.24	219	40.26	80	40.00	181	46.29	225	58.14	1,292	31.30	
Mental health and addiction																							
Drug use	186	30.29	183	38.13	168	34.85	10	2.50	1	.46	19	4.52	194	91.51	22	10.95	52	13.40	148	38.54	983	25.87	382
Alcohol abuse	351	57.17	394	81.74	337	69.92	6	1.50	2	.91	188	44.76	414	97.41	89	44.28	136	34.78	263	68.13	2,180	54.23	162
Mental health prob.	13	2.12	6	1.25	31	6.39	24	6.00	6	2.74	16	3.81	151	27.11	6	2.99	13	3.29	75	19.04	341	8.20	18
Justice contact																							
Police contact	73	11.91	88	18.33	31	6.42	6	1.50	3	1.37	28	6.67	29	5.21	11	5.50	25	6.48	67	17.05	361	8.70	31
Juvenile arrest	4	.65	9	1.89	1	.21	6	1.51	0	.00	9	2.14	2	.36	1	.50	26	6.53	46	11.83	104	2.50	23
Adult arrest	8	1.30	6	1.25	1	.21	11	2.75	2	.91	6	1.43	3	.54	1	.50	18	4.60	48	12.12	104	2.50	18
Criminal variety	.96	1.49	1.45	1.84	2.75	3.50	.69	1.20	1.26	1.62	.68	1.26	.96	1.37	1.03	1.33	1.13	1.71	2.36	2.67	1.34	2.08	65
HDI	866	.905	903	.686	715	.800	.951	.754	.446	.385													

Note. M = male; F = female; NAF = number of arrested friends; drug use = drugs used in the last 12 months; alcohol abuse = alcoholic inebriation in the last 12 months; prob. = problems; NA = missing data; HDI = Human Development Index.

1 = annually; 2 = monthly; 3 = weekly; and 4 = daily). Subsequently, the questions about alcohol and other drug use were dichotomized for each substance type: 0 = did not happen, and from 1 to 4 = occurred at least once during the previous year.

Adverse Childhood Experiences Questionnaire. The Adverse Childhood Experiences (ACE) questionnaire (Dube et al., 2003; Felitti et al., 1998) is a self-report questionnaire evaluating a set of potentially stressful and traumatic experiences during the first 18 years of life. These experiences encompass three broader areas: abuse, neglect, and household dysfunction. Child maltreatment includes experiences of physical, sexual and emotional abuse, and physical and emotional neglect. Household dysfunction includes experiences of parental separation/divorce, exposure to domestic violence against the mother/stepmother, living in a household with substance abuse, mental illness, and incarceration of an adult family member. Child abuse and neglect items are evaluated using a 5-point Likert scale (“never” to “too often”). Questions related to household dysfunction are assessed using a dichotomous response style, except for exposure to domestic violence, which is assessed using a 5-point Likert scale. The ACE questionnaire was scored according to the author’s guidelines (Dube et al., 2003), classifying each one of the experiences of abuse, neglect, and household dysfunction as “present” or “absent.” Finally, the total number of different forms of child maltreatment and household dysfunction experiences was calculated and divided into three different categories (0 = none; 1 = one; 2 = two or more). Validity and reliability of this instrument have been extensively supported by multiple studies, finding strong associations between ACEs and a wide range of social problems, detrimental behaviors and negative health outcomes through the lifespan. For example, ACEs are linked to over 40 negative outcomes, such as chronic somatization, mental illnesses (depression, anxiety), risk behaviors (smoking, alcoholism, deviant behavior), and other outcomes that can cause long-term deterioration in global health (Jelley et al., 2020; Struck et al., 2021). The ACE questionnaire is one of the most widely used questionnaires in research (Schmidt et al., 2020a). Therefore, using this questionnaire facilitates the comparison of our findings with existing research and the simultaneous replication of our research by others. Basto-Pereira et al. (2020, 2022) have provided a detailed description of the ethical and practical issues related to the administration, scoring, and standardization of the ACE questionnaires in the different countries.

Criminal Variety Index. The CVI (Basto-Pereira et al., 2022; Sanches et al., 2016) is a 10-item self-report index evaluating the variety of criminal acts

committed during the previous 12 months. It comprises a subset of questions derived from the Deviant Behavior Variety Scale (DBVS; Sanches et al., 2016), and uses a dichotomous response style. The CVI was developed to address potential differences in the classification of deviant behavior across cultures. In this sense, all items from the DBVS that were not classified as illegal in any of the countries involved (e.g., drug use) were excluded, resulting in a 10-item index that assesses the commitment of behaviors during the previous 12 months that are consistently classified as illegal across all countries included in this cross-national initiative. Those items included are: property damage (“Damaged or destroyed public or private property?”; “Done graffiti on buildings or other locations [e.g., school, public transports, walls]?”), several types of theft (“Used a motorbike or a car to go for a ride without the owner’s permission?”; “Stolen something worth more than 50 euros?”; “Stolen something worth between 5 and 50 euros?”; “Stolen something worth less than 5 euros?”), driving without license (“Drove a motorbike or a car without having a driver’s license?”), vehicle theft and burglary (“Broken into a car, house, shop, school, or other building?”), drug trafficking (“Sold drugs [e.g., hashish, marijuana, cocaine, ecstasy, amphetamines]?”), and aggression (“Hit an adult [e.g., teacher, family, security guard]?”). Basto-Pereira et al. (2022) have provided a detailed description of the CVI items.

The United Nations Human Development Index. The United Nations Human Development Index (United Nations Development Program [UNDP], 2023) is an indicator of the country’s level of well-being, prosperity, and opportunities for individual growth (Ngoo & Tey, 2019). It is calculated using national indicators relating to education (e.g., mean years of school), health (e.g., life expectancy at birth), and income (e.g., gross national income per capita). Each country is quantitatively classified on a scale from 0 to 1.00, and qualitatively distributed across four tiers: (a) very high (≥ 0.80); (b) high (0.70–0.79); (c) medium (0.55–0.69); and (d) low ($\text{HDI} < 0.55$).

Procedures

To standardize procedures and guarantee scientific rigor and ethical procedures across the 10 countries involved in this study, the lead researchers in each country agreed to the terms of the present study and received guidelines with detailed information on the methodology to be implemented. A full description of the procedures was detailed in Basto-Pereira et al. (2020). Participants were recruited using convenience and snowball sampling methods from various community settings, including workplaces, universities,

high schools, online, and sports and social organizations. A total of 79.7% of the sample completed all questionnaires used in this study, leading to a final sample of 3,335 participants.

The *International Study of Pro/Antisocial Behavior in Young Adults* was approved by the Ethics Committee of *Ispa—Instituto Universitário* (Lisbon), which is the project coordinator's university institution. The required ethical and/or legal authorizations were obtained in each of the 10 countries. Participants also provided informed consent after the research project was explained and before they filled out the questionnaires.

Analytic Strategy

Six multilevel random-intercept negative binomial regression models were conducted to examine the impact of familial, psychological, and social vulnerabilities (i.e., sex, age, child maltreatment, family dysfunction, family structure, number of friends who have been arrested, schooling delays, mental health, alcohol/substance abuse) on young adults' criminal variety after taking into account the data's nested nature (i.e., the relationship between young adults residing in the same country). Negative binomial models were used to evaluate the number of different self-reported crimes committed in the previous 12 months, which is a count variable. Poisson regression models are also suitable for a count outcome, but in this case, these were not an option as the criminal variety outcome variable was positively skewed and over-dispersed (Heck et al., 2013). Independent variables are referred to as "predictor" variables and dependent variables as "outcome" variables. Five subgroups were analyzed: (a) males; (b) females; (c) participants living in countries with a very high level of social well-being according to the HDI (≥ 0.80); (d) participants living in countries ranked in the high, medium, or low tiers of the HDI (< 0.80); and (e) young adults with previous justice problems. In addition, for reasons of simplicity and interpretation, count (number of arrested friends; child maltreatment; household dysfunction), ordinal (alcohol and drug use), and non-dichotomic categorical (occupation) psychosocial risk factors were transformed into variables with a small number of categories. Descriptive statistics were conducted using SPSS Version 28.0. Multilevel models were run out using the GLMM adaptive package for R software (R Core Team, 2021).

Results

Six negative binomial multilevel random-intercept models were run to examine the intercultural universality of multisystemic vulnerabilities on current

criminal variety (Table 2). Lower log-likelihood values were found for each of the final models when compared with the null model. The log-likelihood ratio (or deviance) test was statistically significant ($p < .001$), confirming a better fit for each of the six final models when compared with the respective null models. In addition, the intraclass correlation coefficient (ICC) indicated that nationality accounted for 14.1% of the criminal variety during the previous 12 months. The ICC of the null model was similar in the male and female subsamples (15.4%). The ICC was lower in the subsample of youths who had been involved in justice systems (11.8%) and in the subsample of the HDI bottom-half-tier countries (11.6%); higher values were found for the top-half-tier countries (16.4%).

As seen in Table 2, in the total sample, child maltreatment, multiple forms of household dysfunction, large numbers of friends who had been arrested, repeating at least 1 year in school, and drug or alcohol abuse in the previous 12 months were statistically significant predictors of self-reported criminal variety, after taking into account the impact of sex, age, and cross-national differences.

The number of friends who had been arrested was the strongest predictor of criminal variety (see Table 2). Compared with those participants who did not have friends who were currently under arrest or who had been arrested before (number of arrested friends), having one friend with a criminal history increased the odds of self-reported criminal variety by 48%, and having two or more friends with criminal history increased the number by 61%.

Child maltreatment, the number of friends arrested, and drug use showed a predictive ability across all five subgroups. Having two or more friends with a history of arrest was the most important predictor among females and among participants in the HDI top-half-tier countries. By contrast, for participants living in the HDI bottom-half-tier countries and for participants with previous justice problems, to have been the victim of at least one form of child maltreatment was the most relevant predictor of self-reported criminal variety during the previous year.

Discussion

To our knowledge, this is the first study to examine the intercultural multisystemic vulnerabilities and criminal versatility, using a cross-national design that encompasses countries from a broad cultural and socioeconomic segment of the world population (Braga et al., 2017; Nivette, 2021). The primary objective of this research was to investigate whether various individual, familial, and contextual factors were linked to criminal versatility among young adults living in 10 diverse regions across the globe, after controlling

Table 2. Multilevel Negative Binomial Regression Models Predicting Criminal Variety.

Risk Factors	Criminal Variety														
	Sex						HDI								
	Global Sample (N=3,335)		Females (n=2,253)		Males (n=1,082)		Top Tier (n=2,045)		Lower Tier (n=1,290)		Justice Problems (n=337)				
Exp (γ)	SE	Sig.	Exp (γ)	SE	Sig.	Exp (γ)	SE	Sig.	Exp (γ)	SE	Sig.	Exp (γ)	SE	Sig.	
(Intercept) γ00	0.86	0.15	.32	0.45	0.17	<.001	0.89	0.15	.44	0.88	0.27	.634	0.78	0.16	.11
Sex (F=1) γ10	0.55	0.05	<.001	—	—	—	—	—	—	0.57	0.07	<.001	0.51	0.08	<.001
Age (≠19) γ20	1.08	0.06	.18	1.13	0.08	.14	1	0.08	.98	1.05	0.08	.53	1.15	0.09	.13
Age (≧20) γ30	0.97	0.06	.64	0.97	0.08	.72	0.97	0.09	.68	0.96	0.08	.65	0.99	0.09	.93
Child matr. (≠1) γ40	1.38	0.06	<.001	1.45	0.08	<.001	1.28	0.09	.004	1.38	0.08	<.001	1.47	0.10	<.001
Child matr. (≧2) γ50	1.56	0.07	<.001	1.70	0.09	<.001	1.42	0.10	<.001	1.31	0.09	.003	1.90	0.10	<.001
Family dyf. (≠1) γ60	1	0.06	.96	1.02	0.08	.81	0.98	0.09	.85	0.96	0.08	.56	1.1	0.10	.36
Family dyf. (≧2) γ70	1.24	0.07	.001	1.24	0.09	.02	1.23	0.09	.03	1.13	0.09	.15	1.43	0.10	<.001
Family structure γ80	1	0.06	.99	1.03	0.08	.68	0.95	0.08	.55	1.1	0.08	.24	0.93	0.08	.34
NAF (≠1) γ90	1.48	0.11	<.001	1.55	0.18	.01	1.39	0.13	.01	1.57	0.15	.003	1.35	0.15	.05
(=2 or more) γ100	1.61	0.12	<.001	2.01	0.20	.001	1.40	0.13	.009	1.69	0.18	.003	1.53	0.14	.003
School RF γ110	1.19	0.06	.002	1.22	0.08	.01	1.1	0.07	.21	1.16	0.07	.03	1.23	0.09	.02
Occupation RF γ120	1.13	0.14	.37	1.13	0.22	.56	1.1	0.16	.57	1.2	0.19	.32	1.13	0.20	.55
MHealth γ130	1.11	0.10	.32	1.08	0.13	.54	0.97	0.17	.86	1.11	0.14	.45	1.16	0.14	.30
Drugs Ab. 12M γ140	1.58	0.06	<.001	1.56	0.09	<.001	1.51	0.08	<.001	1.6	0.08	<.001	1.44	0.11	.001
Alcohol Ab. 12M γ150	1.31	0.06	<.001	1.21	0.08	.03	1.54	0.09	<.001	1.38	0.08	<.001	1.17	0.10	.11
Var. (intercept) γ0	1.18	0.18		0.20	0.20		0.15	0.15		0.31	0.31		0.07	0.07	
Model fit															
LL (intercept)		-6.310.75			-3.786.74		-2,412.22		-3,865.25		-2,443.06		-950.53		-950.53
LL (final model)		-4.916.09			-3,034.58		-1,863.87		-3,112.58		-1,784.27		-682.85		-682.85
LRT model comparison (Sig)		2,789.33 (<.001)			1,504.33 (<.001)		1,096.71 (<.001)		1,505.34 (<.001)		1,317.59 (<.001)		535.38 (<.001)		535.38 (<.001)

Note. F = female; family dyf. = five adversity ACEs; ACE = Adverse Childhood Experiences; family struct. = raised by a single parent and/or was in Foster Care; NAF = number of arrested friends; School RF = repeated at least 1 year in school; occupation RF = not working or studying; MHealth = self-report a serious mental health issue; Reference = 0; Sig. = p-value; LL = Log-likelihood; HDI = Human Development Index.

for sociodemographic characteristics, justice involvement, and cross-national differences.

Our findings show that five out of nine dynamic childhood vulnerabilities (namely, child maltreatment, family problems, alcohol/substance abuse, delinquent peers, and school problems) were predictors of criminal variety in the global sample. Notably, child maltreatment, having friends who have been arrested, and recent drug use were significant predictors of criminal versatility for male and female young adults living in low/middle- and high-income countries, as well as for youths with prior involvement with the justice system. The varied cross-cultural and cross-sex childhood vulnerabilities suggest a complex and multisystemic nature of criminal behavior development, encompassing shared biological, social, and psychological dimensions. For instance, both child maltreatment and drug use may lead to changes in brain development that affect sensory systems, network architecture, and neural circuits which then, in turn, increase likelihood of criminal behavior (Squeglia & Gray, 2016; Teicher et al., 2016).

The strongest predictor of criminal variety was the number of friends who had been arrested. In line with the differential association theory (Akers & Jennings, 2016), a large network of deviant friends provides multiple models and opportunities for criminal behavior. Therefore, these findings emphasize the crucial role played by socialization processes during adolescence and young adulthood, in particular within deviant peer groups (Haynie & Osgood, 2005).

These developmental risk factors not only affect multiple dimensions of youth development but may also interact with each other. Some forms of child maltreatment, such as neglect, may facilitate unsupervised and inadequate parenting styles, thereby increasing the likelihood of affiliating with delinquent peers. Concurrently, affiliation with delinquent peers may enable access to illegal drugs (McGloin et al., 2007; Thornberry et al., 1994), which is associated with a general deviant lifestyle and altered states of consciousness that facilitate peer conformity, thus increasing the likelihood of engaging in criminal behavior (Allahverdipour et al., 2006; Bennett et al., 2008). In this complex interaction system, additional structural variables may shape behaviors that violate basic and nearly universal social and legal norms. Such variables include the level of neighborhood crime, the affordability of the welfare state, national homicide rates, and unemployment rates (Vazsonyi et al., 2018; Zhang et al., 2001). These structural factors may boost the youth involvement in the criminal justice system and a greater diversity of criminal activity (McGloin et al., 2007).

In line with Jones and Hoffmann (2023), our findings suggest that exposure to multiple forms of victimization (poly-victimization) manifest a

heightened risk of involvement in delinquent behaviors. According to the social learning approach (Akers & Jennings, 2016), children who are raised exposed to, or who have been victims of, violence may come to learn that those acts are acceptable ways to respond to similar situations in life and may imitate and perpetuate these dysfunctional behaviors throughout their lives (Braga et al., 2017).

Predictors of Criminal Versatility: Cross-Cultural Differences Among Females and Males

None of the risk factors discussed are completely independent of sex, income level, or even cultural and social norms. In this study, among the subgroup of youths living in countries with a very high HDI ranking, the most important predictor of criminal variety was the number of friends with a history of arrest. In addition, the effect size was larger in female participants than in male participants. These findings may appear counterintuitive, considering the well-established evidence that males have greater exposure to deviant peer influence, are more susceptible to peer pressure, and are more inclined to engage in risk-taking behaviors (Defoe et al., 2020). Interestingly, these results may derive from the fact that young women tend to be more resistant to deviant peer influences, and having friends with a history of arrest may be a less common risk factor for females (McCoy et al., 2019). Thus, when present, they may face more detrimental outcomes. Along these lines, having friends with histories of arrest in countries ranked in the top half of the HDI is a less common risk factor and, for that reason, they may appear as a more salient risk factor for criminal behavior.

Our findings suggest that experiencing child maltreatment emerges as the foremost predictor of criminal versatility among countries with a lower tier HDI ranking. This pattern also holds true for participants with prior involvement in the justice system, independently of their country. These results appear to highlight the importance of the family context as a potential buffer for macro-structural and socioeconomic challenges (e.g., population affordable access to healthcare, justice, and education services) that are particularly salient in countries with lower HDI rankings (Schofield et al., 2012), and in families supporting youths labeled as deviant (Lösel & Farrington, 2012). Indeed, established cultural frameworks, such as the dimensions of collectivism versus individualism, may introduce subtle nuances to these associations. For instance, they might affect the relevance of family context, group solidarity, and the expression of negative emotions (Hofstede, 1980; Matsumoto et al., 2008). In addition, different cultures, religions, and child-rearing practices influence how parents and society perceive and understand child

maltreatment. In some Asian cultures, corporal punishment is a common child-rearing practice and is often seen as a form of caring (Deater-Deckard et al., 2005; Sudo et al., 2023). However, the use of physical punishment is negatively associated with children's perception of parental care (Sudo et al., 2023). The diverse cultural, economic, and legal backgrounds reflected in this study could shape different coping mechanisms for vulnerabilities and, consequently, lead to diverse responses to criminal behavior.

As aforementioned, child maltreatment is also the most relevant predictor of self-reported criminal variety among justice-involved youths, emphasizing the consistent and consequential link between childhood maltreatment and subsequent offending (Basto-Pereira et al., 2016; Gomis-Pomares & Villanueva, 2020). Interestingly, participants' occupation was only a predictor for self-reported criminal variety among justice-involved youth, underlying the significance of turning points, linked to community-based social bonds in the process of crime desistance (Basto-Pereira & Farrington, 2022; Laub & Sampson, 1993).

Contrary to our expectations, self-reported mental health problems were not a predictor of criminal variety in any of the analyses. In this regard, different meta-analyses have yielded distinct results (Assink et al., 2015; Scott & Brown, 2018). This may be due to the polysemic nature and imprecise borders of mental health problems. Whereas certain mental health problems (e.g., attention deficit and hyperactivity disorder) may significantly contribute to the likelihood of engaging in criminal behavior, other forms may have no bearing on antisocial behavior or could even act as protective factors, despite their detrimental impact on the individual's well-being (e.g., depression; Mohr-Jensen et al., 2019). Future studies should further explore different forms of mental health problems and the role of significant psychopathological symptomatology in the development of criminal pathways.

Strengths and Limitations

To our knowledge, this is the first large, cross-national study to explore the link between a wide range of developmental risk factors and criminal variety using self-reported data collected in each country. This is a relevant strength of this research work, because multiple studies have suggested that criminal data from official convictions, and official reports from child maltreatment cases, are likely to substantially underestimate the true rate of crime and victimization (Basto-Pereira & Farrington, 2019; Gomes et al., 2019). In addition, it is noteworthy that all participants came from a homogeneous age group (Jager et al., 2017), consisting of young adults between ages 18 and

20 years. Finally, this study encompassed one of the largest, most culturally diverse samples in the field of female-offending research, including a large range of predictors from different levels of analysis, measured consistently across countries.

Despite these strengths, this study does have relevant limitations. First, although a wide range of risk factors were assessed, there are other relevant factors that should be taken into account in future cross-national studies, allowing for the analyses of relevant macro-level risk factors, such as the influence of neighborhood-level predictors (Su et al., 2023). In addition, more qualitative investigations within each participant country will substantially enrich the current state of the art in the field. This approach would provide a better understanding of why some risk factors appear to be universal while others are more culturally rooted. It would also help to understand how the legal norms or policies on crime and substance abuse in each country shape the impact of these risk factors. Second, our sample was recruited using a cross-sectional, non-probabilistic sampling methodology. Future studies should conduct cross-national research with randomized sampling, using the combination of self-report data and official records. Moreover, we also highlight the need for more cross-national longitudinal data, which would enable more accurate assessment of the causality of factors related to childhood with criminal variety, which do not rely on retrospective recall.

Final Conclusions and Policy Implications

The findings of the current study suggest that childhood vulnerabilities are linked to criminal behavior through transcultural and multisystemic mechanisms. More specifically, childhood maltreatment, drug use, and a network of deviant friends are significant risk factors that predict criminal versatility among males and females living in countries with varying levels of HDI. Concomitantly, whereas these risk factors appear to be consistent across diverse settings, their magnitude and implications may vary. This highlights the need for nuanced approaches in applying these findings universally, emphasizing the importance of context-specific adaptations in policy and practice.

Since the majority of studies addressing criminal behavior use predominantly male samples, during the data collection, efforts were made to achieve a gender-balanced sample. In this study, each national team was requested to include at least one-third of both male and female participants. It was also required that at least 10% of the participants in all samples were students and non-students aged 18 to 20. Significant intra-sample differences based on characteristics like gender, age, and socioeconomic status were observed,

indicating that these factors can influence the prevalence and impact of predictors of criminal behavior. Future research should investigate deeper into these differences, exploring how the intersections of these and other characteristics, such as ethnicity and educational background, within and across countries, affect these outcomes.

In addition, it is crucial to account for the nature of population diversity that influences criminal behavior across different countries and cultural contexts. Although the concepts and categorizations of diversity may take different forms outside the Western world, particularly regarding ethnicity, their consideration is vital for a truly comprehensive understanding of these findings. This perspective not only challenges us to think innovatively about addressing and considering various forms of diversity within countries in cross-cultural research but also highlights a limitation of our study. Such studies are crucial for developing targeted intervention strategies that address the specific needs of diverse population subgroups.

In a nutshell, this work may contribute as an exploratory step for the development of effective intervention programmes aimed at preventing criminal behavior on a global scale. To achieve this, we recommend that international institutions, such as the United Nations Office on Drugs and Crime and the World Health Organization, promote policies that address poly-victimization, association with deviant peers, and drug use as key components for prevention of youth delinquency and mitigation of adverse outcomes.

In particularly resource-limited countries, the priority should be to raise awareness and strengthen institutions that can protect children from maltreatment and other forms of victimization. In addition, governments should implement evidence-based strategies for early prevention and intervention in child maltreatment. It is vital to emphasize the importance of adopting trauma-informed approaches in all daily settings where children are present, such as schools and youth detention centers. This last recommendation is paramount to promoting a safe and supportive environment for children who have experienced trauma (Roseby & Gascoigne, 2021; Substance Abuse and Mental Health Services Administration, 2023).

Given the significant impact of deviant peers on criminal behavior, justice policies must aim to prevent the concentration of youth with deviant lifestyles in closed detention centers or lengthy prison sentences. Desistance turning points are essential since it allows to counter negative effects from justice system labeling effects and create new opportunities. Along this same line, it is crucial to invest resources in providing, adapting, and disseminating evidence-based programmes to prevent drug misuse and help adolescents who already have drug addiction problems. These recommendations, applied at a global level, may contribute to breaking intergenerational cycles of crime, violence, and social marginalization.

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