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A longitudinal study of the impact of childhood adversity dimensions on social and psychological factors and symptoms of psychosis, depression, and anxiety

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ABSTRACT

The present study examined three empirically-derived childhood adversity dimensions as predictors of social, psychological, and symptom outcomes across three prospective assessments of a young adult sample. Participants were assessed five times over eight years with semi-structured interviews and questionnaires. The analyses used the dimensions underlying multiple subscales from well-established childhood adversity measures administered at the first two assessment waves (described in a previous report). Outcome data pertain to the last three assessment waves, with sample sizes ranging from 89 to 169. As hypothesized, the childhood adversity dimensions demonstrated overlapping and differential longitudinal associations with the outcomes. *Deprivation* predicted the negative (deficit-like) dimension of psychosis, while *Threat* and *Intrafamilial Adversity* predicted the positive (psychotic-like) dimension. Depression and anxiety symptoms were predicted by different childhood adversity dimensions over time. Furthermore, *Threat* predicted a smaller and less diverse social network, *Intrafamilial Adversity* predicted anxious attachment, and *Deprivation* predicted a smaller social network, anxious and avoidant attachment, perceived social support, and loneliness. The three adversity dimensions combined accounted for moderate to large proportions of variance in several outcomes. These results extend prior work by identifying associations of three meaningful dimensions of childhood adversity with different risk profiles across psychological, social, and psychopathological domains. The findings enhance our understanding of the impact of childhood adversity across young adulthood.

1. Introduction

Several environmental experiences have been investigated for their etiological relevance to mental health outcomes (Brown, 2011; Hammen, 2005; van Os et al., 2010). Among these experiences, childhood adversities have received substantial attention and are increasingly recognized as contributing to the unfolding of maladaptive social and psychological processes and the development of diverse forms of psychopathology (Doom and Cicchetti, 2018; McCrory and Viding, 2015; Mondelli and Dazzan, 2019). The term childhood adversity reflects an array of negative environmental experiences occurring in childhood and adolescence, such as maltreatment, peer bullying, or exposure to domestic violence (Bifulco and Thomas, 2012). These experiences constitute deviations from the expectable environment and are likely to require considerable adaptation by the child (McLaughlin, 2016).

Research shows that childhood adversity can have deleterious effects on psychological and social outcomes (Doyle and Cicchetti, 2017; McCrory et al., 2022). For example, there is evidence that individuals with histories of childhood adversity are more likely to have impoverished social networks and to experience loneliness and social functioning difficulties (de Heer et al., 2022; Handley et al., 2019; McCrory et al., 2022). Furthermore, adverse experiences within the caregiving environment are associated with different forms of attachment insecurity in adulthood (Bifulco and Thomas, 2012; Raby et al., 2017).

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With regard to psychopathology, childhood adversity is associated with the risk for and course of a range of clinical conditions and subclinical manifestations—including anxiety, depression, and psychosis-spectrum phenotypes (Cohen et al., 2019; Copeland et al., 2018; Humphreys et al., 2020; Trotta et al., 2015; Varese et al., 2012). Given the reported continuity between the clinical and subclinical expressions of these phenotypes (Barrantes-Vidal et al., 2015; Schreuder et al., 2021; van Os, 2013), the longitudinal investigation of subclinical expressions may shed light on risk and protective processes while minimizing potentially confounding factors (e.g., treatment and chronicity) associated with clinical status (Barrantes-Vidal et al., 2015; Kwapil and Barrantes-Vidal, 2012).

Various studies using a cumulative approach indicate that experiencing an increased number of adversities is associated with increased risk for anxiety, depression, and psychosis-spectrum outcomes (Copeland et al., 2018; Kim et al., 2021a; Morgan et al., 2020). In addition, although findings are not always consistent, some work suggests that distinct adversities pose an elevated risk for different psychopathology domains. For instance, whereas the negative dimension of psychosis generally shows stronger or more consistent links with experiences of neglect than with other adversities, the positive dimension of psychosis has been prominently linked with experiences involving hostility or interpersonal violence, such as bullying and different subtypes of abuse (e.g., Arseneault et al., 2011; Bailey et al., 2018; Catone et al., 2015; Dizinger et al., 2022).

Much of the research on childhood adversity has focused on examining individual adversity subtypes or the number of adversities experienced; however, exclusive reliance on these approaches is unlikely to fully elucidate the effects of childhood adversity and its underlying mechanisms, underscoring the need for complementary approaches (for reviews, *see* Lacey and Minnis, 2020; McLaughlin et al., 2021). In this context, an influential theory-driven framework proposes operationalizing childhood adversity by distinguishing between the dimensions of threat (adversities that involve harm or the threat of harm) and deprivation (adversities that involve a lack of expected environmental input)—as these dimensions are likely to impact some developmental processes in at least partially different ways (McLaughlin and Sheridan, 2016). Indeed, multiple studies have supported this approach (McLaughlin et al., 2021; Schäfer et al., 2023), although it has also been noted that not all adversity subtypes map onto this framework (Smith and Pollak, 2021). At the same time, scholars have increasingly used data-driven approaches to identify meaningful dimensions of adversity (Lacey and Minnis, 2020), and recent research demonstrates the utility and explanatory power of empirically-derived childhood adversity dimensions for investigating associations with behavioral and psychopathological outcomes (e.g., Brieant et al., 2023; Brumley et al., 2019).

Despite a growing interest in theoretically- and empirically-derived dimensions of adversity, the longitudinal impact of different adversity dimensions on social-psychological factors and symptoms of psychopathology is still understudied and incompletely understood. Furthermore, the associations of childhood adversity with specific outcomes may vary across time (McGinnis et al., 2022). For example, Schäfer et al. (2023) found that threat predicted general psychopathology cross-sectionally and longitudinally, whereas deprivation predicted general psychopathology longitudinally. Therefore, further multi-wave, longitudinal research is needed to elucidate the specificity of dimension-outcome associations at different time points. In this regard, young adulthood may be a crucial developmental stage for examining such associations since it represents a peak period for the onset of psychopathology and an opportunity for prevention efforts (*see* Cicchetti, 2023; McMahon, 2014).

1.1. Present study

In a previous report (Gizdic et al., 2023), we used the Barcelona Longitudinal Investigation of Schizotypy Study (BLISS; Barrantes-Vidal et al., 2013a, 2013b) baseline sample to identify the dimensions underlying interview and self-report assessments of a range of childhood adversities and examine their cross-sectional association with measures of psychopathology. Our findings indicated that the *Deprivation* dimension was uniquely associated with schizoid symptoms and negative schizotypy, the *Intrafamilial Adversity* dimension with schizotypal symptoms, and the *Threat* dimension with anxiety, depression, and psychosis-spectrum symptoms. In the present study, we examined the associations of the adversity dimensions with a broad spectrum of social, psychological, and symptom outcomes across the three most recent assessments of the BLISS sample—the last one spanning almost eight years since the first assessment. Specifically, we sought to extend our previous findings by 1) examining how baseline adversity dimensions predicted psychopathology symptom domains at three prospective assessments, and 2) including social and psychological outcomes relevant to adversity exposures, such as attachment styles, perceived social support, and loneliness.

We hypothesized that exposure to childhood adversity would predict greater levels of psychopathology, insecure attachment, loneliness, and diminished social adjustment and support. Based on previous work (e.g., McLaughlin et al., 2020) and our cross-sectional findings, we expected that the *Threat* dimension would show broad associations with symptoms of psychopathology across time. Furthermore, within the psychosis symptom domains, we expected *Threat* to show more consistent associations with measures of the positive symptom dimension and *Deprivation* with the negative symptom dimension. Regarding the *Intrafamilial Adversity* dimension, we did not offer specific hypotheses related to psychopathology, but we expected associations with insecure attachment based on prior research on adverse experiences with caregiving figures (Bifulco and Thomas, 2012). Despite the advantages of a longitudinal design, we note that our sample sizes and measures vary across time points and explicitly acknowledge this as a limitation of this study.

2. Methods

2.1. Participants and procedure

The data are drawn from the BLISS (Barrantes-Vidal et al., 2013a, 2013b), a multi-wave investigation examining risk and resilience for psychopathology. Students from the Universitat Autonoma de Barcelona were assessed at five time points across a mean interval of 7.8 years (SD = 0.5 years). At T1, 547 participants (mean age = 20.6 years; SD = 4.1; 83 % women) were screened, and a subset of this sample was invited to participate in an interview study, oversampling participants with standard scores based upon sample norms of at least 1.0 on measures of schizotypy and psychotic-like experiences, resulting in 214 participants at T2 (mean age = 21.4 years; SD = 2.4; 78 % women). Due to funding constraints, 103 participants were assessed at T3 (mean age = 23.5; SD = 2.6; 62 % women) that retained the original distribution of schizotypy scores, and 89 of this subset were re-assessed at T4 (mean age = 24.8; SD = 2.7; 62 % women). Finally, at T5, we contacted T2 participants and re-assessed 169 (79 % of 214 candidate participants; mean age = 28.0; SD = 2.4; 81 % women). The university ethics committee approved the study and participants provided informed consent at each assessment wave.

2.2. Measures

2.2.1. Childhood adversity

At T1, childhood adversity was measured using the Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998), and at T2 with two interview measures—the Childhood Experience of Care and Abuse (CECA; Bifulco et al., 1994) and the Interview for Traumatic Events in Childhood (ITEC; Lobbestael et al., 2009; Lobbestael and Arntz, 2010).

As described in detail in Gizdic et al. (2023), we conducted a Principal Component Analysis to identify the dimensions underlying

multiple subscales from these measures. We identified four dimensions that explained 63 % of the total variance: *Intrafamilial Adversity* (experiences within the caregiving environment, such as parental discord and role reversal), *Threat* (experiences including bullying and abuse), *Deprivation* (experiences of neglect), and *Sexual Abuse* (experiences of sexual abuse). Given that a very small proportion of participants in the sample endorsed experiences of sexual abuse, we did not use this dimension in the statistical analyses in the present study.

2.2.2. Psychopathology

At T3-T5, we used the suspiciousness subscale of the Schizotypal Personality Questionnaire (SPQ; Raine, 1991) and the short forms of the Wisconsin Schizotypy Scales (WSS-SF; Winterstein et al., 2011), which assess positive and negative schizotypy domains. Positive and negative schizotypy scores were computed following the method described in Gross et al. (2015). At T3-T4, we administered the Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2005), a structured interview to assess the psychosis prodrome and psychotic experiences. The severity of CAARMS-positive symptoms was used for analyses. We used the Structured Clinical Interview for DSM–IV Axis II Disorders (SCID–II; First et al., 1997) to assess schizophrenia-spectrum (paranoid, schizotypal, and schizoid) personality disorders (PD). Dimensional scores were computed by adding individual item ratings for each PD. At T4, we administered the Negative Symptom Manual (NSM; Kwapil and Dickerson, 2001), an interview-based rating system of a range of negative symptoms. The global summary score was used for analyses.

Depressive symptoms were assessed via interview with the Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1992) at T3 and via questionnaire with the Beck Depression Inventory-II (BDI; Beck et al., 1996) at T3-T5. To assess anxiety symptoms, we used the Beck Anxiety Inventory (BAI; Beck et al., 1988) at T3-T4 and the anxiety subscale of the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1977) at T5.

2.2.3. Social-psychological outcomes

At T3-T5, we administrated the Psychosis Attachment Measure (PAM; Berry et al., 2006) to assess anxious and avoidant attachment styles. At T4-T5, the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) was used to obtain subjective reports of social support. At T5, subjective feelings of loneliness were assessed with the 3-item UCLA Loneliness Scale (Hughes et al., 2004). Finally, social adjustment was assessed using items from the Social Network Index (SNI; Cohen et al., 1997) at T5. Specifically, the following variables were used: people in social network (number of people with whom the participant has regular contact), network diversity (number of social roles the participant interacts with), and embedded network (number of network domains in which the participant is active).

2.3. Data analysis

We calculated descriptive statistics for the study variables and computed Pearson correlations to examine bivariate associations of the childhood adversity dimensions with each psychopathology, social, and psychological outcome measure. Next, a series of linear regressions were computed to examine the unique association of the childhood adversity dimensions with the outcome measures assessed at each time point. Specifically, in each regression analysis, the three childhood adversity dimensions were entered together as simultaneous predictors to determine the effect of each dimension over-and-above the effect of the other two dimensions. Note that examining the adversity dimensions simultaneously is in keeping with current recommendations in the field of childhood adversity to investigate the specificity of the effects of adversity experiences (Cecil et al., 2017; Sheridan and McLaughlin, 2020). Effect sizes are noted in the tables following Cohen (1992). Bootstrap procedures with 2000 samples were used for the regression models.

3. Results

Descriptive statistics for the study variables are displayed in Table 1. Supplementary Table 1 presents the intercorrelations of the adversity dimensions at the time of derivation and for the samples at T3, T4, and T5. The correlations were largely consistent for the overlapping samples at the three follow-up assessments, with effect sizes generally on the order of medium effects (with the exception of large effects for *Deprivation* and *Threat* at T3 and T4).

Table 2 presents the bivariate correlations of the childhood adversity dimensions with the outcome variables assessed at T3, T4, and T5. Effect sizes for the associations of the individual adversity dimensions with the psychopathology outcomes ranged from small to large, and those with the social-psychological outcomes ranged from small to medium. Few differential patterns of associations emerged at the bivariate level.

Table 3 shows the results of the linear regression analyses examining the adversity dimensions as simultaneous predictors of the outcome variables at the three follow-up assessments. These results should be considered in light of the incremental information they provide about unique associations of the adversity dimensions with outcome measures over-and-above the information for the bivariate correlations presented in Table 2.

Regarding the schizophrenia-spectrum phenotypes, *Intrafamilial Adversity* predicted schizotypal and CAARMS positive symptoms at T3 and suspiciousness at T4. *Deprivation* predicted schizoid symptoms at T3 and schizotypal and NSM negative symptoms at T4. *Threat* predicted paranoid, schizotypal, and CAARMS positive symptoms at T3, paranoid symptoms at T4, and suspiciousness at T5. In addition, the three dimensions predicted anxiety and/or depression phenotypes. Specifically, *Intrafamilial Adversity* predicted BAI anxiety at T3; *Deprivation* predicted BAI anxiety at T3 and BDI depression at T5; and *Threat* predicted CDSS depression at T3 and SCL-90- anxiety at T5.

Regarding the social-psychological outcomes, *Intrafamilial Adversity* predicted anxious attachment at T3 and T4. *Deprivation* predicted a diminished perception of social support at T4 and a smaller social network, anxious and avoidant attachment, and increased loneliness at T5. Finally, *Threat* predicted a smaller network size and diversity at T5.

4. Discussion

In a previous study (Gizdic et al., 2023), we identified the dimensions underlying self-report and interview measures of childhood adversity and examined their cross-sectional associations with psychopathology. The current study investigated the associations between the adversity dimensions and various social, psychological, and psychopathology outcomes across three prospective assessments. To our knowledge, several of these outcomes have not been previously examined within a longitudinal framework considering different dimensions of childhood adversity simultaneously. Our results demonstrated that the adversity dimensions had overlapping and differential longitudinal associations with psychopathology symptom domains and social-psychological factors, with notable specificity identified for some outcomes. Overall, the findings extend prior research on the utility of empirically-derived dimensions of adversity and enhance our understanding of the impact of childhood adversity on different domains of functioning across young adulthood.

This study found a wider range of associations between the adversity dimensions and the outcome measures in the bivariate analyses compared with the regressions examining their unique contributions. This pattern of results aligns with our cross-sectional study and ample research focused on childhood maltreatment (Lobbestael et al., 2010; Sullivan et al., 2006). Furthermore, it seems consistent with the notion that some links between adverse experiences and developmental outcomes might be driven by what is common (shared variance) across such

Table 1
Descriptive statistics for the psychopathology, social, and psychological measures assessed at each time point.

	Time 3				Time 4				Time 5			
Measure	N	Mean	SD	Range	N	Mean	SD	Range	N	Mean	SD	Range
Psychopathology												
Positive schizotypy	102	−0.70	0.63	−1.27–3.79	89	−0.77	0.39	−1.27–2.02	169	−0.70	0.42	−1.17–2.44
Suspiciousness	102	1.33	1.78	0–8	89	1.25	1.53	0–7	169	1.44	1.57	0–8
CAARMS positive	103	1.21	2.16	0–12	89	1.17	1.96	0–9	–	–	–	–
Paranoid PD	103	1.65	2.11	0–10	89	1.65	2.30	0–12	–	–	–	–
Schizotypal PD	103	1.33	1.98	0–10	89	1.08	1.78	0–8	–	–	–	–
Negative schizotypy	102	−0.14	1.05	−1.06–4.21	89	−0.17	0.93	−1.06–4.70	169	−0.08	0.96	−1.06–5.02
Negative symptoms	–	–	–	–	89	2.13	3.05	0–13	–	–	–	–
Schizoid PD	103	1.01	1.80	0–8	89	1.02	1.95	0–11	–	–	–	–
CDSS depression	103	1.55	2.41	0–11	–	–	–	–	–	–	–	–
BDI depression	102	6.17	6.80	0–28	89	5.64	6.59	0–33	168	5.47	6.16	0–35
SCL-90 anxiety	–	–	–	–	–	–	–	–	168	5.40	4.75	0–28
BAI anxiety	102	5.00	5.77	0–42	89	5.54	5.78	0–39	–	–	–	–
Social-psychological												
Network diversity	–	–	–	–	–	–	–	–	169	4.12	1.27	0–7
People in network	–	–	–	–	–	–	–	–	169	9.36	3.98	0–21
Embedded network	–	–	–	–	–	–	–	–	169	2.02	0.85	0–4
Anxious attachment	102	1.11	0.54	0.25–2.50	89	1.00	0.54	0.13–2.50	169	1.04	0.52	0.13–2.63
Avoidant attachment	102	1.08	0.47	0.25–2.38	89	1.09	0.51	0.25–2.63	169	1.16	0.55	0.13–2.75
Loneliness	–	–	–	–	–	–	–	–	168	3.93	1.22	3–8
Perceived social support	–	–	–	–	89	72.34	10.74	35–84	168	73.26	11.24	13–84

Note: Empty rows indicate that the outcome measure was not administered at that assessment wave. N = sample size; SD=Standard deviation; CAARMS = Comprehensive Assessment of At-Risk Mental States; PD = Personality Disorder (SCID-II); CDSS = Calgary Depression Scale for Schizophrenia; BDI = Beck Depression Inventory-II; SCL-90 = Symptom Checklist-90-Revised; BAI = Beck Anxiety Inventory.

experiences (Cecil et al., 2017; Schuurmans et al., 2022), highlighting the relevance of research efforts to characterize both the common and specific effects of different adversity dimensions.

Note that the analysis and interpretation of both the bivariate and regression results provides unique information for understanding the impact of the adversity dimensions and their results should be integrated for a full understanding of the dimensions—especially given the moderate to large correlations of the adversity dimensions. The bivariate correlations provide a baseline method for assessing the association of the adversity dimensions with psychopathology and impairment, although they do not allow for separation of their unique contribution. In contrast, the regression analyses allow for examination of the association of each adversity dimension with the outcome measures over-and-above the other adversity dimensions (although caution should be exercised in interpreting these partialed effects in light of concerns raised by Hoyle et al., 2023). Finally, the total *R*-square value from the regression analyses provides a useful indication of the full contribution of the three dimensions.

4.1. Childhood adversity dimensions and psychopathology

The expectation that *Threat* would show broad associations with symptoms of psychopathology across time was largely supported in the bivariate analyses and at T3 in the regression analyses; however, fewer unique associations emerged at later time points. While this finding may reflect methodological factors, it may also suggest that the impact of *Threat* on psychopathology is broader during the first years of navigating the transition from late adolescence to early adulthood, which tend to be years marked by instability. This pattern merits further exploration considering that the effects of adversity on psychopathological outcomes have been found to vary across the lifespan, perhaps due to a combination of variables, such as salient developmental challenges and the unfolding of other risk and protective factors (Cohen et al., 2017; La Rocque et al., 2014).

The findings supported the hypothesis that *Threat* would show more consistent associations with the positive dimension of psychosis and *Deprivation* with the negative dimension. In particular, we found that *Threat* uniquely predicted measures of positive psychotic features across time, especially those tapping paranoid beliefs. This supports the interpretation that early environments characterized by threat contribute to the risk for reality distortion (Arseneault et al., 2011). Likewise, *Deprivation* uniquely predicted schizoid symptoms at T3 and negative symptoms at T4, which substantiates the notion that an absence of expected inputs from the environment forecasts risk for deficit features (Gallagher 3rd and Jones, 2013). To our knowledge, this is the first study to demonstrate these links in a longitudinal framework examining unique contributions of different adversity dimensions.

We found that *Intrafamilial Adversity* predicted measures of the positive symptom dimension at T3 and T4. This finding is in line with research investigating some of the components of this dimension, such as parental role reversal (Sheinbaum et al., 2015) and parental discord/violence (Kelleher et al., 2008), and demonstrates the significance of specific experiences within the caregiving environment over-and-above those captured in our *Threat* dimension—which encompasses experiences across different relational domains. Relatedly, it is worth noting that although our cross-sectional study found a unique association between *Intrafamilial Adversity* and schizotypal symptoms (Gizdic et al., 2023), the present study found that the three dimensions uniquely predicted schizotypal symptoms across time—*Threat* and *Intrafamilial Adversity* at T3 and *Deprivation* at T4. This finding is unsurprising given the heterogeneous nature of this phenotype and reinforces the observation that specifying its positive, negative, and disorganized features should enhance etiological research (Barrantes-Vidal et al., 2015; Kwapil and Barrantes-Vidal, 2012).

In line with previous studies (e.g., Henry et al., 2021; McGinnis et al., 2022), the adversity dimensions were prospectively associated with symptoms of anxiety and depression. The finding that different dimensions emerged as unique predictors across time might suggest relatively little specificity for these outcomes, although our use of different measures in some assessment waves may have contributed to this result. Another possibility suggested by recent research is that, for these outcomes, distinguishing between emotional versus other forms of

Table 2
Bivariate correlations of the childhood adversity dimensions with the outcome measures assessed at each time point.

		Time 3 outcomes			Time 4 outcomes			Time 5 outcomes		
		Intrafamilial Adversity	Deprivation	Threat	Intrafamilial Adversity	Deprivation	Threat	Intrafamilial Adversity	Deprivation	Threat
Psychopathology	Positive schizotypy	**0.31****	**0.44*****	**0.41*****	0.14	**0.32****	0.17	−0.01	0.14	0.12
	Suspiciousness	**0.34*****	**0.41*****	**0.46*****	**0.39*****	**0.37*****	**0.42*****	0.14	**0.30*****	**0.33****
	CAARMS positive	**0.43*****	**0.42*****	**0.47*****	0.20	**0.34****	**0.33****	–	–	–
	Paranoid PD	**0.34*****	**0.46*****	***0.56*****	**0.35****	**0.44*****	***0.52*****	–	–	–
	Schizotypal PD	**0.39*****	**0.47*****	***0.50*****	0.11	**0.46*****	**0.35****	–	–	–
	Negative schizotypy	−0.05	0.20*	0.12	−0.10	0.09	0.02	−0.07	0.11	0.06
	Negative symptoms	–	–	–	0.16	**0.42*****	**0.32****	–	–	–
	Schizoid PD	0.12	**0.31****	0.18	−0.02	**0.33****	0.18	–	–	–
	CDSS depression	**0.35*****	**0.35*****	**0.47*****	–	–	–			
	BDI depression	**0.33****	**0.37*****	**0.40*****	0.29**	**0.39*****	**0.41*****	0.04	0.28*****	0.21**
	SCL-90 anxiety	–	–	–	–	–	–	0.12	0.16*	**0.30*****
	BAI anxiety	**0.45*****	***0.50*****	**0.45*****	0.25*	0.26*	0.24*	–	–	–
Social-Psychological	Network diversity	–	–	–				−0.03	−0.11	−0.20**
	People in network	–	–	–	–	–	–	−0.05	−0.23**	−0.26**
	Embedded network	–	–	–	–	–	–	0.00	−0.08	−0.12
	Anxious attachment	0.29**	0.11	0.19	**0.38*****	0.23*	0.26*	0.02	0.22**	0.19*
	Avoidant attachment	0.09	0.26**	0.25*	0.09	0.23*	0.19	0.11	**0.32*****	0.20**
	Loneliness	–	–	–	–	–	–	0.03	0.28*****	0.23**
	Perceived social support	–	–	–	−0.15	**−0.48*****	**−0.38*****	−0.12	−0.21**	−0.20**

Note1: According to Cohen, correlations of 0.10 indicate small effect sizes, 0.30 medium effect sizes (in bold), and 0.50 large effect sizes (bold and italics).
Note2: CAARMS=Comprehensive Assessment of At-Risk Mental States; PD=Personality Disorder (SCID-II); CDSS=Calgary Depression Scale for Schizophrenia; BDI=Beck Depression Inventory-II; SCL-90 = Symptom Checklist-90-Revised; BAI=Beck Anxiety Inventory.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 3
Linear regressions examining the childhood adversity dimensions as predictors of the outcome measures assessed at each time point.

		Time 3 outcomes					Time 4 outcomes					Time 5 outcomes				
		Intrafamilial Adversity	Deprivation	Threat			Intrafamilial Adversity	Deprivation	Threat			Intrafamilial Adversity	Deprivation	Threat		
	Criteria	β	β	β	Total R^2	f ^{2}	β	β	β	Total R^2	f ^{2}	β	β	β	Total R^2	f ^{2}
Psychopathology	Positive schizotypy	0.14	0.26	0.19	0.24	**0.31**	0.04	0.35	−0.07	0.10	0.11	−0.10	0.14	0.09	0.03	0.03
	Suspiciousness	0.18	0.15	0.30	0.26	***0.35***	0.26*	0.12	0.25	0.25	**0.33**	−0.04	0.20	0.25*	0.14	**0.16**
	CAARMS positive	0.27*	0.14	0.29*	0.31	***0.45***	0.07	0.20	0.17	0.14	**0.16**	–	–	–	–	–
	Paranoid PD	0.14	0.14	0.42**	0.35	***0.54***	0.17	0.13	0.37*	0.31	***0.45***	–	–	–	–	–
	Schizotypal PD	0.21*	0.21	0.29*	0.33	***0.48***	−0.07	0.43**	0.09	0.22	**0.28**	–	–	–	–	–
	Negative schizotypy	−0.14	0.23	0.03	0.05	0.06	−0.14	0.17	−0.04	0.03	0.03	−0.15	0.15	0.05	0.03	0.03
	Negative symptoms	–	–	–	–	–	0.00	0.37*	0.07	0.18	**0.22**	–	–	–	–	–
	Schizoid PD	0.02	0.32*	−0.04	0.09	0.10	−0.15	0.41	−0.04	0.13	**0.15**	–	–	–	–	–
	CDSS depression	0.20	0.03	0.38*	0.26	***0.35***	–	–	–	–		–	–	–	–	–
	BDI depression	0.19	0.16	0.22	0.21	**0.27**	0.15	0.19	0.23	0.21	**0.27**	−0.12	0.27*	0.13	0.10	0.11
	SCL-90 anxiety	–	–	–	–		–	–	–	–		0.01	0.02	0.29**	0.09	0.10
	BAI anxiety	0.29*	0.30*	0.15	0.35	**0.54**	0.17	0.15	0.08	0.10	0.11	–	–	–	–	–
Social-Psychological	Network diversity	–	–	–	–	–	–	–	–	–	–	0.06	−0.04	−0.21*	0.04	0.05
	People in network	–	–	–	–	–	–	–	–	–	–	0.10	−0.16*	−0.22**	0.09	0.10
	Embedded network	–	–	–	–	–	–	–	–	–	–	0.07	−0.06	−0.12	0.02	0.02
	Anxious attachment	0.26*	−0.08	0.14	0.10	0.10	0.32*	0.05	0.11	0.16	**0.19**	−0.12	0.21*	0.14	0.07	0.08
	Avoidant attachment	−0.02	0.19	0.13	0.08	0.09	−0.01	0.18	0.07	0.06	0.06	−0.04	0.30***	0.08	0.12	0.11
	Loneliness	–	–	–	–	–	–	–	–	–	–	−0.13	0.27**	0.14	0.11	0.12
	Perceived social support	–	–	–	–	–	0.03	−0.41**	−0.13	0.24	**0.31**	−0.01	−0.15	−0.13	0.06	0.06

Note1: Each table row (within each time point) represents a separate regression analysis in which the three childhood adversity dimensions were entered as simultaneous predictors.
Note2: Bootstrap procedures (with 2000 samples) were employed.
Note3: According to Cohen, f-square of 0.02 is small, 0.15 is medium (in bold), and 0.35 is a large effect size (in bold and italics).
Note4: CAARMS=Comprehensive Assessment of At-Risk Mental States; PD=Personality Disorder (SCID-II); CDSS=Calgary Depression Scale for Schizophrenia; BDI=Beck Depression Inventory-II; SCL-90 = Symptom Checklist-90-Revised; BAI=Beck Anxiety Inventory.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

adversity might be more relevant than the threat-deprivation distinction (Humphreys et al., 2020; Schlensog-Schuster et al., 2022). In this regard, the three adversity dimensions investigated in this study comprise some adverse experiences within the emotional/psychological domain. Future work should continue to examine different approaches to grouping childhood adversities to inform models of vulnerability to depression and anxiety phenotypes.

4.2. Childhood adversity dimensions and social-psychological outcomes

The results concerning social-psychological outcomes support the notion that adverse environmental experiences have a lasting impact on psychological and social functioning (Bifulco and Thomas, 2012; Pfaltz et al., 2022). In line with our hypotheses, *Intrafamilial Adversity* was prospectively associated with insecure attachment and specifically predicted anxious attachment at T3 and T4. This suggests that the experiences comprised in this dimension may contribute to the formation of internal working models organized around a need for approval and preoccupation with relationships (Schimmenti and Bifulco, 2015) and the reliance on hyperactivating emotion regulatory strategies (Mikulincer and Shaver, 2007). In addition, we found that *Deprivation* uniquely predicted anxious and avoidant attachment at T5. This result parallels research showing that experiences of neglect are associated with general attachment insecurity (Borelli et al., 2015) and both anxious and avoidant attachment (Kim et al., 2021b). Taken together, these findings might be interpreted to suggest that neglect of the child's physical and emotional needs may foster internal working models of the self as unworthy and others as unavailable or unreliable, contributing to the risk for different forms of attachment insecurity.

Regarding the more "objective" characteristics of social relationships, we found that *Threat* and *Deprivation* uniquely predicted having a smaller social network, consistent with research documenting such associations in the maltreatment literature (McCrory et al., 2022). Furthermore, *Threat* uniquely predicted network diversity, indicating that threat-related experiences possibly contribute to developmental adaptations that restrict the range of social roles in which individuals are likely to engage. Finally, *Threat* and *Deprivation* were associated at the bivariate level with the perception of social support and loneliness. However, the regressions generally suggested that these associations were best accounted for by the *Deprivation* dimension. Therefore, experiencing childhood neglect may be particularly detrimental to the perception of social connection and support, which could potentially be related to or further compounded by a tendency to construe interactions with the social world in terms of previous experiences of neglect (*see* Luyten and Fonagy, 2019).

Finally, we found that the three adversity dimensions combined accounted for moderate to large proportions of variance in many of the outcome measures (especially at T3 and T4). This is notable given the range of factors that contribute to psychopathology and impairment in young adults. The effects were especially striking for positive schizophrenia-spectrum characteristics (despite the fact that this was a non-clinically ascertained sample). Thus, the multidimensional approach for characterizing adverse experiences demonstrated powerful unique effects for the adversity dimensions, as well as sizable total effects.

4.3. Strengths and limitations

Strengths of this study include the multi-wave, longitudinal research design, the comprehensive assessment of psychopathology and social-psychological outcomes, and the use of empirically-derived adversity dimensions obtained from in-depth interviews and self-report measures covering a wide range of adversities. However, there are some limitations to consider. One limitation is that using a predominantly female sample initially drawn from a college population may limit the generalizability of the findings. Although studies involving student and non-student populations have produced similar results in the field of trauma research (Boals et al., 2020), it will be important to examine whether these findings are replicated in samples with more varied sociodemographic characteristics and in clinical populations. Furthermore, the variations in sample size and measures used across time points, while common in longitudinal studies (Curran et al., 2008; Heinzel et al., 2016), raise the possibility that some of the findings are related to this methodological limitation. Along the same lines, another shortcoming is that we did not use clinical interviews at T5. At this assessment wave, we had the restriction of using only self-report measures to maximize the sample size, but this yielded greater differences in the pool of comparable measures of psychopathology. Finally, we also note that, unfortunately, the different (albeit overlapping) samples at our three time points did not allow for more sophisticated time-series analyses.

4.4. Conclusion and future directions

In closing, our findings extend prior work by demonstrating prospective associations of three meaningful childhood adversity dimensions with different risk profiles across psychological, social, and psychopathological domains. In addition, these results add novel longitudinal evidence to the literature supporting the utility of empirically-derived dimensions to investigate the developmental consequences of childhood adversity (Brieant et al., 2023; Brumley et al., 2019). In this context, it is worth noting that theoretical and empirical work has implicated the social-psychological outcomes examined in this study in pathways to psychopathology following the experience of childhood adversity (Cicchetti and Doyle, 2016; McCrory et al., 2022; Schimmenti and Bifulco, 2015; Sheinbaum et al., 2020; Williams et al., 2018). Therefore, a relevant next step is investigating their potential mediating or moderating effects. Furthermore, future studies could focus more on examining protective factors to enhance our understanding of resilience and the processes that mitigate maladaptive outcomes. Overall, increasing our understanding of the impact and underlying mechanisms of childhood adversity across the lifespan is crucial to refining conceptual models of adversity and identifying intervention targets.

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CRediT authorship contribution statement

Tamara Sheinbaum: Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Investigation, Data curation, Conceptualization. **Alena Gizdic:** Writing – original draft, Writing – review & editing, Visualization, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Thomas R. Kwapil:** Statistical consultation, Writing – review & editing, Visualization, Supervision, Methodology, Conceptualization. **Neus Barrantes-Vidal:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that there are no conflicts of interest to be

disclosed.

Data availability

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.schres.2024.05.016.

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