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RESEARCH ARTICLE

The Effect of Adverse and Positive Childhood Experiences, Attachment, and Emotional Support on Adult Mental Health

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Introduction: Adverse childhood experiences (ACEs) can contribute to significant health issues in adulthood.
Aims: The present study seeks to understand the role of attachment and positive childhood experiences (PCEs) in the association between ACEs, self-rated emotional support and mental health.
Methods: An online panel survey gathered data from 4,940 Slovenian adults aged 18 to 75. Simultaneous multiple regression path analysis (PROCESS) was used to test two moderation and mediation models.
Results: Results indicate that ACEs were weakly associated with higher rates of anxious attachment and reduced self-rated mental health. Anxious attachment mediated the relation between ACEs and self-rated emotional support and self-rated mental health. PCEs were weakly negatively associated with anxious and avoidant attachment and interacted with ACEs in their effect on emotional support in adulthood. The strongest associations were found in the negative pathways between the two attachment styles (anxious and avoidant), emotional support, and self-rated mental health.
Conclusions: These findings can guide (therapeutic) interventions for individuals with a history of child adversity: interventions could focus on addressing insecure attachment, involve a person's social network as well as recognize and support the potential role of positive childhood experiences as protective factors.

Keywords: attachment anxiety, attachment avoidance, adverse and positive childhood experiences, self-rated mental health, self-rated emotional support

Introduction

Adverse Childhood Experiences (ACEs) are recognized as a major global health problem as they can have long-lasting negative effects on physical and mental health, psychosocial functioning, and quality of life (Felitti et al., 1998; Hughes et al., 2017; van der Kolk et al., 2005). Indeed, the severity of ACEs is recognized globally, highlighted by their inclusion in the United Nations Sustainable Development Goals (United Nations, 2015). Several constructs have been used to better understand the associations between these adverse experiences in early life and adult outcomes. One of the most well-known such constructs is attachment (e.g., Corcoran & McNulty, 2018; Muller et al., 2012; Widom et al., 2018).

The attachment theory proposed by John Bowlby (1982) states that childhood mental representations and attachment patterns formed during early interactions with attachment figures influence adult attachment. This

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theory distinguishes between secure attachment, which results from consistent, sensitive interactions with caregivers, and insecure attachment, which can be further subdivided into resistant and avoidant styles (Ainsworth et al., 1978; Cassidy & Berlin, 1994). Securely attached children have the confidence that their carers are there to meet their needs. These children seek comfort from their caregivers when they are frightened, show distress when their caregivers leave, and are happy when they return. This attachment style develops through consistent, sensitive and attentive care. Children with resistant attachment show clinginess and dependence, but also difficulties in being comforted. They can be very distressed when their attachment figure leaves and ambivalent when they return because they seek comfort but resist it. This pattern results from the caregiver's inconsistent availability and responsiveness, which makes the child insecure about the caregiver's reliability (Ainsworth et al., 1978). Children with an avoidant attachment show hardly any emotional reactions to the presence or absence of their attachment figure and may even avoid them altogether. They tend to be self-reliant and emotionally distant, often because the carer is unavailable or unresponsive to their needs. These children learn to suppress their emotional needs to avoid rejection or neglect (Cassidy & Berlin, 1994).

Adverse childhood circumstances, such as maltreatment or parental psychopathology, may precipitate the development of "disorganized" attachment in childhood (Baer & Martinez, 2006; Main & Solomon, 1990), which is referred to as "unresolved" attachment in adulthood (Main & Hesse, 1990). Disorganized attachment occurs when a child's need for closeness and security with their caregiver collides with their fear of the same person, resulting in a lack of coherent attachment strategy (Main & Solomon, 1990). This pattern of attachment is considered particularly maladaptive because it fails to provide a sense of security or a reliable strategy for dealing with stress and emotions. It is often associated with atypical maternal behavior as described in the AMBIANCE code system, which identifies disrupted communication and caregiving patterns between the caregiver and the child (Lyons-Ruth et al., 2013). When disorganized patterns persist into adulthood without informal or formal support and attachment-related interventions, they pose risks for the development of psychopathology (Cicchetti & Doyle, 2016; Mikulincer & Shaver, 2012).

Our research builds on the understanding that attachment, which is expressed not only at the psychological and interpersonal level but also at the neurobiological level, is a critical mechanism due to its potential for modification, making it an appropriate target for interventions developed for people with adverse life histories (Lahousen et al., 2019; Schore & Schore, 2008). Attachment patterns are not static; they can change over time in response to life events and relational experiences, which emphasizes the importance of timely and effective interventions.

It is important to recognize the continuum of parenting behaviors, ranging from insensitive interactions to more severe trauma such as abuse or neglect, as well as the continuum of attachment types, ranging from insecure to disorganized to attachment disorders including Reactive Attachment Disorder and Disinhibited Social Engagement Disorder which represent the most severe disruptions in attachment patterns (American Psychiatric Association, 2013).

Our research focuses specifically on attachment insecurity and its indicators, which are assessed using brief screening tools for risks of avoidant and anxious tendencies. In our study, we use the terms "attachment anxiety" and "attachment avoidance" as used by several authors (e.g., Corcoran & McNulty; 2018, Mikulincer & Shaver, 2005). Attachment anxiety is characterized by an excessive need for closeness and fear of rejection. Attachment avoidance corresponds to avoidant attachment, which is characterized by emotional distance and self-reliance. By identifying and measuring the signs of attachment insecurity, we aim to better understand the complex interactions between adverse childhood experiences and mental health in adulthood. This approach will allow us to develop targeted interventions that can change attachment patterns and thus improve the psychological and interpersonal functioning of people with adverse life histories.

Empirical Results and Research Gaps

ACEs, Attachment and Mental Health

There is extensive research on the detrimental effects of ACEs on adult outcomes, including self-rated health (Felitti et al., 1998; Hughes et al., 2017; Petruccelli et al., 2019). ACEs have a significant impact on mental health in adulthood and contribute to a higher risk of developing depression, anxiety, PTSD and other mental disorders (Anda et al., 2006; Edwards et al., 2003; Hughes et al., 2017). Furthermore, the literature points to the mediating role of attachment in developing adverse childhood experiences into psychopathology in adulthood, which includes mental health symptoms, personality disorders, somatic symptoms and risk behaviors (Bifulco et al., 2006; Corcoran & McNulty, 2018; Hankin, 2005; Lin et al., 2020; Oshri et al., 2015; Riggs et al., 2007; Schimmenti

& Bifulco, 2015; Widom et al., 2018). Some studies, such as Corcoran and McNulty (2018), demonstrate that attachment anxiety and avoidance mediate the relationship between adverse childhood circumstances and subjective well-being. Their research shows that people with a high level of attachment anxiety or avoidance who experienced adverse circumstances in their childhood have a lower subjective well-being. However, other studies question the universality of these pathways, pointing only at the mediating role of attachment anxiety but not avoidance (Lin et al., 2020; Schimmenti & Bifulco, 2015), or finding different pathways depending on the attachment measurement method used (self-report questionnaire or interview) (Riggs et al., 2007).

Although attachment insecurity generally correlates with various forms of psychological distress, the pathways are complex and are influenced by individual differences in coping mechanisms and social support systems, indicating that attachment anxiety and avoidance are not deterministic but interact with a range of personal and environmental factors and are part of a broader interplay of circumstances that influence adult outcomes. Further research is needed to explore how different attachment styles influence the long-term outcomes of adverse childhood experiences and to identify the moderating factors that can enhance mental health.

In this study, we focus on self-rated mental health as the primary outcome variable, rather than on specific psychopathologies. While mental health is often equated with the absence of mental symptoms or disorders, the World Health Organization (2022) defines it more broadly to include subjective well-being, coping and contribution to the community. Therefore, we use self-rated mental health to provide a holistic view that encompasses feelings of well-being or distress and their impact on functioning (Ahmad et al., 2014; Levinson & Kaplan, 2014; McAlpine et al., 2018). The use of self-rated mental health is relevant because the results show that correlations between diagnostic measures of mental health and subjectively rated mental health are modest (McAlpine et al., 2018). Both measures capture different aspects of mental health, allowing for the possibility that someone could meet the criteria for mental illness while maintaining healthy aspects of mental health. Self-rated mental health provides additional predictive value for various outcomes (e.g., mortality and future well-being), beyond objective measures of mental health, and includes characteristics not captured by objective diagnostic measures such as severity, recency, persistence of symptoms and impairment of functioning (Levinson & Kaplan, 2014; McAlpine et al., 2018).

ACEs, Attachment, and Emotional Support

Emotional support is often a precursor to sound mental health; it involves providing comfort and help to others who are struggling with problems or worries (Cutrona, 1990; Cutrona & Russel, 1983). Actual received and perceived emotional support are not necessarily the same. The latter depends on how a person appraises potential support and has been linked to myriad health outcomes (Haber et al., 2007). People differ in their need for support as a means of coping with distress, in their ability to mobilize the support available in their social environment, in their ability to use the support offered, and in their satisfaction with the support (Coble et al., 1996; Sarason et al., 1991). Attachment theory provides a useful theoretical framework for understanding these differences, particularly in the context of ACEs. ACEs, such as childhood abuse, neglect, or household dysfunction, can significantly disrupt the development of secure attachment and have long-term effects on how people perceive and utilize emotional support in adulthood. Securely attached individuals possessing a history of relationships with significant others who have been available and responsive to signals of distress in times of need, create an expectation that significant others will be available when needed and able to bring comfort and relief (Ainsworth et al., 1978; Hazan & Shaver, 1987). This expectation, developed despite the possible presence of ACEs, allows them to effectively recognize and utilize available support, which is crucial for regulating distress and maintaining mental health.

In contrast, individuals who experienced ACEs often develop insecure attachment styles due to past relationships with attachment figures who were unresponsive, unavailable or rejecting in times of need. These individuals, whether they develop an avoidant or anxious-preoccupied attachment style, may struggle with the perception and utilization of emotional support in adulthood. They often develop a general belief that significant others cannot comfort them when they are distressed and are ambivalent or unwilling to rely on others to help them cope with life's adversities (Ainsworth et al., 1978; Hazan & Shaver, 1987). Existing studies show that individuals with insecure attachment, particularly those shaped by ACEs, tend to report low levels of perceived support, even if the support is available to them (Anders & Tucker, 2000; Blain et al., 1993; Florian et al., 1995; Kobak & Sceery, 1988; Priel & Shamai, 1995; Wallace & Vaux, 1993).

Perceptions of lower support may be related to emotion regulation strategies that are influenced by attachment qualities, especially by the attachment disruptions caused by ACEs (Brenning & Braet, 2013; Ognibene &

Collins, 1998), including biases regarding the availability and trustworthiness of others (Sirois et al., 2016) and behavioral components such as deficits in interpersonal communication skills (Anders & Tucker, 2000). People with anxious attachment may use hyperactivation strategies as an attempt to cope with distress and regulate emotions, which can lead to excessive and sometimes insatiable demands for support, reinforcing the perception that others are less available and sensitive to their needs (Mikulincer et al., 1993). They may also doubt that others can comfort them or fear the possibility of being rejected. As a result, they may distrust the intentions of others, interpret their responses negatively, and believe that they do not have the appropriate skills to mobilize available sources of support (e.g., Collins & Read, 1990; Hazan & Shaver, 1987; Mikulincer & Florian, 1997). Conversely, individuals with avoidant attachment typically deactivate their attachment system in distressing situations, use emotional disengagement as a coping strategy, maintain emotional distance from others, and rely predominantly on their own resources (Hazan & Shaver, 1987; Mikulincer & Shaver, 2007). Their façade of independence and "compulsive self-reliance" (Bowlby, 1980) may mask their distrust of others as sources of support and lead them to devalue any support offered as not available or necessary (Mikulincer & Shaver, 2007). However, there is a still a need for further research regarding ACEs influence on perceived emotional support (Bethell et al., 2019).

Moderating Role of Positive Childhood Experiences (PCEs)

In addition to the well-documented harmful effects of ACEs, research has shown that positive childhood experiences (PCEs) can play an important role in counteracting these negative effects. PCEs, characterized by safe, stable and nurturing relationships as well as supportive community and environmental factors, carry the potential to mitigate the negative impact of ACEs on negative mental health outcomes in adulthood and increase resilience (Afifi & MacMillan, 2011; Bethell et al., 2019; Crandall et al., 2019; Kuhar & Zager Kocjan, 2021; Masten & Cicchetti, 2016). Research has primarily focused on PCEs in the area of relationships, emphasizing the importance of secure, stable and nurturing relationships (Thornberry et al., 2013). Studies have shown that having at least one positive relationship with an adult in childhood can mitigate the negative effects of childhood adversity on later life outcomes (Bellis et al., 2017; Crouch et al., 2019). Furthermore, an individual's experiences and adaptive responses to adversity are shaped by a complex interplay of factors including personal characteristics, community and societal resources (e.g., safe and supportive neighborhoods, schools, clubs) (Biggs et al., 2017), as well as natural and spiritual experiences (Bethell et al., 2019).

Research Objectives

The present study aims to:

- Explore the mediating role of attachment insecurity, specifically anxiety and avoidance, in the relationship between ACEs and self-rated emotional support and mental health: Despite an extensive research on the effects of ACEs on mental health, a notable gap exists in understanding how attachment insecurity, particularly anxiety and avoidance, mediates the relationship between ACEs and self-rated emotional support and mental health. To address this gap, the present study aims to examine the mediating effects of these attachment styles, providing insights into the pathways through which ACEs influence adult psychological outcomes. By exploring these mediating roles, we hope to improve the understanding regarding the underlying mechanisms.
- Examine both direct and indirect relationships between ACEs and self-rated emotional support through attachment styles: This study aims to investigate how attachment styles mediate the relationship between ACEs and self-rated emotional support, and how emotional support, influenced by attachment styles, may serve as both an outcome of ACEs and a moderator of their effects on self-rated mental health. Self-rated emotional support, influenced by attachment styles, may be both an outcome of ACEs and a moderator of their effects on mental health. Although previous research has focused on the protective or buffering effects of perceived versus received support in adulthood against the negative consequences of ACEs (e.g., Cheong et al., 2017; Runtz & Schallow, 1997; Sperry & Widom, 2013), understanding how insecure attachment might elucidate the connection between ACEs and perceived emotional support in adulthood remains incomplete. Despite the extensive research on the impact of ACEs on mental health conditions (Hughes et al., 2017), a notable gap exists in the literature regarding how ACEs influence perceived emotional support (Bethell et al., 2019). The present study seeks to fill these gaps by means of providing a comprehensive analysis of these relationships.

- Examine the moderating role of PCEs in the impact of ACEs on self-rated emotional support and mental health: While we know that PCEs can buffer the negative effects of ACEs on mental health, the specific mechanisms through which they operate, particularly their role in mitigating the effects of ACEs on perceived emotional support and mental health, have not yet been adequately explored. The present study aims to fill this gap through investigating how PCEs influence the relationship between ACEs and self-rated emotional support and mental health. Understanding these mechanisms is crucial for the development of developing interventions that utilize PCEs to strengthen resilience and improve mental health in people with ACEs.

By systematically exploring the role of attachment insecurity and PCEs in the context of ACEs, this study aims to provide insights that can further inform the development of therapeutic and preventive strategies to mitigate the harmful effects of ACEs.

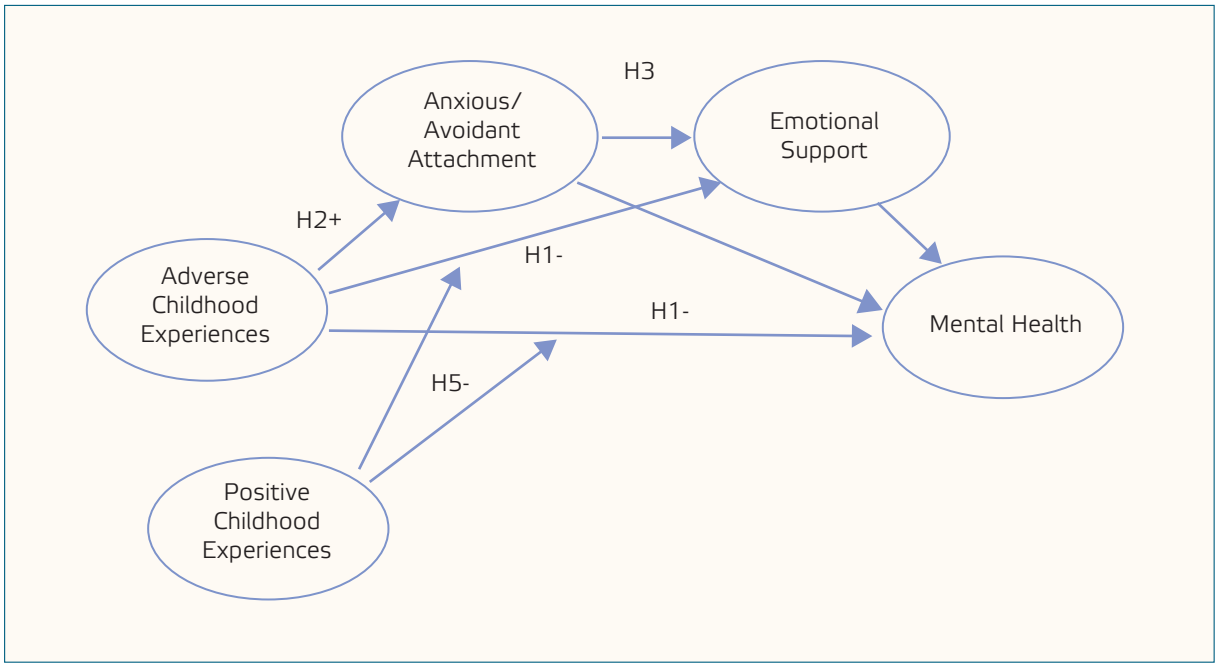
Our proposed model is based on a serial mediation approach that examines perceived emotional support as an antecedent of self-rated mental health. This perspective derives from evidence suggesting that self-rated emotional support and self-rated mental health can predict outcomes such as physical well-being, health use and expenditure (Cohen & Wills, 1985; McAlpine et al., 2018; Nguyen et al., 2015).

Hypotheses

Based on the theoretical overview, we postulate the following hypotheses (presented in Figure 1):

- Hypothesis I: Higher numbers of ACEs are negatively associated with self-rated (a) emotional support and (b) mental health.
- Hypothesis II: Higher numbers of ACEs are positively associated with (a) avoidant and (b) anxious attachment.
- Hypothesis III: The association between ACEs and self-rated mental health is mediated by (a) attachment avoidance and anxiety and (b) self-rated emotional support.
- Hypothesis IV: PCEs are negatively associated with (a) avoidant and (b) anxious attachment.
- Hypothesis V: PCEs moderate (reduce) the direct negative association between ACEs and self-rated (a) emotional support and (b) mental health.

Figure 1. Conceptual Moderation and Mediation Model Portraying the Hypothesized Associations Between ACEs, PCEs,, Attachment Qualities, Self-Rated Emotional Support, and Mental Health



Note. H4 predicts direct associations between PCEs and attachment and is not depicted in Figure 1. H3 predicts the indirect association from ACEs to self-rated mental health through attachment and perceived emotional support. Anxious and avoidant attachment models were run separately.

Method

Participants and Data Collection

We tested the model on a large sample of Slovenian adults with demographic characteristics similar to those of the general Slovene population. Although a former Yugoslav republic, Slovenia was the "westernmost" country of the Eastern European communist bloc, gaining independence in 1991 and joining the EU in 2004. In terms of demographic, family, and child-rearing trends, Slovenia is considered more modern than Eastern and Southern Europe and quite like Western countries (e.g., Švab et al., 2012). Therefore, we assumed that the used constructs apply to the Slovenian population in a similar way as to other Western populations.

Participants were recruited from an online survey panel run by a Slovene research agency using nonprobability quota sampling based on the demographic characteristics regarding the population of Slovenia aged between 18 and 75 years. The panel consists of individuals who have given their informed consent in advance to participating in online surveys and receive a small compensation for their participation. We conducted a computerized web survey that was fully completed by 4,940 panelists. Data collection took place between February and October 2019. Data were weighted by gender, age, education, and statistical regions to reduce potential bias and ensure an accurate reflection of the population. The weighting was done through an iterative proportional adjustment process that matches survey respondents to population benchmarks. Demographic benchmarks were obtained from the SiStat data portal (Statistical Office of the Republic of Slovenia (SURS), 2018). The characteristics of the survey sample are presented in the online appendix. In the weighted study sample, women accounted for 49.1% and men for 50.9% of the participants. The average participant age was 46.7 years (SD = 15.3 years). In terms of their education, 43.9% of the participants completed only primary school, 31.0% completed secondary school and 25.0% completed a post-secondary or tertiary education. Participants also provided a self-assessment of their household's material living conditions, with 40.3% reporting below average material living conditions, 45.1% reporting average material living conditions, and 14.7% reporting above average material living conditions. The study was approved by the National Medical Ethics Committee of the Ministry of Health (0120–236/2019/4).

Measures

Adverse Childhood Experiences

Adverse childhood experiences (ACEs) were measured with ten items asking about a variety of negative experiences based on Felitti et al. (1998), Dube et al. (2003), and the Behavior Risk Factor Surveillance System (Centers for Disease Control and Prevention, n.d.) – for the full items see Kuhar & Zager Kocjan, 2021). Five items measured child maltreatment (i.e., physical abuse, emotional abuse, sexual abuse, physical neglect, and emotional neglect), and five items measured household dysfunction among the adults in the household (i.e., domestic violence, mental illness, substance abuse, incarceration, death/separation of parents). The items on child maltreatment were on a scale from *never* (1) to *very often* (5). Household dysfunction items were dichotomous (*yes/no*). If a participant indicated that at least one of the items for a single ACE was present (answering *yes* to the items on household dysfunction) or that he or she had experienced the adverse situation at least a few times (answering *sometimes*, *often*, or *very often* to physical and emotional abuse and neglect items) by the age of 18, a score of 1 was given for that ACE. In the case of sexual abuse, 1 was also given for the answer *once* for any of the corresponding items. Once the scores were assigned, all items were summed to create an ACE composite variable that ranged from 0–10. In this study, the 10-item scale was reliable (α = .75).

Positive Childhood Experiences

Positive childhood experiences (PCEs) were assessed with 13 items from the Resilience Questionnaire (Rains & McClinn, 2013). Example items include, "When I was little, my mother/father loved me", and "My parents or guardians had the help of relatives, neighbors, or other people." Response options ranged from *not at all true* (1) to *completely true* (5). The response options 1–3 were recoded as 0 and 4–5 were recoded as 1. All items were summed to create a composite PCEs variable that ranged from 0–13. The 13-item scale was reliable (α = .88).

Attachment

Attachment qualities were assessed using Carver's (1997) Measure of Attachment Qualities (MAQ) scale. Response options ranged from *not at all true* (1) to *completely true* (5). As we have been specifically interested in the impact of insecure attachment styles on adult self-rated emotional support and mental health, the secure attachment sub-scale, while obviously important in attachment theory, was excluded from the data analysis as it was not relevant to the set hypotheses.

Avoidance was measured using three items from the avoidance sub-scale of the MAQ: we conducted a maximum likelihood exploratory factor analysis on the data of all five items originally included into the sub-scale, and found that two of the items did not load onto the same factor as the rest of the items; they were therefore omitted (see Online Appendix).

The items included were "I prefer not to be too close to others", "It's not hard for me to maintain closeness with others", and "I get uncomfortable when someone wants to be very close." The items were averaged to create an attachment avoidance composite variable that ranged from 1–5. The three-item scale's reliability was acceptable ($\alpha = .61$). Dropping the reverse coded item improved reliability to $\alpha = .73$, however, testing the models with the two-item version of attachment avoidance did not change the results, so the three-item variable is reported here.

Anxiety was measured via six items from the worry and merger anxiety sub-scales of the MAQ. A maximum likelihood factor analysis indicated that all six items load onto one factor (see Online Appendix). Example worry items include "I often worry that my partner doesn't really love me" and "I often worry my partner will not want to stay with me." Example merger items include "I have trouble getting others to be as close as I want them to be" and "I find others are reluctant to get as close as I would like." Because both worry and merger are indicative of anxious attachment, the two sub-scales were averaged to create an anxiety composite score for each participant that ranged from 1–5. The six-item scale was reliable ($\alpha = .79$).

Self-Rated Emotional Support

A single item (cf. Bethell et al., 2019) assessed emotional support "How often do you receive emotional support when you need it?" Response options ranged from *never* (1) to *always* (5). On average, participants reported receiving emotional support above the scale midpoint.

Self-Rated Mental Health

A single item assessed mental health (Ahmad et al., 2014; Levinson & Kaplan, 2014; McAlpine et al., 2018) with the question, "My mental health is:" Response options ranged from *very poor* (1) to *very good* (5). On average, participants reported good mental health.

Data Analysis

Descriptive statistics and correlations were calculated. All study variables had skew and kurtosis values between -1.0 and +1.0, indicating normal distribution (see Table 1).

To analyze the proposed model (see Figure 1), two mediation and moderation models were tested using Hayes' (2017) PROCESS macro for SPSS (Model 85). Control variables included gender, age, education level, and the other type of attachment (avoidant attachment in the anxious model, anxious attachment in the avoidant model).

ACEs were included as the independent variable, avoidant (Model 1) and anxious (Model 2) attachment and self-rated emotional support as serial mediators, and mental health as the dependent variable (H1–3). Serial mediators (i.e., 1) avoidant or anxious attachment and 2) self-rated emotional support) create a hypothesized causal chain linking an independent variable with two or more mediating variables and then a dependent variable (see Figure 1 for depiction). PCEs were included as moderators in the relationships between ACEs and self-rated emotional support/mental health (H5). A moderator (i.e., PCEs) is predicted to change the relationship between an independent and dependent variable. PROCESS simultaneously tests the direct associations between moderators and outcomes. These statistics were used to answer H4. The Likert scales included in our models are similar to interval level data with evenly spaced response options (see Norman, 2010; Sullivan & Artino, 2013). As such, we used multiple regression to test our hypotheses.

Results

Descriptive Statistics

Table 1 includes descriptive statistics (mean, standard deviation, minimum and maximum values) for all scales, as well as correlations among the study variables.

Table 1. Descriptives and Bivariate Correlations

Variables (Min.-Max.)	Mean (*SD*)	Skewness (*SE*)	Kurtosis (*SE*)	1	2	3	4	5	6
1. ACEs (0–10)	2.37 (2.20)	.87 (.04)	-.06 (.07)	-					
2. PCEs (0–13)	8.94 (3.41)	-.79 (.04)	-.26 (.07)	-.51*	-				
3. Avoidance (1–5)	2.41 (.74)	.21 (.04)	.13 (.07)	.16*	-.24*	-			
4. Anxiety (1–5)	2.43 (.71)	.36 (.04)	.16 (.07)	.21*	-.25*	.42*	-		
5. Emo. Support (1–5)	3.56 (1.23)	-.50 (.04)	-.65 (.07)	-.25*	.38*	-.29*	-.33*	-	
6. Mental Health (1–5)	4.01 (.90)	-.83 (.04)	.57 (.07)	-.27*	.27*	-.31*	-.40*	.29*	-

Note. ACEs = adverse childhood experiences, PCEs = positive childhood experiences, Emo. Support = perceived emotional support. Pearson's correlation is reported for ACEs and PCEs. All other correlations are Spearman's rho.
*$p < .001$.
All significant correlations have p values less than .001.

Associations Between Sociodemographic Variables and Study Measures

Participant age had a weak negative association with PCEs ($\rho = -.11$, $p < .001$), avoidance ($\rho = -.05$, $p < .001$), anxiety ($\rho = -.15$, $p < .001$), and self-rated emotional support ($\rho = -.13$, $p < .001$) indicating that older participants reported fewer PCEs, lower avoidance and anxious attachment, and reduced emotional support. Age had a small positive association with mental health ($\rho = .13$, $p < .001$) indicating that older participants reported better mental health. Education level had a weak positive association with PCEs ($\rho = .15$, $p < .001$), perceived emotional support ($\rho = .09$, $p < .001$), and mental health ($\rho = .07$, $p < .001$). Education level had a weak negative association with ACEs ($\rho = -.08$, $p < .001$) and anxious attachment ($\rho = -.13$, $p < .001$).

Men and women significantly differed on ACEs, PCEs, avoidance and anxious attachment, self-rated emotional support, and mental health (see Table 2). Men reported higher PCEs and mental health whereas women reported higher ACEs, self-rated emotional support, avoidance and anxious attachment. Effect sizes for these differences were small. Due to significant differences by gender and the association of age and education level with the study variables, these variables were included as control variables in the subsequent models.

Table 2. Comparing Study Variables by Participant Gender

Variable	Women		Men		*t*	*df*	*p*	*d*
	M	*SD*	*M*	*SD*				
ACEs	2.61	2.35	2.14	2.01	7.47	4937	<.001	.21
PCEs	8.71	3.42	9.17	3.39	4.67	4818	<.001	.14
Avoidance	2.47	0.76	2.36	0.71	5.05	4923	<.001	.14
Anxiety	2.45	0.73	2.42	0.70	1.32	4923	.190	.04
Emo. Support	3.68	1.17	3.45	1.28	6.63	4937	<.001	.13
Mental Health	3.87	0.92	4.14	0.86	10.53	4937	<.001	.30

Note. Mann-Whitney was used to calculate difference scores for self-rated emotional support and mental health.
All other difference scores were calculated using t-tests.

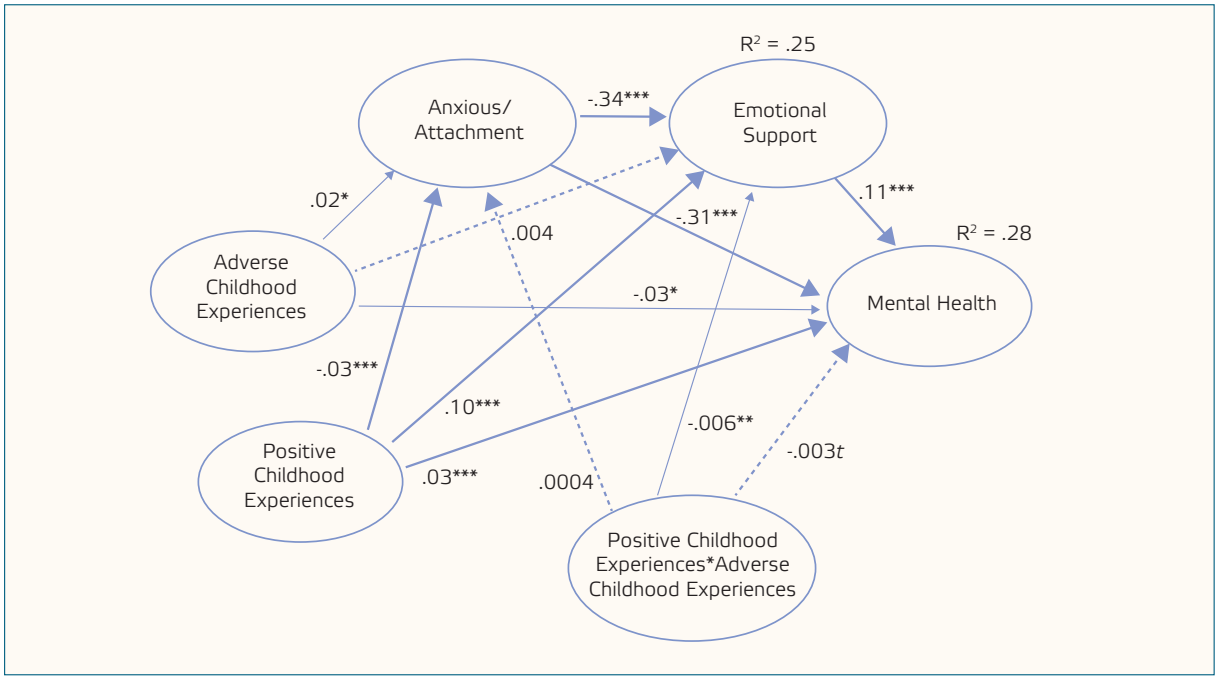
Cross-Correlations

ACEs had a moderate negative association with PCEs and weak negative associations with self-rated emotional support and self-rated mental health (see Table 1). ACEs had weak positive associations with attachment avoidance and anxiety. Avoidance and anxiety had weak negative associations with PCEs and weak-to-moderate negative associations with self-rated emotional support and good mental health.

Model Analyses

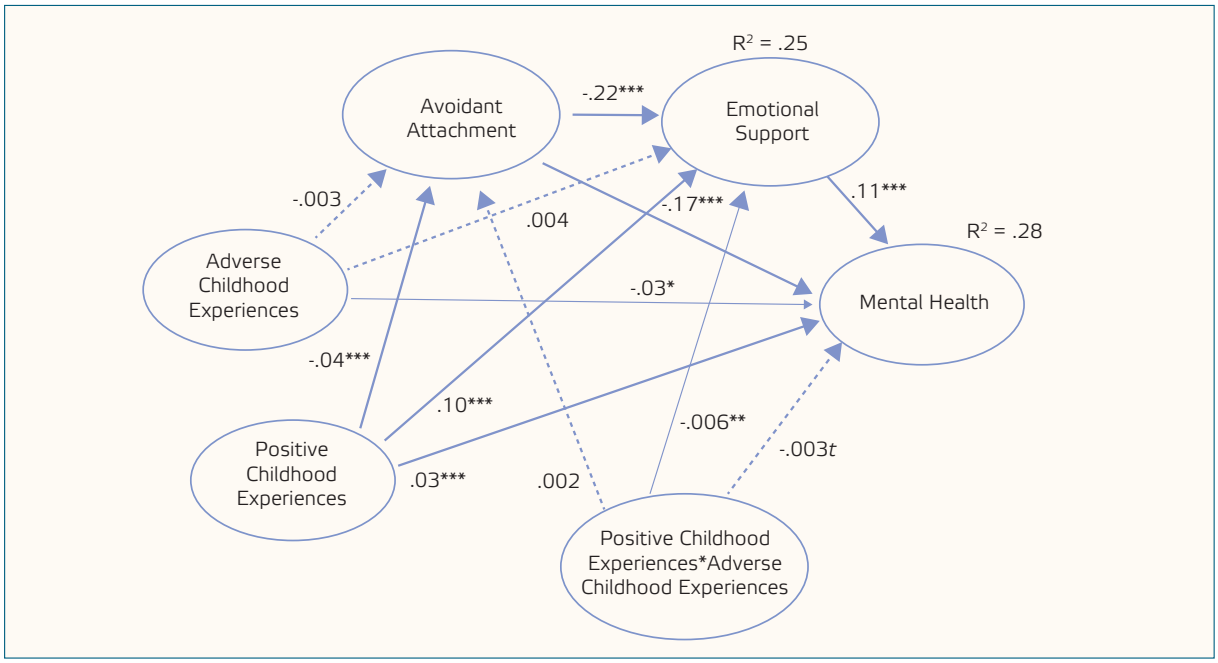
The models accounted for 24.9% of the variance in self-rated emotional support and 28.2% of the variance in mental health. The strongest pathways in the model were between the two types of attachment, perceived emotional support, and perceived mental health. ACEs and PCEs contributed less but indicated some significant trends. Model results are presented in Figures 2-3.

Figure 2. Anxious Attachment Serial Mediation and Moderation Model



Note. Dashed lines indicate nonsignificant paths, light lines indicate very small effect sizes that should be interpreted with caution. Effects (B) are unstandardized. Because the model including Avoidant Attachment as mediator includes Anxious Attachment as control variable and vice versa, the results of PCE and ACE on Emotional Support and Mental Health remain the same throughout the two models.

Figure 3. Avoidant Attachment Serial Mediation and Moderation Model



Note. Dashed lines indicate nonsignificant paths, light lines indicate very small effect sizes that should be interpreted with caution. Effects (B) are unstandardized. Because the model including Avoidant Attachment as mediator includes Anxious Attachment as control variable and vice versa, the results of PCE and ACE on Emotional Support and Mental Health remain the same throughout the two models.

ACEs' Direct Associations

H1 predicted that higher numbers of ACEs are negatively associated with self-rated (a) emotional support and (b) mental health. As predicted, ACEs had a weak and negative association with self-rated mental health but were not significantly associated with self-rated emotional support in either model (see Table 3). Only H1b was supported.

H2 predicted that higher levels of ACEs are positively associated with (a) avoidant and (b) anxious attachment. In the models, ACEs were not significantly associated with reports of avoidant attachment (H2a) but had a small positive association with reports of anxious attachment, thereby supporting H2b.

Table 3. ACE, PCE, Attachment, Perceived Emotional Support, and Mental Health Direct, Indirect, and Conditional Path Model Results

Path	*B*	*SE*	CI [lower, upper]
Avoidant Attachment Model			
Direct Paths			
ACE → Avoidant Attachment	-.003	.012	[-.026, .020]
ACE → Emotional Support	.004	.018	[-.032, .040]
ACE → Mental Health	-.029*	.013	[-.055, -.003]
PCE → Avoidant Attachment	-.040***	.005	[-.050, -.030]
PCE → Emotional Support	.103***	.008	[.088, .119]
PCE → Mental Health	.025***	.006	[.013, .036]
Avoidant Attachment → Emotional Support	-.219***	.022	[-.263, -.176]
Avoidant Attachment → Mental Health	-.169***	.016	[-.201, -.137]
Emotional Support → Mental Health	.105***	.011	[.085, .126]
ACE*PCE → Avoidant Attachment	.002	.001	[-.001, .004]
ACE*PCE → Emotional Support	-.006**	.002	[-.010, -.002]
ACE*PCE → Mental Health	-.003*t*	.002	[-.006, .000]
Indirect Paths			
ACE → Emotional Support → Mental Health	-.004*	.001	[-.006, -.002]
ACE → Avoidant Attachment → Mental Health	-.002	.001	[-.003, .001]
ACE → Avoidant Attachment → Emotional Support → Mental Health	-.0002	.001	[-.002, .000]
Anxious Attachment Model			
Direct Paths			
ACE → Anxious Attachment	.024*	.011	[.002, .046]
ACE → Emotional Support	.004	.018	[-.032, .040]
ACE → Mental Health	-.029*	.013	[-.055, -.003]
PCE → Anxious Attachment	-.030***	.005	[-.039, -.020]
PCE → Emotional Support	.103***	.008	[.088, .119]
PCE → Mental Health	.025***	.006	[.013, .036]
Anxious Attachment → Emotional Support	-.340***	.024	[-.386, -.294]
Anxious Attachment → Mental Health	-.312***	.018	[-.346, -.277]
Emotional Support → Mental Health	.105***	.011	[.085, .126]
ACE*PCE → Anxious Attachment	.0004	.001	[-.002, .003]
ACE*PCE → Emotional Support	-.006**	.002	[-.010, -.002]
ACE*PCE → Mental Health	-.003*t*	.002	[-.006, .000]
Indirect Paths			
ACE → Emotional Support à Mental Health	-.004*	.001	[-.007, -.002]
ACE → Anxious Attachment à Mental Health	-.009*	.002	[-.012, -.005]
ACE → Anxious Attachment → Emotional Support → Mental Health	-.001*	.000	[-.002, -.001]

Note: ACEs = adverse childhood experiences, PCEs = positive childhood experiences. Control variables include age, gender, education level, and the other attachment style. Because the model including Avoidant Attachment as mediator includes Anxious Attachment as control variable and vice versa, the results of PCE and ACE on Emotional Support and Mental Health remain the same throughout the two models.

*p < .05, **p < .01, ***p < .001, t indicates p < .100.

Attachment Mediation

H3 predicted that (a) avoidant and (b) anxious attachment and self-rated emotional support mediate the association between ACEs and self-rated mental health. Each model contained three indirect effects (see Figure 1). In the *avoidant attachment* model, the association between ACEs and self-rated mental health through emotional support was negative and significant. The association between ACEs and self-rated mental health through avoidant attachment was not significant, nor was the association between ACEs and mental health through both avoidant attachment and emotional support.

All three indirect effects were significant in the *anxious attachment* model. The association between ACEs and self-rated mental health through emotional support was negative and significant. The association between ACEs and self-rated mental health through anxious attachment was negative and significant. Finally, the association between ACEs and self-rated mental health through both anxious attachment and emotional support was negative and significant. H3 was partially supported (see Table 3).

PCE's Direct Association

H4 predicted that positive childhood experiences are negatively associated with (a) avoidant and (b) anxious attachment. As predicted, PCEs had a small negative association with avoidant attachment and anxious attachment, supporting H4a and H4b.

Moderation

H5 predicted that PCEs moderate (i.e., reduce) the direct negative association between ACEs and self-rated (a) emotional support and (b) mental health. In both models, the interaction between ACEs and PCEs related to emotional support was very small but negative and significant, indicating that PCEs moderated the association between ACEs and self-rated emotional support (see Figure 4). However, the moderation effect did not work in the proposed direction. The interaction between ACEs and PCEs related to self-rated mental health was not significant.

Figure 4. The Interaction of ACEs and PCEs On Perceived Emotional Support

Discussion

Our study aimed to decipher the role of adult insecure attachment (avoidant and anxious) and PCEs in the correlation between ACEs and self-rated mental health and emotional support in adulthood. Although our findings are consistent with previous literature, they also yield unique insights and contributions. It is important to note that we attempted to capture these constructs using brief screening procedures and measurement instruments rather than more in-depth, multilevel instruments. While this approach grants us a broad overview, it may not provide the depth and specificity of more comprehensive instruments. Therefore, our results should be interpreted with caution. That said, the strongest (and likely most important) associations were observed for the pathways between the two attachment styles, emotional support and mental health. Both types of attachment were negatively associated with perceived (a) emotional support, and (b) mental health. Pathways in the model from ACEs and PCEs contributed less but offered some significant indicative trends.

First, we found that ACEs have a weak but direct impact on self-rated mental health, confirming previous findings (Felitti et al., 1998; Hughes et al., 2017). However, in contrast to the reports of some studies with high-risk samples (Caravaca-Sanchez et al., 2019; Schüssler-Fiorenza Rose et al., 2016), our results did not show a significant direct association between ACEs and self-rated emotional support. This divergence might be due to our "low-risk sample", which is not specifically targeted at high-risk groups with known mental illness. Our sample might be considered "low-risk" given the low mean number of ACEs (M = 2.37 out of 10) and the relatively high perceived emotional support (M = 3.56 out of 5) reported by the participants. This may explain the lack of significant correlation between ACEs and self-rated emotional support, in contrast to the significant association between ACEs and self-rated mental health, which may be more sensitive to variation in a broader population. This observation warrants more focused future research to identify possible patterns in the relations between ACEs and perceived emotional support, perhaps taking into account the possible differences of perceived emotional support across different relationships. Our second hypothesis was only partially confirmed. While ACEs showed a weak positive association with anxious attachment, no such relationship was found with avoidant attachment. While this contradicts some previous studies (Erozkan, 2016; Taunton et al., 2021), it aligns with others (Hatton-Bowers et al., 2023). One possible explanation for this discrepancy lies in the nature of avoidant attachment, which can involve minimising the importance of negative life experiences (Muller, 2009); this may bias retrospective reports of ACEs submitted by avoidantly attached adults. Additionally, including disorganized attachment in the study might have revealed a stronger link between ACEs and attachment. It is also plausible that insecure attachment arises not only from ACEs but from other factors within or beyond the family environment (e.g., parental insensitivity), or that a different attachment measure could have yielded different results.

Although our third hypothesis was only partially supported, our study offers nuanced insights into the mediating role of different attachment styles in the relationship between ACEs, perceived emotional support and self-rated mental health in adults. Our analysis found a weak but significant pathway from ACEs, through attachment styles, to perceived emotional support and then to self-rated mental health that was significant only for anxious attachment. In contrast, the mediation pathway was not significant in the avoidant attachment model. A possible explanation for this finding could be that avoidant people are inherently less likely to reach out to their networks for emotional support or expect support availability from their networks, which could potentially affect the perceived emotional support. In both models, perceived emotional support acted as a significant mediator of the negative association between ACEs and mental health. This finding confirms the existing literature that underscores the importance of emotional support in mitigating the adverse effects of ACEs (Corcoran & McNulty, 2018; Lin et al., 2020; Widom et al., 2018). Furthermore, our study extends this discussion by highlighting the differential mediating role of anxious and avoidant attachment styles, thus providing a more nuanced understanding of how these factors interplay to influence self-rated mental health, a key indicator of overall health and well-being (McAlpine et al., 2018). However, these findings should be interpreted with caution given the small effect sizes and cross-sectional nature of our data. We argue that the observed associations provide a weak but valuable snapshot, suggesting plausible pathways that are theoretically consistent with existing literature. These findings highlight the necessity for longitudinal studies to examine the temporal dynamics of these relationships.

Consistent with previous research (Bethell et al., 2019), our findings highlight the protective role of positive childhood experiences (PCEs) in the context of adverse childhood events. In particular, our weak but significant findings consolidate the finding that PCEs are inversely related to avoidant and anxious attachment styles, supporting H4a and H4b. Our moderation analysis provides additional insights. While H5 assumed that PCEs would mitigate the negative impact of ACEs on self-rated emotional support *and* mental health, our findings

reveal a more complex picture. Specifically, we found that the interaction of ACEs and PCEs had a small but significant negative impact on perceived emotional support. When ACEs were low, high PCEs boosted perceived emotional support. However, for those who experienced high ACEs, PCEs did not boost perceived emotional support nearly as much. However, the expected moderation of the association between ACEs and mental health by PCEs was found to be at a trend level of significance (p = .082). This non-significant finding may be due to the inclusion of emotional support in the model containing mental health (indeed, when running the model without emotional support, this interaction was small but significant (p = .035). This means that PCE's impact on perceived mental health overall could be mediated or affected by other factors.

Strenghts and Limitations

One of this study's main strengths and limitations lay in the fact that self-rated emotional support and mental health were each measured with a single item. This approach allows for a straightforward and efficient assessment that captures the most important aspects of the constructs in question. However, it may also limit the ability to capture the full complexity and nuance of these experiences. The reliance on single-item measures may not fully grasp the variability and multidimensional nature of emotional support and mental health, thus compromising the depth of the results. Furthermore, the degree of avoidant attachment tendencies was assessed with only three items. While this approach is a useful screening tool to identify risk for avoidant tendencies, it may not be as in-depth and extensive as more comprehensive measures. Therefore, results related to avoidant attachment should be interpreted with caution. In addition, the effect sizes for indirect and moderating effects were small. Our large sample size likely influenced our ability to detect significance in small effects. Despite this, some direct effects were robust, including the link between attachment and perceived (a) emotional support and (b) mental health. In addition, our models accounted for 25% of the variance in emotional support and 28% of the variance in mental health, indicating their strength.

Besides, our study was based on self-reports with strengths and limitations as previously described, such as the use of the online research panel (Kuhar & Zager Kocjan, 2021). Respondents knew the topic of the survey before they agreed to participate, which can lead to motivation bias. Those who chose to participate may have a particular interest in the topic or personal experience with the issues discussed, which may bias the results. The fact that ACEs and PCEs were reported retrospectively, and attachment qualities, self-rated mental health and emotional support were reported as cross-sectional data should also be considered when reporting or generalizing findings. ACE's provided self-reports may be biased by concurrent mental health factors, such as depression and psychological distress (Colman et al., 2016). Attachment qualities were measured using self-report, which may bias responses (Brennan et al., 1998). Objectively measured ACEs and PCEs would allow researchers to explore their influence on attachment without concerns about attachment styles biasing retrospective accounts of parent-child interactions. A limitation regarding the self-rated measure of mental health is that somatic symptoms or physical complaints may influence the perceived state of mental health. However, subjective assessments of mental health can also capture symptoms, difficulties, and reactions to life events (e.g., the end of a love relationship) that are not classified as psychiatric disorders (Levinson & Kaplan, 2014; McAlpine et al., 2018). This broad perspective is valuable because many mental health challenges remain undiagnosed, and a single-item assessment on a five-point scale can serve as an effective screening tool to identify individuals who might benefit most from treatment (Mawani & Gilmour, 2010; McAlpine et al., 2018; Nguyen et al., 2015). This approach increases the prognostic importance of self-rated mental health, providing additional predictive value to outcomes such as mortality and future well-being.

Conclusion, Implications and Future Direction

This study examined the complex relations between both adverse and positive childhood experiences (i.e., ACEs and PCEs), adult attachment qualities, and outcomes in adulthood (i.e., self-rated mental health and emotional support). The results suggest that among a large number of Slovene adults, PCEs may help mitigate the negative associations between ACEs and the mentioned outcomes. In addition, the findings indicate that ACEs are associated with increased tendencies toward insecure attachment qualities whereas PCEs appear to be associated with reduced tendencies toward these insecure attachment patterns.

These findings can guide interventions for individuals with history of child adversity to (also) focus on addressing insecure attachments as intervention targets – not only for children (e.g., Bakermans-Kranenburg et al., 2003) but also for adults (Daniel, 2006). Insecure attachment can be effectively treated through various therapeutic interventions, such as Dyadic Developmental Psychotherapy (Hughes, 2017) or Emotionally Focused Therapy (Johnson & Greenman, 2006). Interventions could also involve a person's social network – not only to show them how to think differently about emotional support, but also to ensure that they actively seek support from their network. This could be particularly relevant for interventions aimed at couples and could focus not only on helping the person with the insecure attachment to be more receptive to the support available, but also on the "support person" adjusting their own behavior to facilitate this process. Furthermore, the findings suggest that clinical interventions for individuals with adverse childhood histories could benefit from a comprehensive understanding of how these experiences may influence their relationships and interactions in adulthood. In addition, the role of PCEs should be recognized and supported. This study provides initial evidence on the strength of PCEs, which could be fostered through various programs that aim to provide each child with at least one adult caregiver or "mentor" type relationship. Such a relationship can serve as a PCE and help reduce some of the negative effects of the possible ACEs that children may experience.

In order to build on the results of this study, future research should address several critical areas. Longitudinally gathered data would provide more nuanced insight into the dynamic interactions of ACEs, PCEs, attachment and their role in adulthood well-being. Although longitudinal data were not used in this study, the study variables were time-ordered (i.e., ACEs/PCEs occurred prior to our findings), which theoretically underpins our mediation models as a methodologically sound approach to examining the associations between these variables. Furthermore, we suggest that subsequent research utilize longitudinal designs to verify and extend our findings and provide a clearer picture of how these early experiences and attachment styles evolve over time, influencing perceived mental health and emotional support in adulthood.

Future research should include the severity of different types of mental health problems and consider whether perceptions of emotional support vary across the different networks in the person's life (e.g., they may feel very supported by their friends but not by their siblings). Additionally, it should also consider disorganized attachment which is associated with a particularly high vulnerability to later psychological difficulties, especially dissociative experiences (Brothers, 2014) – perhaps the relationship between ACEs and disorganized attachment would prove to be stronger. Future research should also distinguish between different types of ACEs (e.g., abuse, neglect, household dysfunction), as evidence suggests that different adversity types contribute to different outcomes, including attachment qualities (e.g., Widom et al., 2018). This distinction could lead to a more nuanced understanding of the specific impact each type of adversity produces on mental health and attachment.

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Author contribution

Metka KUHAR: conceptualization, design, methodology, funding acquisition, investigation, project administration, data management, interpretation, supervision, writing original draft, writing review and editing.
Elizabeth DORRANCE-HALL: conceptualization, design, methodology, formal analysis, interpretation, supervision, writing review and editing.
Simona PROSEN: conceptualization, interpretation, writing review and editing.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
All participants engaged in the research voluntarily and anonymously.
Their data are stored in coded materials and databases without personal data.
The studies involving human participants were reviewed and approved by the National Medical Ethics Committee, Ministry of Health of the Republic of Slovenia, n. 0120-236/2019/4.

Data availability statement
The data and the materials necessary to attempt to replicate the findings are accessible upon reasonable request from the first author. The analyses presented here were not preregistered. The analytic code necessary to reproduce the analyses presented in this paper is not publicly accessible.

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Online Appendix

Online Table 1. Demographic Characteristics and Descriptive Statistics of Main Study Variables for the Total Sample

	Total sample	
	UnW No.	W % / *M (SD)*
Age	4,939	46.7 (15.3)
Gender		
Male	2,513	50.9
Female	2,426	49.1
Education		
Less than high school	1,886	38.2
High school	1,533	31.0
Post-secondary and graduate	1,236	25.0

Note. UnW = unweighted, W = weighted.

Online Table 2. Exploratory Factor Analysis Results for Anxious Attachment

Item	Factor Loading
Worry Subscale	
I often worry that my partner doesn't really love me.	.732
I often worry my partner will not want to stay with me.	.766
*I don't worry about others abandoning me.	.392
Desire for Merger Subscale	
I have trouble getting others to be as close as I want them to be.	.735
My desire to connection sometimes scares people away.	.507
I find others are reluctant to get as close as I would like.	.606

Note. *Reverse coded item.

Online Table 3. Exploratory Factor Analysis Results for Avoidant Attachment

Item	Factor Loading
I prefer not to be too close to others.	.790
I get uncomfortable when someone wants to be very close.	.727
I find it easy to be close to others.*	.315

Note. *Reverse coded item.