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# Associations between childhood adversity, psychiatric symptoms, and self-esteem outcomes in adolescents and young adults: An experience sampling study

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## Abstract

**Objectives:** Self-esteem and self-esteem stability are important factors during adolescence and young adulthood that can be negatively impacted by childhood adversity and psychiatric symptoms. We examined whether childhood adversity and psychiatric symptoms are associated with decreased global self-esteem as well as increased self-esteem instability as measured with experience sampling method. In addition, we examined if childhood adversity moderates the association between psychiatric symptoms and self-esteem outcomes.

**Methods:** Our study consisted of 788 adolescents and young adults who were part of a twin pair. The twin structure was not of interest to the current study. Mean age was 16.8 (SD = 2.38, range: 14–25), 42% was male. We used a multilevel modeling approach to examine our hypotheses to account for the presence of twins in the data set.

**Results:** Childhood adversity and psychiatric symptoms were negatively associated with global self-esteem (respectively standardized  $\beta = -.18$ , SE = 0.04,  $p < .0001$  and

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standardized  $\beta = -.45$ ,  $SE = 0.04$ ,  $p < .0001$ ), with a larger effect for psychiatric symptoms. Similarly, both were associated with increased self-esteem instability (respectively standardized  $\beta = .076$ ,  $SE = 0.025$ ,  $p = .002$  and standardized  $\beta = .11$ ,  $SE = 0.021$ ,  $p < .0001$ ). In addition, interactions between childhood adversity and psychiatric symptoms on both global self-esteem (standardized  $\beta = .06$ ,  $SE = 0.01$ ,  $p < .0001$ ) and self-esteem instability (standardized  $\beta = -.002$ ,  $SE = 0.0006$ ,  $p = .001$ ) were found, showing that the negative association of psychiatric symptoms with self-esteem outcomes is less pronounced in young people with higher levels of childhood adversity, or formulated differently, is more pronounced in young people with little or no exposure to childhood adversity.

**Conclusion:** Global self-esteem and self-esteem instability in young people are influenced by both current psychiatric symptomatology and exposure to childhood adversity. Those with more psychiatric symptoms show worse self-esteem and higher self-esteem instability, which is moderated by childhood adversity. For young people with high childhood adversity levels lower self-esteem and higher self-esteem instability are less influenced by reductions in psychiatric symptoms.

#### KEYWORDS

childhood adversity, experience sampling method, psychiatric symptoms, self-esteem, self-esteem instability, young adult

## 1 | INTRODUCTION

Self-esteem is the extent to which individuals evaluate and value themselves (Biddle et al., 2015). Both childhood adversity and psychiatric symptoms have been associated with self-esteem. First, childhood adversity is associated with self-esteem (Babad et al., 2020; Mwakanyamale & Yizhen, 2019). In addition, several studies have demonstrated a negative effect of childhood adversity via self-esteem on several different psychiatric symptoms (Berber Çelik & Odacı, 2020; Ju & Lee, 2018). Particularly childhood emotional abuse and neglect seem to be the most poignant contributing factors (Reid-Russell et al., 2021; Schlenzog-Schuster et al., 2022). Second, the relationship between self-esteem and psychiatric symptoms may be bidirectional. On the one hand, low self-esteem may serve as a risk factor for the development of psychiatric symptoms. This has been coined the “vulnerability model” and indeed low self-esteem has been shown to be predictive of future depressive and anxious symptoms, although the effect size is modest (Keane & Loades, 2017). On the other hand, the reverse may also apply whereby low self-esteem is the result of psychiatric symptoms rather than a predictive factor. This is referred to as the “scar model” (Zeigler-Hill, 2011). Importantly, both models are not mutually exclusive. Psychiatric symptoms are thus

often associated with alterations in self-esteem. Lastly, childhood adversity moderates several aspects of the presence and persistence of psychiatric symptoms. Those with childhood adversity experience more comorbidity, higher severity, and chronicity of symptoms (Teicher & Samson, 2013). It may be hypothesized that childhood adversity also moderates the association of psychiatric symptoms with self-esteem, whereby the presence of both psychiatric symptoms and childhood adversity synergistically negatively affect self-esteem. Previous research has examined how psychiatric symptoms and childhood adversity are separately associated with self-esteem, but not how the presence of childhood adversity moderates the association of psychiatric symptoms with self-esteem.

There is more to self-esteem than the global level. An additional characteristic of self-esteem, namely self-esteem instability has been defined as the magnitude of fluctuations in momentary, contextually-based self-esteem (Kernis, 2005). A meta-analysis revealed a weak negative correlation between self-esteem level and self-esteem instability, which also provides evidence for the existence of both concepts as separate constructs (Okada, 2010). People showing a combination of high self-esteem level and instability displayed an increased disposition toward anger and hostility (Kernis et al., 1989). Furthermore, unstable self-esteem might be a vulnerability factor for the onset of depressive symptoms (Kernis, 2005; Sowislo et al., 2014). Some studies have argued that it may even be a better predictor for later depression than self-esteem level itself (Franck & De Raedt, 2007), but this was not confirmed in larger-scale studies (Sowislo et al., 2014). Nevertheless, research convincingly showed that high, unstable, and thus fragile self-esteem is associated with more psychological and relational problems (Kernis, 2005). Within the Big Five framework of personality, self-esteem instability has been negatively associated with emotional stability, agreeableness, and conscientiousness (Zeigler-Hill et al., 2015). Self-esteem instability may also be part of a larger meta-personality trait of instability which is consistently related to the presence and severity of psychiatric symptoms (Ringwald et al., 2023). Several psychiatric disorders, such as borderline personality disorder, posttraumatic stress disorder, and schizophrenia, have shown a distinct association with increased self-esteem instability, arguing that it may be a core characteristic of the disorder (Kashdan et al., 2006; Kockler et al., 2022; Weinberg et al., 2012). Self-esteem instability can be assessed using the experience sampling method (ESM), a well-validated structured diary technique that assesses individual and contextual measures in the current moment, multiple times per day on a number of consecutive days (Myin-Germeys et al., 2009). This way of measuring reduces recall bias and increases ecological validity. Furthermore, it allows us to tap into the dynamic nature of psychological concepts, which is central to the concept of self-esteem instability. Although the association of childhood adversity and psychiatric symptoms with global self-esteem has already received research attention, research examining the association of childhood adversity and psychiatric symptoms with self-esteem instability has not been done yet.

Adolescence is a period of rapid physical, social, and cognitive growth during which important changes in self-esteem level and variability may occur. Studies on longitudinal trajectories of self-esteem show generally higher levels during childhood, typically followed by declines in early adolescence and subsequent gradual increases in young adulthood. The younger the person, the more self-esteem is instable and contingent on self-relevant events. At a younger age, rising and declining of self-esteem may follow after only minor positive or negative social feedback (Meier et al., 2011). Some studies report that males in general have higher self-esteem than females in this age category, but other studies do not find this sex imbalance (Erol & Orth, 2011; Kiviruusu et al., 2015). It is therefore important to study self-esteem and self-esteem instability in this population as they are also most vulnerable to the development of psychiatric symptoms (Kessler et al., 2005). The present study therefore uses a large representative cohort of adolescents and young adults with the aim to examine the cross-sectional associations of both childhood adversity and psychiatric symptoms with global self-esteem level and self-esteem instability. We hypothesize that childhood adversity and psychiatric symptoms are associated with decreased global self-esteem as well as increased self-esteem instability. In addition, as childhood adversity moderates several aspects of the presence and persistence of psychiatric symptoms, we hypothesize that the association of psychiatric symptoms with global self-esteem and self-esteem instability is also moderated by the level of childhood adversity, with stronger associations between psychiatric symptoms and self-esteem measures in people with more exposure to childhood adversity. Lastly, in line with previous studies, we hypothesize that stronger associations between self-esteem and emotional abuse and neglect exist than with other types of adversity (Reid-Russell et al., 2021).

## 2 | MATERIALS AND METHODS

### 2.1 | Participants

Participants were sampled from the East Flanders Prospective Twin Survey (EFPTS) (Derom et al., 2019). The EFPTS is a prospective, population-based registry of multiple births in the province of East Flanders, Belgium, gathering data on twins since 1964. The TwinssCan project (Pries et al., 2019) collected data from the EFPTS on adolescents and young adults between 15 and 35 years between April 2010 and 2014. The data set included 840 participants: 292 monozygotic twins, 486 dizygotic twins, 18 triplets, and 43 siblings and 1 participant for whom no data on twin or sibling status was present. The twin structure of the data set is not of interest for the current paper. Additionally, data from 363 parents was collected, which was not used in the present study. The project was approved by the Local Ethical Committee UZ/KU Leuven (Commissie Medische Ethiek van de Universitaire ziekenhuizen KU Leuven, Nr. B32220107766) and all participants gave written informed consent. The study was performed in accordance with the ethical standards of the 1964 Declaration of Helsinki. If the participant was younger than 18 years, parents also signed informed consent. Candidate-participants were ineligible for participation if they had a pervasive mental disability as reported by caregivers.

### 2.2 | ESM

The ESM is a structured form of assessment related to the diary technique. It assesses participants in their daily habits, living, and environment. This methodology has been validated for examining within-person variation in psychological parameters (Myin-Germeys et al., 2009). Participants received an electronic medical Personal Digital Assistant, especially developed for this purpose. This custom-made PDA has been patented and is called the "Psy-mate." The Psy-mate was programmed to emit a signal ("beep") at an unpredictable moment in each of 10 90 min time blocks between 7:30 and 22:30, on 6 consecutive days. After each beep, participants were asked to stop their activity and to answer questions regarding their mental state (Derom et al., 2019). Participants were instructed to complete their reports immediately after the beep, thus minimizing memory distortion. To assure reliability and validity the Psy-mate recorded the time at which participants completed the assessment. Reports needed to be completed within 15 min of the beep, otherwise the data for this time point were considered missing (Devries & Delespaul, 1989). Although many previous ESM studies have set a minimum compliance threshold for the number of valid beeps, recent evidence demonstrated that this might lead to biased estimates and as such is not best practice (Jacobson, 2020). Therefore, all available data was used in the current study. The ESM procedure was explained to participants during an initial briefing session and a practice trial was performed to confirm that participants understood the response format.

### 2.3 | Measures

#### 2.3.1 | Self-esteem

Global self-esteem was measured using the Rosenberg self-esteem scale, translated and validated in Dutch (Franck et al., 2008). It is a 10-item Likert-scale with items answered on a four-point-scale with responses ranging from "Strongly Disagree" (0) to "Strongly Agree" (3). The scale ranges from 0 to 30 with higher scores indicating higher self-esteem and has been shown to have good internal consistency and validity (Franck et al., 2008). Internal consistency of the scale in our study was good (Cronbach  $\alpha$  = .86, confidence interval [CI]: 0.85–0.88). Global self-esteem was measured before the start of the ESM period.

Within-subject instability of self-esteem was assessed with ESM items pertaining to self-esteem. Previous ESM studies using similar items of self-esteem demonstrated good reliability and validity (Crowe et al., 2019; Pavlickova et al., 2015). In these studies, four ESM self-esteem items are used: two positively worded items and two negatively worded items. However, it is advised to only use positively worded items as a measure of self-esteem since this measures the concept more accurately and measurement effects such as effects of wording can be avoided (Lindwall et al., 2012; Michaelides et al., 2016). Thus, a variable was constructed measuring within-person self-esteem over the ESM period by taking the mean of the items "I like myself" and "I am satisfied with myself" (Mazereel et al., 2021; Postma et al., 2021). Anchors on these items were provided on the Likert scale at each beep: 1 being "Not at all," 4 being "Moderate," and 7 being "Very Much." Intraclass correlations for this averaged self-esteem variable were 0.16 at the twin level, 0.41 at the subject level, and 0.57 at the subject-within-twin level (Lorah, 2018). Within-subject instability of self-esteem was then conceptualized by assessing mean self-esteem at each ESM beep and then taking the within-person standard deviation (SD) of this variable over the 60 beeps as a measure of the aggregate within-person instability of self-esteem.

### 2.3.2 | Childhood adversity

The childhood trauma questionnaire–short form Dutch version (CTQ) was used to assess childhood adversity (Thombs et al., 2009). It is a well validated and widely used 25-item questionnaire with items rating frequency of emotional abuse and neglect, physical abuse and neglect and sexual abuse from "Never" (1) to "Very frequent" (5). Internal consistency of the scale in our study was excellent (Cronbach  $\alpha = .89$ , CI: 0.88–0.90). Subscores for the individual adversity types (emotional and physical abuse and neglect, sexual abuse) were calculated according to the CTQ manual for subsequent analyses. A continuous overall childhood adversity variable was constructed by adding the subscores of the different categories. Range of the CTQ is 25–125.

### 2.3.3 | Psychiatric symptoms

The Symptom-Checklist-90-Revised (SCL-90-R) is a questionnaire designed to assess self-reported symptom dimensions. Participants in the Dutch version rate items on a 5-point scale ranging from 0 (*not at all*) to 5 (*extremely*) (Arrindell & Ettema, 2003). This results in a symptom intensity score on different subscales. The checklist consists of the following subscales: somatization, obsessive compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. We used the total score as a measure of general psychiatric symptoms (Preti et al., 2019). Internal consistency of the scale in our study was excellent (Cronbach  $\alpha = .97$ , CI: 0.97–0.98).

## 2.4 | Statistical analysis

Statistical analysis was performed in R, version 4.0.5 (R Core Team, 2019). As described above, rows with beep delay >15 min, and day number >6 were considered invalid observations and omitted. Participants older than 25 were excluded. For missing data, we assumed data was Missing At Random and modeled this using the full information maximum likelihood estimation (Little & Rubin, 2020; Molenberghs & Kenward, 2007). A full information maximum likelihood estimation uses all available information, without the need either to delete or impute measurements or entire subjects. By using this method, appropriate adjustments are made to parameters at times when data are incomplete due to the within-subject correlation (Enders & Bandalos, 2001). Given the large sample size of this study, normality is assumed according to the central limit theorem (Anderson, 2010). We

checked for the presence of outliers ( $>3SD$ ) for the variables of interest and reran analyses without these outliers to check for possible influence of outliers on the results. We visually inspected linearity by plotting scatterplots and tested for significance of quadratic and cubic polynomials of childhood adversity and psychiatric symptoms in each main analysis. Polynomial predictors were only retained when their predictors were significant in the model; this was done using approximate  $t$ -test for inference for the marginal model. Level of significance was set at  $\alpha = .05$ .

#### 2.4.1 | Associations with global self-esteem

To examine the association of childhood adversity and psychiatric symptoms with global self-esteem, we used univariate linear multilevel modeling to account for the twin structure of our data set. We used the lme4 package in R (Bates et al., 2015). We first regressed global self-esteem on childhood adversity, psychiatric symptoms. We then added self-esteem instability, age, and sex as a priori confounders. Lastly, in the full model, we then included the interaction between childhood adversity and psychiatric symptoms. Standardized  $\beta$  coefficients are shown in the results.

#### 2.4.2 | Associations with self-esteem instability

To examine the association of childhood adversity and psychiatric symptoms with within-person self-esteem instability, we again modeled a univariate linear multilevel model. We first regressed within-person self-esteem instability on childhood adversity and psychiatric symptoms. We then included global self-esteem, age, and sex as a priori confounders. Lastly, in the full model, we then included the interaction between childhood adversity and psychiatric symptoms. Standardized  $\beta$  coefficients are shown in the results. Previous work has shown concern for the conceptualization of intraindividual variability as within-subject SD (Baird et al., 2006). They argued that this conceptualization is conflated with mean state scores. They suggested the use of a corrected SD which is conceptualized as the regression of the SD on linear and quadratic mean state self-esteem, after which the residuals are saved as an indicator of self-esteem instability that is not confounded with mean-level scores. We calculated this corrected self-esteem instability score and reran the analyses. The results remained similar and as such we chose to report the results with the most commonly used method of within-subject SD.

#### 2.4.3 | Analysis for childhood adversity type

To examine the effects of individual adversity types on both global self-esteem and within-person instability of self-esteem, we fitted the above models with adversity types as individual predictors including the interactions with psychiatric symptoms.

### 3 | RESULTS

#### 3.1 | Sample

Eight hundred and forty participants took part in the study with a total of 33,931 ESM observations resulting in an overall completion rate of 67% (actual recorded beeps over the expected amount of recorded beeps). The participant identity from 1 participant was invalid, 11 participants had invalid day numbers, 1 participant had invalid beep numbers, observations with day number  $>6$  were also removed and 39 participants were

**TABLE 1** Sociodemographic characteristics.

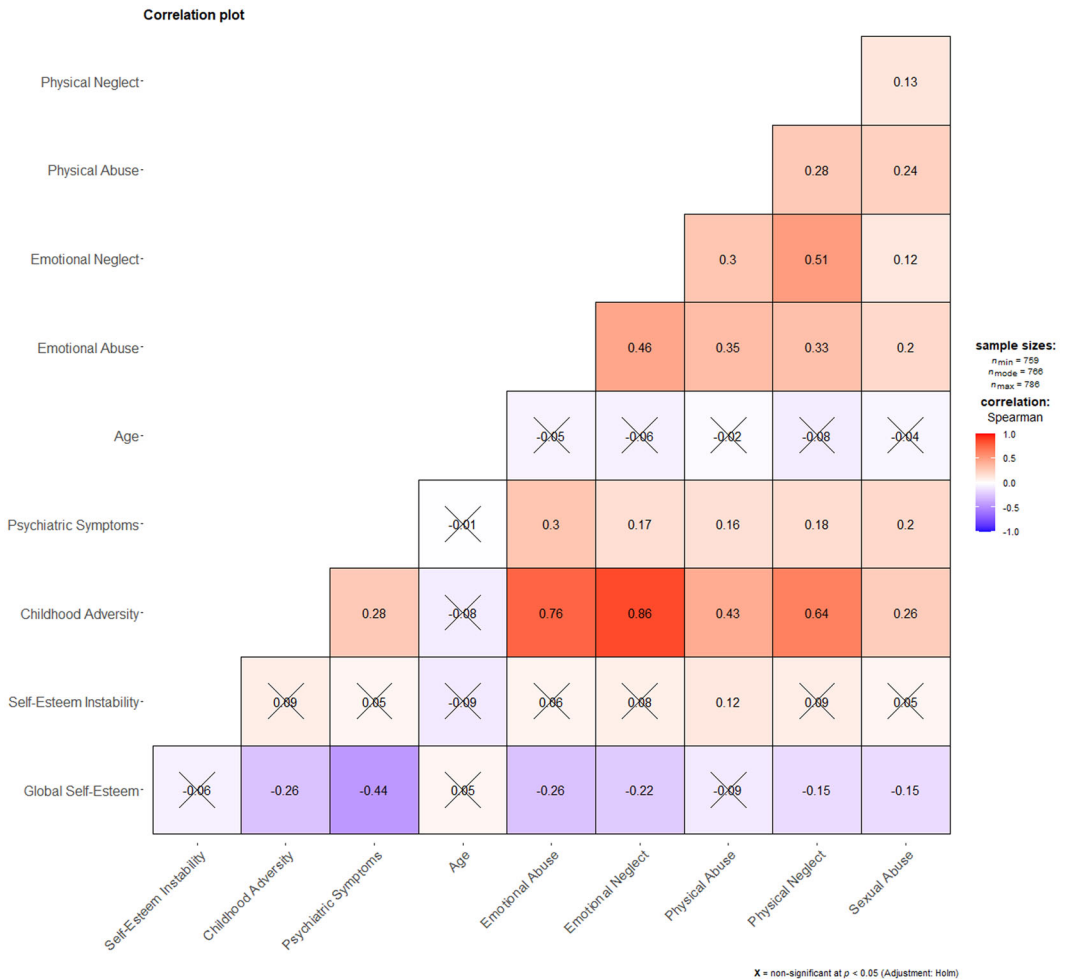
Characteristic	Value
Age, mean (SD)	16.84 (2.38)
Female sex, <i>n</i> (%)	458 (58%)
Educational level, <i>n</i> (%)	
Low (primary–high school)	585 (73%)
High (bachelor–master)	179 (22%)
Income, <i>n</i> (%)	
No income	742 (94%)
Income	45 (6%)
Living with, <i>n</i> (%)	
Parents	709 (90%)
Away from parents	79 (10%)

older than 25, leaving 788 participants with 28,806 observations (compliance rate of 61%). For sociodemographic characteristics, see Table 1. The mean global self-esteem of the Rosenberg self-esteem scale was 19.9 (SD = 5.02), mean within-person self-esteem over the ESM period was 5.1 (SD = 1.14), mean within-person self-esteem instability was 0.68 (SD = 0.31). Pearson's correlation between mean within-person self-esteem and within-person self-esteem instability was  $-0.13$  ( $p = .0002$ ). Childhood adversity score had a mean of 34.17 (SD = 8.69) and the mean of psychiatric symptoms score was 43.77 (SD = 38.90). The correlation table between the study variables is shown in Figure 1.

### 3.2 | Associations with global self-esteem

Both childhood adversity and psychiatric symptoms were negatively associated with global self-esteem in the analysis with only the main effects, the analysis with inclusion of confounders and the full model (results of the full model are shown in Table 2). Polynomials were not significant. The  $\beta$  coefficient for psychiatric symptoms was significantly larger than the  $\beta$  coefficient for childhood adversity (post hoc general linear hypothesis test,  $p < .0001$ ). Moreover, there was a significant interaction between childhood adversity and psychiatric symptoms on global self-esteem (see Table 2 and Figure 2), indicating that the effect of psychiatric symptoms on global self-esteem was dependent on the level of childhood adversity. For people with low childhood adversity scores, the negative slope of psychiatric symptoms on global self-esteem is stronger than for people with higher childhood adversity score. Across individuals, a stronger decline in global self-esteem as psychiatric symptoms increase is apparent in individuals with less childhood adversity. A Johnson–Neyman analysis demonstrated that the slope of psychiatric symptoms became nonsignificant above 4.88 SDs, corresponding to a CTQ score of 76.5. We detected outliers ( $>3$  SDs) for global self-esteem ( $n = 4$ ), childhood adversity ( $n = 13$ ), and psychiatric symptoms ( $n = 16$ ). We reran analyses with and without these outliers. The results remained largely similar. However, the interaction between childhood adversity and psychiatric symptoms became nonsignificant when removing childhood adversity and/or psychiatric symptom outliers.





**FIGURE 1** Interaction between childhood adversity and psychiatric symptoms on self-esteem instability. Standardized effects are shown.

### 3.3 | Associations with self-esteem instability

Only the quadratic polynomials of childhood adversity and psychiatric symptoms were positively associated with self-esteem instability only in the full model. In the model with only the main effects and the model with inclusion of the confounders childhood adversity was nonsignificant (results of the full model are shown in Table 2). Their relationship is thus best described by a U-curve. This means that with increasing psychiatric symptoms self-esteem instability first decreases slightly before it sharply increases again. The  $\beta$  coefficient for psychiatric symptoms was similar to the  $\beta$  coefficient for childhood adversity (post hoc general linear hypothesis test,  $p = .24$ ). The interaction between the polynomials was also significant (see Table 2 and Figure 3) suggesting that for people with lower childhood adversity scores an increase in psychiatric symptoms leads to a sharper increase in self-esteem instability than for people with higher childhood adversity scores. Probing the interaction further with the Johnson–Neyman technique we saw that the slope of psychiatric symptoms on self-esteem instability became nonsignificant when childhood adversity scores were greater than 5.3 SDs, which corresponds to a CTQ score of 79.9. We detected outliers ( $>3$  SDs) for

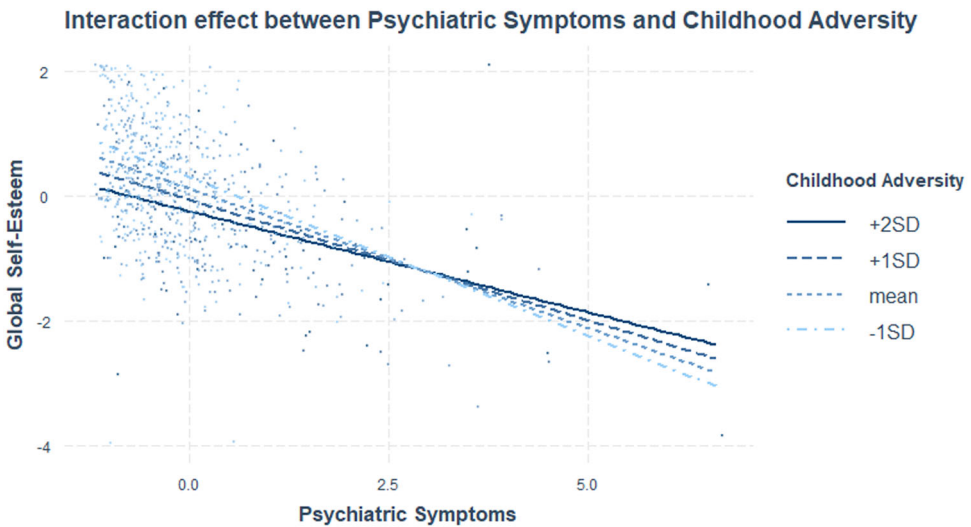
**TABLE 2** Results main analyses for global self-esteem and self-esteem instability.

	Fixed effects	Standardized $\beta$ coefficient	SE	t Value	95% confidence interval	p Value
Global self-esteem	CA	-.18	0.04	-4.53	-0.26 to -0.10	<.0001*
	PS	-.45	0.04	-12.59	-0.52 to -0.38	<.0001*
	CA $\times$ PS	.06	0.01	4.34	0.03 to 0.09	<.0001*
	Self-esteem instability	.002	0.032	0.06	-0.061 to 0.065	.95
	Age	.086	0.034	2.50	0.019 to 0.15	.013*
	Female sex	-.25	0.06	3.89	-0.38 to -0.12	.0001*
Self-esteem instability	CA <sup>2</sup>	.076	0.025	3.04	0.027 to 0.12	.002*
	PS <sup>2</sup>	.11	0.021	5.37	0.071 to 0.15	<.0001*
	CA <sup>2</sup> $\times$ PS <sup>2</sup>	-.002	0.0006	-2.62	-0.003 to -0.0004	.009*
	Global self-esteem	-.006	0.004	-0.17	-0.085 to 0.071	.86
	Age	-.093	0.036	-2.57	-0.16 to -0.022	.01*
	Female sex	-.17	0.072	2.38	-0.31 to -0.03	.02*

Note:  $\beta$  coefficients of continuous predictors are standardized.

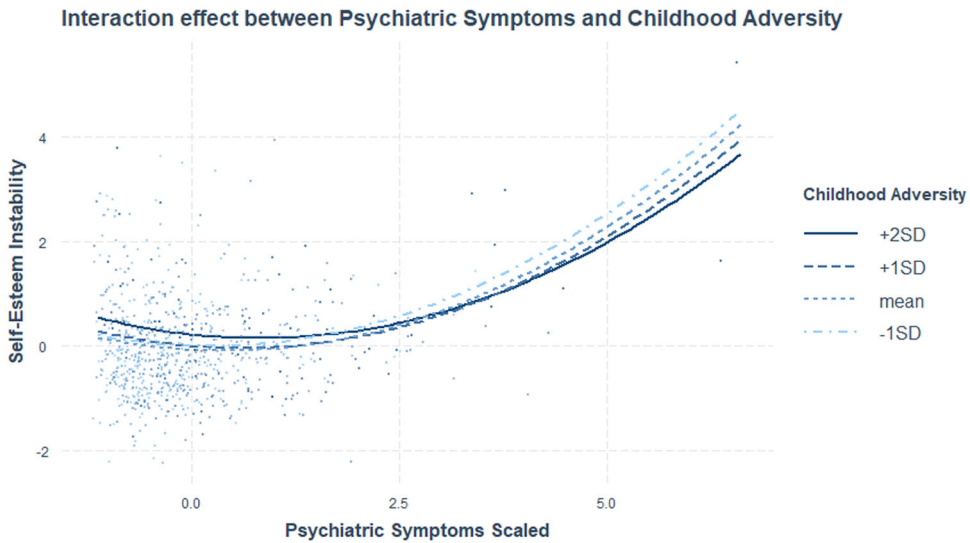
Abbreviations: CA, childhood adversity; PS, psychiatric symptoms; SE, standard error.

\*Significance set at  $\alpha p < .05$ .



**FIGURE 2** The Spearman's correlation plot between the study variables. Correlations that are crossed are nonsignificant, adjusted for multiple testing.

self-esteem instability ( $n = 9$ ), childhood adversity ( $n = 13$ ), and psychiatric symptoms ( $n = 16$ ). We reran analyses with and without these outliers. The results remained largely similar. However, the interaction between childhood adversity and psychiatric symptoms became nonsignificant when removing psychiatric symptom outliers.



**FIGURE 3** Interaction between childhood adversity and psychiatric symptoms on global self-esteem. Standardized effects are shown.

### 3.4 | The effect of adversity type on global self-esteem and self-esteem instability

At the level of adversity subtypes, the results showed that only emotional abuse and emotional neglect were (negatively) associated with global self-esteem (respectively standardized  $\beta = -.11$  SE = 0.042,  $t$ -value =  $-2.63$ , 95% CI =  $[-0.19$  to  $-0.029]$ ,  $p = .009$ ; standardized  $\beta = -.15$ , SE = 0.042,  $t$ -value =  $-3.52$ , 95% CI =  $[-0.23$  to  $-0.065]$ ,  $p = .0005$ ). No difference was noted between the  $\beta$  coefficients of emotional abuse and neglect (post hoc general linear hypothesis test,  $p = .60$ ). No significant associations of adversity types or their quadratic and cubic polynomials with self-esteem instability were found.

## 4 | DISCUSSION

### 4.1 | Findings

Our study examined the associations of childhood adversity and psychiatric symptoms with both global self-esteem and self-esteem instability. We found that childhood adversity and psychiatric symptoms are both associated with decreased global self-esteem and also show evidence for statistical interaction. Moreover, similar results were found for self-esteem instability.

### 4.2 | Associations with global self-esteem

Our findings on global self-esteem are consistent with previous literature (Babad et al., 2020; Berber Çelik & Odacı, 2020; Fasciano et al., 2020). We observed that psychiatric symptoms had a larger negative association with self-esteem than childhood adversity by comparing the betas of the predictors in a linear hypothesis test. This suggests that although childhood adversity is an important risk factor for decreased self-esteem, the presence of psychiatric symptoms is more decisive. This is potentially consistent

with both a scar and a vulnerability model of self-esteem whereby the association between psychiatric symptoms and self-esteem is central (Zeigler-Hill, 2011). As our study was cross-sectional no conclusions can be drawn from our data regarding the direction of the association between psychiatric symptoms and self-esteem concordant with either the scar or vulnerability model. Longitudinal cross-lagged panel modeling also show bidirectional effects of self-esteem and depressive symptoms on one another over large periods of time with both the vulnerability and scar model being verified, although with larger effects for the vulnerability model (Steiger et al., 2015). Even so, a systematic review pointed out that low self-esteem often co-occurs with depression and anxiety, but in itself is a weak predictor of future depression and anxiety (Keane & Loades, 2017). More longitudinal mediation models or cross-lagged panel models in which the intimate relationships between childhood adversity, self-esteem, and psychiatric symptoms are disentangled would be informative.

The interaction effect between childhood adversity and psychiatric symptoms on self-esteem that we observed provides further interesting insights. Contrary to our hypothesis, our results indicate that people with low childhood adversity scores have lower self-esteem when they experience psychiatric symptoms than people with higher childhood adversity scores. This is further corroborated by the fact that people with very high adversity scores do not have a decrease in self-esteem with increasing psychiatric symptoms, although they start off with a lower self-esteem to begin with. This seems to suggest that the self-esteem of people with many childhood adverse experiences remains low and is less contingent on factors such as psychiatric symptoms. One possible explanation is that they have stronger negative attention and information processing biases and as such might view an increase in psychiatric symptoms as fitting their negative expectations of themselves and their future (Flechtsenhar et al., 2022; Hepp et al., 2021). Another interpretation is that a floor effect is present: when self-esteem is already lower due to higher childhood adversity, it is more difficult for it to further decrease with increasing psychiatric symptoms. The mean global self-esteem score in our population is consistent with population-based norms for adolescents and young adults (Bagley & Mallick, 2001; Gabhainn & Mullan, 2003). In our study, psychiatric symptoms cease to be negatively associated with self-esteem when childhood adversity scores are above 4.88 SDs. This corresponds with a decrease in global self-esteem of 0.87 SDs or a Rosenberg self-esteem score of 15.5. This could also be rephrased as a ceiling effect for stressors. Additional stressors such as psychiatric symptoms above and beyond experiences of childhood adversity do not further decrease self-esteem much. However, our sample consisted of individuals from the general population, so these results should be further clarified in clinical samples with higher psychiatric symptom and childhood adversity scores.

When looking at separate adversity types it was observed that the negative association between childhood adversity and global self-esteem was only statistically significant for emotional neglect and abuse. This is also consistent with the existing literature, which finds similar results (Babad et al., 2020; Reid-Russell et al., 2021; Schlensog-Schuster et al., 2022). One possible explanation might lie in attachment theory (Bowlby, 1969). Children who experience emotional abuse and neglect may be more likely to have their basic attachment needs unfulfilled and develop negative relational patterns with others and themselves, which might lead them to feel bad, unwanted or unworthy of love (Cameranesi & Piotrowski, 2020; Gregorowski & Seedat, 2013). When thinking about interventions to increase self-esteem in adolescents, our results suggest that targeting emotional communication and improvement of attachment between family members may be particularly beneficial. These two techniques are also the cornerstones of certain forms of family therapy, which suggests that these forms of family therapy may be interesting avenues for further research aimed at improving self-esteem in young persons (Diamond, 2014; Kolaitis et al., 2014). In addition, our results should be followed-up in clinical samples, as our sample was taken from the general population.

### 4.3 | Associations with self-esteem instability

A second important finding is that young adults who have experienced childhood adverse experiences also experience more momentary fluctuations in their self-esteem and that this is a quadratic effect. This means that self-esteem instability is lowest for people with moderate amounts of psychiatric symptoms. People who have high levels of psychiatric symptoms have a sharp increase in self-esteem instability. As self-esteem instability has been associated with poorer mental health outcomes, independent from global self-esteem (Kernis, 2005), this may confer a possible additional risk factor for people exposed to childhood adversity. Our additional analysis for the association of different adversity types and self-esteem instability did not show a main effect of any specific adversity type on self-esteem instability. This suggests that it might not be one specific type that drives the association.

In our analysis, psychiatric symptoms were also positively associated with self-esteem instability. This is in line with previous research finding an association between self-esteem instability and depression (Crowe et al., 2019; Mlawer et al., 2021; van Tuijl et al., 2018), psychosis and paranoia (Postma et al., 2021; Thewissen et al., 2007), and anxiety (Farmer & Kashdan, 2014; van Tuijl et al., 2018). In our study, we found a quadratic effect, which suggests that people with moderate amounts of psychiatric symptoms experience the lowest self-esteem instability and people with even more psychiatric symptoms have a sharp increase in self-esteem instability. General instability, of which self-esteem instability may be a part, has also been strongly associated with maladaptive personality traits and psychiatric disorders (Ringwald et al., 2023).

The interaction between childhood adversity and psychiatric symptoms suggests that people with higher scores on childhood adversity have a less pronounced increase in self-esteem instability when psychiatric symptoms increase. This was again contrary to our hypothesis and may point to self-esteem instability as more of a core characteristic in people with high childhood adversity scores, which is less contingent on the presence of psychiatric symptoms. Our results thus seem to suggest that self-esteem and self-esteem instability could potentially be less amenable to change in those with more childhood adversity. If replicated in clinical samples, this may have important treatment consequences, in that only resolving psychiatric symptoms may not lead to the attainment of high and stable self-esteem. Specific approaches for addressing the impact of childhood adverse experiences may be necessary.

Of note is that in our study self-esteem instability was not correlated with global self-esteem (see correlation plot in Figure 1), which is in contrast with earlier findings (Okada, 2010). This might be related to the assessment of self-esteem instability through multiple daily measures over several days versus the measurement of global self-esteem only once in a self-report scale as self-esteem instability was negatively correlated with mean within-person self-esteem. This may be related to the difference between the measurement of constructs with retrospective self-reports versus measuring them with ESM. In the former, recall biases and the individual, (un)conscious need to preserve certain self-concepts may influence the measurement, while in the latter these concerns are less prominent as data are collected in a real world, momentary setting (Howard, 2017; Myin-Germeys et al., 2009).

### 4.4 | Strengths and limitations

This study has several strengths, such as examining both global self-esteem and self-esteem instability together, exploring the moderation of the association between psychiatric symptoms and self-esteem outcomes by childhood adversity, and a large sample size of adolescents and young adults. Nevertheless, a number of limitations should be considered. By using a cross-sectional design, our study is not able to pinpoint causal relationships between examined factors. Especially the relationship between psychiatric symptoms and self-esteem can be bidirectional (the vulnerability and the scar hypothesis) (Zeigler-Hill, 2011). To really disentangle the relationships between childhood adversity, self-esteem and psychiatric symptoms over longer time periods, cross-lagged panel models

including both self-esteem (instability) and psychiatric symptoms at all time points should be considered. Over shorter time periods, longitudinal analysis of ESM data on self-esteem may be fruitful in examining the momentary and consecutive relationships between self-esteem level, instability, and psychiatric symptoms throughout the day. Another possibility for the relationship between psychiatric symptoms and self-esteem also lies in common other factors that give rise to both self-esteem (instability) and psychiatric symptoms changes in young adults such as family environment or genetic influences (Raevuori et al., 2007). In addition, our sample was taken from the general population. These associations may be different in more severe clinical samples with higher adversity and symptom scores. Future research in clinical samples is warranted.

## 5 | CONCLUSIONS

Global self-esteem and self-esteem instability in young people are impacted by both current psychiatric symptoms and exposure to childhood adversity. Those exposed to higher levels of adversity, however, show worse self-esteem and higher self-esteem instability which are impacted less by current psychiatric symptoms. This indicates that in these young people, lower self-esteem and higher self-esteem instability may be more enduring and less sensitive to change. This calls for additional approaches besides reduction of psychiatric symptoms for increasing self-esteem in this group. Our results may suggest that increasing emotional communication and attachment between family members would be an interesting avenue for increasing self-esteem in young persons.

### AUTHOR CONTRIBUTIONS

Ruud van Winkel, Jeroen Decoster, Marc De Hert, Catherine Derom, Nele Jacobs, Claudia Menne-Lothmann, Jim van Os, Evert Thiery, Bart P. F. Rutten, and Marieke Wichers designed the study, wrote the protocol and conducted the research. Victor Mazereel and Ruud van Winkel conceptualized the paper and managed the literature searches and analyses. Victor Mazereel and Kristof Vansteelandt undertook the statistical analysis. Victor Mazereel wrote the first draft of the manuscript, which was critically revised by Ruud van Winkel. All authors contributed to and have approved the final manuscript.

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### CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

### DATA AVAILABILITY STATEMENT

The data set and code used for the current study are available in the Open Science Framework repository: [https://osf.io/e4bgc/?view\\_only=1731f9d6e5d9433aa7809d56f3f2647a](https://osf.io/e4bgc/?view_only=1731f9d6e5d9433aa7809d56f3f2647a)

### ETHICS STATEMENT

The project was approved by the Local Ethical Committee UZ/KU Leuven and all participants gave their written informed consent. If the subject was younger than 18 years, parents also signed informed consent.

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## PEER REVIEW

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