


# The Impact of Adverse Childhood Experiences on Coping Strategies in Schizophrenia Spectrum Disorders: A Case-Control Study

Justyna Kasznia<sup>1</sup>  
Aleksandra Pytel<sup>2</sup>  
Bartłomiej Stańczykiewicz<sup>2</sup>  
Jerzy Samochowiec<sup>3</sup>  
Katarzyna Waszczuk<sup>3</sup>  
Małgorzata Kulik<sup>4</sup>  
Agnieszka Cyran<sup>5</sup>   
Błażej Misiak<sup>5</sup>

<sup>1</sup>Inpatient Psychiatric Unit, Municipal General Hospital, Ostrów Wielkopolski, Poland; <sup>2</sup>Department of Nervous System Diseases, Wrocław Medical University, Wrocław, Poland; <sup>3</sup>Department of Psychiatry, Pomeranian Medical University, Szczecin, Poland; <sup>4</sup>Institute of Psychology, University of Szczecin, Szczecin, Poland; <sup>5</sup>Department of Psychiatry, Division of Consultation Psychiatry and Neuroscience, Wrocław Medical University, Wrocław, Poland

**Purpose:** Several studies have shown that individuals with schizophrenia-spectrum disorders (SSD) employ ineffective coping styles. However, it remains unknown whether a history of adverse childhood experiences (ACEs), associated with a risk of SSD, contributes to these observations. Therefore, in this study, we aimed to investigate whether exposure to ACEs is associated with coping styles in subjects with SSD.

**Patients and Methods:** We recruited 127 inpatients with SSD and 56 healthy controls. Coping styles and ACEs were recorded using self-reports.

**Results:** Individuals with SSD had significantly higher use of using avoidance coping. A history of parental antipathy, physical and sexual abuse was significantly more frequent in subjects with SSD compared to controls. Subjects with SSD had significantly higher multiplicity and severity of ACEs. Individuals with SSD and a history of parental loss had significantly higher use of avoidance coping compared to controls with and without a history of parental loss. Other characteristics of ACEs (age at first exposure, severity and multiplicity) were not associated with using specific coping strategies.

**Conclusion:** These findings imply that higher use of using avoidance coping by individuals with SSD might be related to a history of parental loss.

**Keywords:** stress, psychosis, psychotic disorder, trauma, maltreatment

## Introduction

Adverse childhood experiences (ACEs) are reported by about one-third of individuals with schizophrenia spectrum disorders (SSD).<sup>1</sup> There is convincing evidence that ACEs increase a risk of SSD, and are related to clinical expression of SSD.<sup>2,3</sup> Indeed, individuals with SSD and positive history of ACEs tend to show higher levels of psychotic symptoms,<sup>4</sup> greater cognitive deficits,<sup>5</sup> worse response to antipsychotic treatment<sup>6</sup> and greater functional impairment.<sup>7</sup> These observations suggest that ACEs exert a long-term impact on psychological processes that lead to the development of SSD. A recent systematic review and meta-analysis showed that processes mediating the association between ACEs and a risk of SSD include dissociation, emotional dysregulation, post-traumatic stress disorder (PTSD) symptoms and negative schemata (mental constructs of meaning).<sup>8</sup>

There is evidence that ACEs may make individuals more prone to experience subsequent adversities through increased stress sensitivity and threat anticipation.<sup>9–11</sup> These observations provide the rationale to assume that ACEs impact the use of specific coping strategies by individuals with SSD. According to the vulnerability/

Correspondence: Błażej Misiak  
Department of Psychiatry, Division of Consultation Psychiatry and Neuroscience, Wrocław Medical University, Pasteura 10 Street, Wrocław, 50-367, Poland  
Tel +48 71 784 16 30  
Email blazej.misiak@umed.wroc.pl

stress model of schizophrenia, exposure to stress that exceeds individual abilities to cope and/or the use of ineffective coping may initiate a number of psychobiological processes that trigger the onset and relapse of psychosis.<sup>12,13</sup> Coping strategies capture a variety of trait-dependent activities approached to deal with challenges driven by stressful experiences. It has been reported that individuals with SSD tend to prefer avoidance coping than adaptive coping.<sup>14–19</sup> Lower preference of active coping strategies and the preference of dysfunctional coping have also been associated with greater severity of positive and depressive symptoms as well as cognitive impairment.<sup>20–22</sup>

However, little is known about the association between ACEs and coping strategies approached by individuals with SSD. It has been found that a history of childhood emotional and sexual abuse is associated with passive and avoidance coping in subjects with psychotic disorders and their unaffected siblings.<sup>23</sup> Another study demonstrated that childhood sexual abuse is related to lower likelihood of positive coping in subjects at clinical high risk of psychosis.<sup>24</sup> Finally, Ered et al<sup>25</sup> revealed that higher levels of maladaptive coping mediate the association between traumatic life events and psychotic-like experiences in a non-clinical sample. It should be noted that these studies did not include a comparison group of healthy controls. Therefore, it remains unknown whether the association between ACEs and coping is specific to individuals with psychosis. Moreover, other aspects of ACEs, beyond their types, such as age at first exposure, severity and multiplicity may play an important role in moderating their impact. For instance, Schalinski et al<sup>26</sup> found that ACEs are associated with a severity of psychotic symptoms in a dose-dependent manner. The authors also revealed that neglect at the age of 10 years was the most important predictor of the severity of psychotic symptoms. Taking into account these research gaps in the field, we aimed to investigate the association between various aspects of ACEs (age at exposure, severity, multiplicity and types of ACEs) and preference of coping strategies in subjects with SSD and healthy controls.

## Materials and Methods

### Participants

Individuals with SSD were enrolled at three inpatient units in Poland, in the years 2016–2020 ( $n = 127$ ). The majority of them were during the treatment of psychotic relapse ( $n = 85$ , 66.9%), while others were admitted for the first time

( $n = 42$ , 33.1%). Individuals with SSD were diagnosed with schizophrenia, schizoaffective disorder, schizophreniform disorder and brief psychotic disorder. Inpatients who were admitted due to psychotic relapse met the criteria of schizophrenia or schizoaffective disorder. The DSM-IV criteria assessed using the Operational Criteria for Psychotic Illness (OPCRIT) checklist were implemented to diagnose the patients.<sup>27</sup> The majority of individuals with SSD ( $n = 125$ ) were receiving antipsychotics with mean chlorpromazine equivalent dosage (CPZeq) of 357.7 mg/day ( $SD = 388.7$  mg/day), while two individuals were antipsychotic-naïve on the day of assessment. The Positive and Negative Syndrome Scale (PANSS)<sup>28</sup> was used to examine a severity of psychopathological manifestation.

There were 56 healthy controls recruited at Wrocław Medical University (Wrocław, Poland) through advertisements. They reported negative family history of mood and psychotic disorders in first- and second-degree relatives. The protocol of this study was approved by the Ethics Committee at Wrocław Medical University, Wrocław, Poland. Written informed consent was collected from all participants. The study was conducted in accordance with the Declaration of Helsinki.

### Assessment of ACEs

The Childhood Experience of Care and Abuse Questionnaire (CECA.Q) was used to collect data on exposure to ACEs.<sup>29</sup> The CECA.Q is a self-report that was developed to obtain information on the following types of ACEs before the age of 17 years:

1) Parental loss is defined as any death of mother or father before age 17 or any continuous separation from parents of at least one year.

2) Mother and father neglect is defined as a parent's lack of interest in material care, health, school activities and friendships. This category of ACEs is assessed for each biological parent or parent surrogate with whom the child lived for at least 12 months. There are 8 items scored between 1 ("no, not at all") and 5 ("yes definitely") to assess neglect of each parent. The maximum score is 40. In case of studies with disorder outcomes, the cutoff score is 25 for mother neglect and 26 for father neglect.

3) Mother and father antipathy is defined by hostility, coldness or rejection expressed by parents or surrogate parents towards the child. This category of ACEs is assessed for each biological parent or parent surrogate with whom the child lived for at least 12 months. There

are 8 items scored between 1 (“no, not at all”) and 5 (“yes definitely”) to assess antipathy expressed by each parent. The maximum score is 40. In case of studies with disorder outcomes, the cutoff score is 28 for mother antipathy and 30 for father antipathy.

4) Physical abuse is defined as repeated hitting by parents or other older household members. This category of ACEs is recorded by the following question:

When you were a child or teenager were you ever hit repeatedly with an implement (such as a belt or stick) or punched, kicked or burnt by someone in the household?

If the answer is “yes” (score: 1), further questions regarding characteristics of ACEs need to be answered: age at onset of physical abuse, how the child was hit (belt or stick or punched/kicked; score 1 if either present), whether any injuries occurred (bruises, black eyes or broken limb; score 1 if yes) and whether the perpetrator was out of control (score 1 if yes). The maximum score is 4. In case of studies with disorder outcomes, the cutoff score is 3.

5) Sexual abuse is defined by physical contact or approach of a sexual nature by any adult to the child. Willing sexual contacts with peers are excluded from this definition. Sexual abuse is recorded by the following questions: “When you were a child or teenager did you ever have any unwanted sexual experiences?”, “Did anyone force you or persuade you to have sexual intercourse against your wishes before age 17?” and “Can you think of any upsetting sexual experiences before age 17 with a related adult or someone in authority, eg, teacher?”. Possible answers to these questions include: “yes”, “no” and “unsure”. “Yes” and “unsure” responses are considered positive and scored as “1”. In case of these responses, 8 questions regarding the severity and age at onset of sexual abuse need to be answered separately for first experience and other experiences. All of these questions (except for age at onset) have “yes” (1 point) and “no” (0 points) responses. The maximum score for the severity of each exposure is 7. In case of studies with disorder outcomes, the cutoff for the severity score is 2.

Additionally, the CECA.Q includes subscales for parental psychological abuse and role reversal that were not validated against interview. Therefore, these categories of ACEs were not analyzed in this study.

Apart from the analysis of specific types of ACEs, three characteristics of ACEs were also analyzed: 1) age at first exposure; 2) multiplicity and 3) severity. Age at first exposure was defined as the age when the first

category of ACEs had been reported. Multiplicity was operationalized as the number of ACEs reported by each participant (parental loss, mother neglect, mother antipathy, father neglect, father antipathy, physical abuse and sexual abuse; range: 0–7). Severity was calculated for all ACEs together, except for parental loss, as the CECA.Q does not include the severity score for this category of ACEs. More specifically, we divided reported severity of exposure by the maximum severity score that can be obtained for specific category of ACEs. Next, all severity scores were summarized and divided by the number of ACEs categories ( $n = 6$ ).

## Coping Strategies

The COPE Inventory was administered to assess employment of specific coping strategies.<sup>30</sup> It is a self-report that includes 60 statements referring to the use of specific strategies that are based on a 4-point Likert scale (1 – “I usually don’t do this at all”; 2 – “I usually do this a little bit”; 3 – “I usually do this a medium amount” and “4 – I usually do this a lot”). Each single coping strategy is scored based on four items. Higher scores indicate greater employment of specific coping strategies. The COPE Inventory recognizes 15 coping strategies. In the present study, we used the Polish version validated by Jurczyński and Ogińska-Bulik.<sup>31</sup> Factor analysis of the Polish version of the COPE Inventory revealed three clusters of coping strategies (Table 1).

## Data Analysis

Analyses were performed using the Statistical Package for Social Sciences, version 20 (SPSS Inc., Chicago, Illinois, USA). Bivariate comparisons were assessed using the  $\chi^2$  test or the Mann–Whitney *U*-test, where appropriate. According to the Kolmogorov–Smirnov test, the majority of continuous variables (except for the scores of active coping and emotion-focused coping had non-normal distribution). The scores of avoidance coping were the only variable that appeared to have normal distribution after logarithmic transformation. Therefore, data analysis was based on both non-parametric and parametric tests. Correlations with the scores of coping strategies were tested using the linear regression analysis. The analysis of co-variance (ANCOVA) was performed to explore the effects of group (SSD vs controls) and types of ACEs on the scores of coping strategies. Age and sex were added as co-variables in linear regression analyses and ANCOVA. In case of significant interactions between group (SSD vs

**Table 1** The COPE Inventory Clusters of Coping Strategies

Active Coping (Score Range: 20–80)	Avoidance Coping (Score Range: 24–96)	Emotion-Focused Coping (Score Range: 16–64)
-Active coping (items: 5, 25, 47, 58) -Planning (items: 19, 32, 39, 56) -Suppression of competing activities (items: 15, 33, 42, 55) -Positive reinterpretation and growth (items: 1, 29, 38, 59) -Restraint (items: 10, 22, 41, 49)	-Acceptance (items: 13, 21, 44, 54) -Denial (items: 6, 27, 40, 57) -Behavioral disengagement (items: 9, 24, 37, 51) -Mental disengagement (2, 16, 31, 43) -Substance use (items: 12, 26, 35, 53) -Humor (items: 8, 20, 36, 50)	-Seeking of emotional social support (items: 11, 23, 34, 52) -Seeking of instrumental social support (items: 4, 14, 30, 45) -Turning to religion (items 7, 18, 48, 60) -Focus on and venting of emotions (items 3, 17, 28, 46)

controls) and a history of ACEs, post-hoc comparisons were performed using the Games-Howell test. Due to the use of multiple tests ( $n = 110$ ), the Benjamini-Hochberg correction with the 25% false discovery rate was applied. The level of significance was set at  $p \leq 0.009$  after applying the correction for multiple testing.

## Results

Individuals with SSD and healthy controls did not differ significantly in terms of age and sex (Table 2). As expected, the number of education years was significantly lower in subjects with SSD compared to healthy controls. The group of participants with SSD was significantly more likely to report a history of parental antipathy, physical abuse and sexual abuse in comparison with healthy controls. Multiplicity and severity of ACEs were significantly higher in subjects with SSD. No significant between-group

differences were found with respect to the rates of parental loss and parental neglect as well as age at first exposure. The use of avoidance coping was significantly higher in subjects with SSD compared to healthy controls, after adjustment for age and sex (Figure 1).

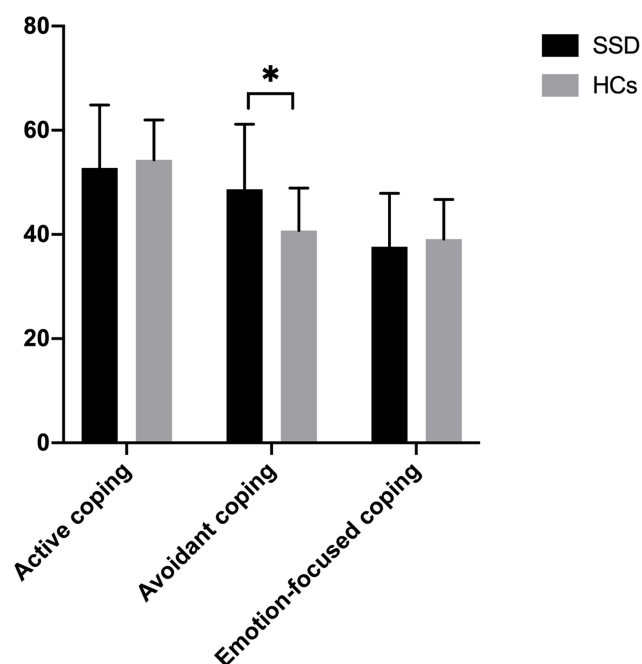
No significant correlations of coping strategies with continuous characteristics of ACEs were found (age at first exposure, severity and multiplicity) neither in individuals with SSD nor in healthy controls (Table 3). In turn, associations between a history of specific ACEs and coping strategies are presented in Table 4. There were significant main effects of group (SSD vs healthy controls) on the use of avoidance coping in almost all ANCOVA models (except for the one testing for the effects of sexual abuse). Importantly, in the model testing for the effects of parental loss, significant effects of interactions between group (SSD vs healthy controls) and ACEs on the use of

**Table 2** General Characteristics of the Sample

	SSD, $n = 127$	Controls, $n = 56$	Statistics
Age, years	$39.1 \pm 13.8$	$38.3 \pm 6.8$	$U = 3366.5, p = 0.566$
Gender, males (%)	61 (48.0)	24 (42.8)	$\chi^2 = 0.4, p = 0.518$
Education, years	$13.2 \pm 2.8$	$16.0 \pm 2.4$	<b><math>U = 889.5, p &lt; 0.001</math></b>
Parental loss, n(%)	38 (29.9)	12 (21.4)	$\chi^2 = 1.5, p = 0.223$
Parental antipathy, n(%)	68 (53.5)	16 (28.6)	<b><math>\chi^2 = 10.1, p = 0.002</math></b>
Parental neglect, n(%)	41 (32.3)	16 (28.6)	$\chi^2 = 0.3, p = 0.594$
Physical abuse, n(%)	55 (43.3)	13 (23.2)	<b><math>\chi^2 = 6.9, p = 0.009</math></b>
Sexual abuse, n(%)	29 (22.8)	3 (5.4)	<b><math>\chi^2 = 8.3, p = 0.004</math></b>
Age at first exposure	$9.5 \pm 4.6$	$9.0 \pm 4.6$	$U = 1037.5, p = 0.616$
Multiplicity	$2.3 \pm 1.8$	$1.1 \pm 1.3$	<b><math>U = 4940.5, p &lt; 0.001</math></b>
Severity	$0.4 \pm 0.3$	$0.3 \pm 0.4$	<b><math>U = 4965.5, p &lt; 0.001</math></b>
PANSS-P	$19.9 \pm 10.0$	—	—
PANSS-N	$24.4 \pm 9.8$	—	—
First admission, n (%)	42 (33.1)	—	—
CPZeq, mg/day	$357.7 \pm 388.7$	—	—

**Note:** Significant differences ( $p \leq 0.009$ ) were marked with bold characters.

**Abbreviations:** CECA.Q, the Childhood Experience of Care and Abuse Questionnaire; CPZeq, chlorpromazine equivalent dosage; MADRS, the Montgomery-Asberg Depression Rating Scale; PANSS, the Positive and Negative Syndrome Scale; SSD, schizophrenia spectrum disorders; YMRS, the Young Mania Rating Scale.



**Figure 1** Coping strategies in individuals with SSD and healthy controls. Mean values are shown. Error bars represent standard deviation. \*The use of avoidance coping was significantly higher in subjects with SSD compared to healthy controls after adjustment for age and sex [ $F(1182) = 17.096$ ,  $\eta_p^2 = 0.123$ ,  $p < 0.001$ ;  $48.7 \pm 12.5$  vs  $40.7 \pm 8.2$ , respectively]. No significant differences between individuals with SSD and healthy controls with respect to using active coping [ $F(1182) = 1.099$ ,  $\eta_p^2 = 0.009$ ,  $p = 0.297$ ;  $52.8 \pm 12.5$  vs  $54.3 \pm 7.6$ , respectively) and emotion-focused coping [ $F(1182) = 0.041$ ,  $\eta_p^2 < 0.001$ ,  $p = 0.840$ ;  $37.6 \pm 10.3$  vs  $39.1 \pm 7.6$ , respectively].

avoidance coping were found. Post-hoc analyses revealed that the use of avoidance coping was significantly higher only in individuals with SSD and a history of parental loss compared to healthy controls with and without a history of parental loss (Figure 2).

## Discussion

The present study confirms previous findings that individuals with SSD tend to rely on avoidance coping.<sup>32,33</sup> More interestingly, we found significantly higher use of avoidance coping only in subjects with SSD and a history

of parental loss, compared to healthy controls with and without a history of parental loss. However, we did not find any significant associations of other characteristics of ACEs (age at first exposure, multiplicity and severity) with the use of coping strategies.

Coping refers to a range of cognitive and behavioral strategies that are used to meet the demands driven by stressful situations.<sup>34</sup> These processes are activated by appraisals of external and internal demands against individual resources.<sup>35</sup> Appraisals can be largely influenced by lifetime experiences.<sup>35</sup> Among them, there is an important role of parental support that enhances the development of more adaptive coping strategies.<sup>36</sup> Early parental loss may exceed individual cognitive capacity to understand and cope with this experience as well as it may disrupt further development of coping strategies.<sup>37</sup> Adults who experienced early parental loss have been shown to report more substance use, behavioral disengagement and emotional eating.<sup>38</sup>

Our findings are also consistent with those reported by Tait et al<sup>39</sup> in subjects during recovery from psychosis. The authors demonstrated that participants with sealing-over recovery styles report lower levels of parental care during childhood. A meta-analysis of eight studies revealed that parental loss is related to 1.70-fold higher risk of developing psychosis.<sup>3</sup> More recently, Misra et al<sup>40</sup> confirmed these results in a large, six-country case-control study (OR: 1.54, 95% CI: 1.18–4.37). However, the authors noticed that single experience of early parental death is rather insufficient to cause psychosis, and it is likely that certain antecedents and consequences of parental loss might be causative. First, a risk of parental loss and its consequences might be higher in socially disadvantaged populations. Examples of consequences might include quality of care and support after parental loss, engagement in risky behaviors (eg, substance use), subsequent stressors and changes in economic status.<sup>35</sup>

**Table 3** Bivariate Correlations Between Coping Strategies and Symptomatic Manifestation

	Group	Active Coping	Avoidance Coping	Emotion-Focused Coping
Age at first exposure	SSD	$B = -0.657$ , $p = 0.241$	$B = -0.016$ , $p = 0.046$	$B = -0.390$ , $p = 0.419$
	Controls	$B = 0.400$ , $p = 0.403$	$B = 0.001$ , $p = 0.747$	$B = 0.773$ , $p = 0.076$
Multiplicity	SSD	$B = 0.648$ , $p = 0.454$	$B = 0.011$ , $p = 0.076$	$B = 0.549$ , $p = 0.447$
	Controls	$B = 0.390$ , $p = 0.620$	$B = -0.008$ , $p = 0.098$	$B = -0.462$ , $p = 0.562$
Severity	SSD	$B = -2.941$ , $p = 0.494$	$B = 0.033$ , $p = 0.367$	$B = -2.730$ , $p = 0.447$
	Controls	$B = -2.315$ , $p = 0.413$	$B = -0.006$ , $p = 0.862$	$B = 1.668$ , $p = 0.561$



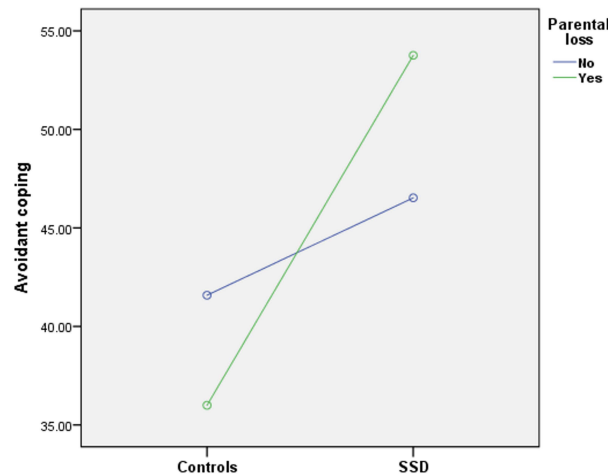
**Table 4** Associations Between a History of Various Types of ACEs and Coping Strategies

Model	Independent Variable	Active Coping	Avoidance Coping	Emotion-Focused Coping
1	Age	$F(1,182) = 0.592, \eta_p^2 = 0.005, p = 0.443$	$F(1,182) = 1.825, \eta_p^2 = 0.004, p = 0.180$	$F(1,182) = 1.005, \eta_p^2 = 0.008, p = 0.318$
	Sex	$F(1,182) = 0.100, \eta_p^2 = 0.001, p = 0.753$	$F(1,182) = 0.011, \eta_p^2 < 0.001, p = 0.995$	$F(1,182) = 4.488, \eta_p^2 = 0.036, p = 0.036$
	Group	$F(1,182) = 0.555, \eta_p^2 = 0.005, p = 0.458$	<b><math>F(1,182) = 25.003, \eta_p^2 = 0.211, p &lt; 0.001</math></b>	$F(1,182) = 0.035, \eta_p^2 < 0.001, p = 0.853$
	Parental loss	$F(1,182) = 0.224, \eta_p^2 = 0.002, p = 0.637$	$F(1,182) = 0.141, \eta_p^2 = 0.001, p = 0.706$	$F(1,182) = 3.613, \eta_p^2 = 0.029, p = 0.060$
	Group $\times$ parental loss	$F(1,182) = 0.266, \eta_p^2 = 0.002, p = 0.607$	<b><math>F(1,182) = 8.679, \eta_p^2 = 0.080, p = 0.004</math></b>	$F(1,182) = 1.734, \eta_p^2 = 0.014, p = 0.190$
	R <sup>2</sup>	0.017	0.195	0.097
	Adjusted R <sup>2</sup>	-0.024	0.151	0.059
2	Age	$F(1,182) = 0.80, \eta_p^2 = 0.007, p = 0.373$	$F(1,182) = 0.982, \eta_p^2 = 0.008, p = 0.324$	$F(1,182) = 0.796, \eta_p^2 = 0.007, p = 0.374$
	Sex	$F(1,182) = 0.14, \eta_p^2 = 0.001, p = 0.711$	$F(1,182) = 0.002, \eta_p^2 < 0.001, p = 0.961$	$F(1,182) = 3.994, \eta_p^2 = 0.032, p = 0.048$
	Group	$F(1,182) = 0.66, \eta_p^2 = 0.005, p = 0.417$	<b><math>F(1,182) = 16.668, \eta_p^2 = 0.122, p &lt; 0.001</math></b>	$F(1,182) = 0.004, \eta_p^2 < 0.001, p = 0.947$
	Parental antipathy	$F(1,182) = 0.29, \eta_p^2 = 0.002, p = 0.588$	$F(1,182) = 0.305, \eta_p^2 = 0.003, p = 0.582$	$F(1,182) = 0.129, \eta_p^2 = 0.001, p = 0.720$
	Group $\times$ parental antipathy	$F(1,182) = 0.54, \eta_p^2 = 0.004, p = 0.464$	$F(1,182) = 0.627, \eta_p^2 = 0.005, p = 0.430$	$F(1,182) = 0.095, \eta_p^2 = 0.001, p = 0.759$
	R <sup>2</sup>	0.020	0.135	0.044
	Adjusted R <sup>2</sup>	-0.021	0.099	0.004
3	Age	$F(1,182) = 0.596, \eta_p^2 = 0.005, p = 0.442$	$F(1,182) = 1.142, \eta_p^2 = 0.009, p = 0.287$	$F(1,182) = 0.782, \eta_p^2 = 0.006, p = 0.378$
	Sex	$F(1,182) = 0.089, \eta_p^2 = 0.001, p = 0.766$	$F(1,182) = 0.034, \eta_p^2 < 0.001, p = 0.855$	$F(1,182) = 3.859, \eta_p^2 = 0.031, p = 0.052$
	Group	$F(1,182) = 1.488, \eta_p^2 = 0.012, p = 0.225$	<b><math>F(1,182) = 19.826, \eta_p^2 = 0.142, p &lt; 0.001</math></b>	$F(1,182) = 0.003, \eta_p^2 < 0.001, p = 0.957$
	Parental neglect	$F(1,182) = 0.309, \eta_p^2 = 0.003, p = 0.580$	$F(1,182) = 0.078, \eta_p^2 = 0.001, p = 0.780$	$F(1,182) = 0.164, \eta_p^2 = 0.001, p = 0.686$
	Group $\times$ parental neglect	$F(1,182) = 0.394, \eta_p^2 = 0.003, p = 0.531$	$F(1,182) = 2.684, \eta_p^2 = 0.022, p = 0.104$	$F(1,182) = 0.098, \eta_p^2 = 0.001, p = 0.755$
	R <sup>2</sup>	0.016	0.146	0.044
	Adjusted R <sup>2</sup>	-0.025	0.111	0.005
4	Age	$F(1,182) = 0.662, \eta_p^2 = 0.005, p = 0.418$	$F(1,182) = 1.150, \eta_p^2 = 0.009, p = 0.286$	$F(1,182) = 0.814, \eta_p^2 = 0.007, p = 0.369$
	Sex	$F(1,182) = 0.113, \eta_p^2 = 0.001, p = 0.738$	$F(1,182) = 0.012, \eta_p^2 < 0.001, p = 0.914$	$F(1,182) = 4.052, \eta_p^2 = 0.033, p = 0.046$
	Group	$F(1,182) = 0.362, \eta_p^2 = 0.003, p = 0.549$	<b><math>F(1,182) = 13.467, \eta_p^2 = 0.101, p &lt; 0.001</math></b>	$F(1,182) = 0.125, \eta_p^2 = 0.001, p = 0.724$
	Physical abuse	$F(1,182) < 0.001, \eta_p^2 < 0.001, p = 1.000$	$F(1,182) = 0.254, \eta_p^2 = 0.002, p = 0.615$	$F(1,182) = 0.004, \eta_p^2 < 0.001, p = 0.952$
	Group $\times$ physical abuse	$F(1,182) = 0.981, \eta_p^2 = 0.008, p = 0.324$	$F(1,182) = 0.059, \eta_p^2 < 0.001, p = 0.809$	$F(1,182) = 2.614, \eta_p^2 = 0.021, p = 0.109$
	R <sup>2</sup>	0.020	0.130	0.066
	Adjusted R <sup>2</sup>	-0.021	0.094	0.027
5	Age	$F(1,182) = 0.796, \eta_p^2 = 0.007, p = 0.374$	$F(1,182) = 1.044, \eta_p^2 = 0.009, p = 0.309$	$F(1,182) = 0.724, \eta_p^2 = 0.006, p = 0.396$
	Sex	$F(1,182) = 0.034, \eta_p^2 < 0.001, p = 0.854$	$F(1,182) = 0.042, \eta_p^2 < 0.001, p = 0.839$	$F(1,182) = 4.318, \eta_p^2 = 0.035, p = 0.040$
	Group	$F(1,182) = 0.151, \eta_p^2 = 0.001, p = 0.698$	$F(1,182) = 5.899, \eta_p^2 = 0.047, p = 0.017$	$F(1,182) = 0.633, \eta_p^2 = 0.005, p = 0.428$
	Sexual abuse	$F(1,182) = 1.060, \eta_p^2 = 0.009, p = 0.305$	$F(1,182) = 0.630, \eta_p^2 = 0.005, p = 0.429$	$F(1,182) = 0.097, \eta_p^2 = 0.001, p = 0.756$
	Group $\times$ sexual abuse	$F(1,182) = 0.011, \eta_p^2 < 0.001, p = 0.917$	$F(1,182) = 0.012, \eta_p^2 < 0.001, p = 0.912$	$F(1,182) = 0.851, \eta_p^2 = 0.007, p = 0.358$
	R <sup>2</sup>	0.022	0.133	0.056
	Adjusted R <sup>2</sup>	-0.018	0.097	0.017

**Note:** Significant associations ( $p \leq 0.009$ ) were marked with bold characters.

**Post hoc comparisons:**

SSD, parental loss(+) vs. SSD, parental loss(-):  $p = 0.048$   
 Controls, parental loss(+) vs. Controls, parental loss(-):  $p = 0.078$   
 SSD, parental loss(+) vs. Controls, parental loss(+):  **$p < 0.001$**   
 SSD, parental loss(-) vs. Controls, parental loss(-):  $p = 0.201$   
 SSD, parental loss(+) vs. Controls, parental loss(-):  **$p = 0.001$**   
 SSD, parental loss(-) vs. Controls, parental loss(+):  $p = 0.051$



**Figure 2** Effects of parental loss on avoidance coping in individuals with SSD and healthy controls. Significant differences ( $p \leq 0.009$ ) were marked with bold characters.

**Abbreviations:** parental loss(+), participants with a history of parental loss; parental loss(-), participants without a history of parental loss.

The present study has important limitations requiring further comments. First, the sample size was not large. This might explain as to why we did not find significantly higher rates of parental loss in individuals with SSD compared to healthy controls. Additionally, we did not perform a more detailed analysis of parental loss. It is likely that the impact of this adversity is related to several characteristics, eg, the number of parents lost, causes and circumstances of death and age at parental loss. Another important point is that the percentage of variance explained by the ANCOVA models was relatively low, and thus it is likely that other factors, not recorded by the present study, also impact coping strategies. Moreover, we did not measure potential antecedents and consequences of ACEs. Therefore, this study does not provide mechanistic insights into the association between parental loss and coping styles. Finally, it should be noted that assessment of ACEs was based on self-reports, and the recall bias should be taken into consideration.

## Conclusion

In conclusion, this study indicates that the use of avoidance coping is higher among individuals with SSD compared to

healthy controls. This phenomenon might be associated with parental loss. The present findings have certain research and clinical implications. Future studies in this field need to provide a closer look at the role of antecedents and consequences of parental loss in shaping individual coping strategies. This might be achieved by detailed analysis of socioeconomic status, parental bonding and attachment styles as well as engagement in risky health behaviors over time. Given that coping styles have previously been shown to impact clinical manifestation of SSD, it is important to focus psychological interventions on strengthening adaptive coping in this population. However, these interventions need to take into consideration the impact of ACEs, especially parental loss.

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## Disclosure

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