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Research article

Longitudinal Relationships between Perceived Social Support and Symptom Outcomes: Findings from a sample of Adult Survivors of Childhood Sexual Abuse



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ABSTRACT

Introduction: Cross-sectional studies have consistently reported an inverse association between perceived social support and the severity of mental health symptoms among adult survivors of childhood sexual abuse (CSA). However, there is a lack of longitudinal studies investigating the bidirectional association between social support and the severity of symptoms among adult CSA-survivors, as well as the role of relational problems in predicting perceived social support and symptom levels over time. The present study addressed these questions in a sample of primarily female CSA-survivors.

Methods: In a three-wave, four-year longitudinal study of 506 CSA-survivors (94.9% women, 5.1% men) recruited from support centers for sexual abuse survivors in Norway, we used cross-lagged panel structural equation modeling to examine the directionality of the longitudinal associations between perceived social support and symptoms of posttraumatic stress, anxiety, depression and insomnia.

Results: Cross-lagged panel analyses revealed significant weak reciprocal associations between perceived social support and depression, posttraumatic stress symptoms and anxiety symptoms, but not with insomnia symptoms. The observed effects were partly overlapping and partly inconsistent across the different symptom domains. Relational problems predicted social support cross-sectionally and longitudinally, whereas only cross-sectional associations were found between the relational problems variable and mental health symptoms. Theoretical and clinical implications of the findings are discussed, alongside methodological limitations of the study.

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1. Introduction

Childhood sexual abuse (CSA) is a highly prevalent crime affecting between 8-31% women and 3-17% men (Barth, Bermetz, Heim, Trelle, & Tonia, 2013; Stoltenborgh, van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011). A large literature shows that CSA is a strong general risk factor for life-long negative health consequences including a wide range of complex mental and somatic health disorders (Chen et al., 2010; Irish, Kobayashi, & Delahanty, 2010; Kendler et al., 2000; Maniglio, 2009; Paras et al., 2009; Varese et al., 2012) as well as adverse social outcomes and socioeconomic costs (Bonomi et al., 2008; Hubbard & Pratt, 2002; Tang et al., 2006; Walker et al., 1999), making it a major public health problem globally. While the association of CSA with adverse health outcomes is well established, studies also report substantial heterogeneity in the type and extent of problems among CSA-survivors (Kendall-Tackett, Williams, & Finkelhor, 1993; Trickett, Noll, & Putnam, 2011). The degree of social support from family, friends or other sources has been identified as an important protective factor that might mitigate symptom severity following traumatic events, with meta-analyses identifying lack of social support as one of the strongest predictors of symptom severity across a variety of different trauma types (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2008). A distinction has also been made between *received* social support (e.g. the actual support a person receives from their social networks during a specified time period) and the *perceived availability* of social support (e.g. the persons' perception that support will be provided to them if needed). Perceived social support has empirically been more strongly associated with health outcomes than received social support (Cohen, 2004; Sarason, Sarason, & Pierce, 1994). In line with this literature, cross-sectional studies of CSA-survivors have consistently linked higher levels of perceived social support to less severe symptom outcomes in child (Aydin, Akbas, Turla, & Dundar, 2016; Kaufman et al., 2004; Tremblay, Hébert, & Piché, 1999) and adult CSA-survivors (Hyman, Gold, & Cott, 2003; Lueger-Schuster et al., 2015; Runtz & Schallow, 1997).

A common and plausible interpretation of the inverse association between social support and symptom severity is based on the framework of Cohen and Wills (1985), where the important premise is that supportive relationships help people cope with stressful events both directly and indirectly, by mitigating symptom severity both in general and following stressful events specifically (Cohen & Wills, 1985; Cohen, 2004). This interpretation is also referred to as the *social causation* hypothesis, and is supported by a large literature showing that people reporting higher levels of supportive social relationships have better physical and mental health, engage in more positive health behaviors, and have lower mortality rates (Cohen & Wills, 1985; Holt-Lunstad, Smith, & Layton, 2010; Rueger, Malecki, Pyun, Aycocock, & Coyle, 2016; Uchino, 2006; Umberson & Montez, 2010).

Another plausible and increasingly examined interpretation is the *social erosion* hypothesis (also referred to as *social selection* and *social deterioration*), where the important premise is that mental health symptoms induce negative responses from others, negatively affecting the quality of social relationships, contributing to an erosion of social support over time (King, Taft, King, Hammond, & Stone, 2006). For instance, those with more severe symptoms may socially withdraw to a larger extent compared to those with less severe symptoms, which again may deprive them of the beneficial direct- and stress buffering effects of social support. A more severe symptomatology may also fuel social behaviors that undermine support from others (e.g. less social responsiveness, lack of interest in others, a focus on one's own negative experiences), or to symptoms and behaviors that are too distressing for potential support sources to handle (e.g. anger, bitterness, self-harm behaviors), resulting in withdrawal of potential support sources (see for example Allen, 2001, chapters 9 and 11, for an elaborated discussion). Thus, a more severe symptomatology may interfere more with social relationships compared to less severe symptomatology, leading to more relational problems or reduced social support over time.

Several studies have been undertaken to empirically investigate these two, non-mutually exclusive hypotheses in longitudinal, prospective studies of trauma survivors, the majority of which comprised survivors of war, accidents, severe physical injuries and natural disasters. Overall, these studies have failed to find consistent temporal patterns between social support and symptom severity over time. Some studies have reported evidence of social erosion only. The latter was found for the association between perceived social support and posttraumatic stress symptoms (PTSS) in a two-wave longitudinal study of 2249 male war veterans (King et al., 2006), a four-wave study of 1132 survivors of traumatic injury (Nickerson et al., 2017), a three-wave study of 287 patients with orofacial injury (Lui, Glynn, & Shetty, 2009), and a two-wave study of 128 war veterans receiving treatment for posttraumatic stress disorder (PTSD) (Laffaye, Cavella, Drescher, & Rosen, 2008). Other studies have reported strong evidence for social erosion as well as partial evidence for social causation, including a four-wave study of 426 children severely affected by the hurricane Katrina (Lai, Osborne, Piscitello, Self-Brown, & Kelley, 2018). Yet other studies indicate that social erosion and social causation processes operate at different time points following traumatic events. For example, in a four-wave study of 461 adult earthquake survivors, Kaniasty and Norris (2008) found that perceived social support predicted PTSS-severity from baseline to twelve months follow-up, perceived social support and PTSS predicted each other reciprocally from twelve to eighteen months follow-up, whereas only PTSS predicted perceived support levels from eighteen to twenty-four months follow-up (Kaniasty & Norris, 2008).

While the above-mentioned inconsistent findings across studies in part may be explained by differences in trauma types, sample characteristics and length of follow-up, studies have also shown that the moderating effect of social support on symptom severity may vary based on trauma type and severity (Evans, Steel, & DiLillo, 2013; Howard Sharp et al., 2017; Punamaki, Komproe, Qouta, El-Masri, & de Jong, 2005). This indicates that a general model for the nature of the association between social support and symptoms over time across different trauma types may not be feasible, highlighting the need for studies in trauma-specific samples. To further elucidate the nature of the association between social support and symptoms among CSA-survivors, therefore, studies in samples of sexual abuse survivors specifically are warranted.

2. Previous longitudinal studies in samples of sexual abuse survivors

Although several previous studies have examined the role of social support in longitudinal symptom outcomes among sexual abuse survivors (Bal, De Bourdeaudhuij, Crombez, & Van Oost, 2005; Burgess & Holmstrom, 1978; Littleton, 2010), we are aware of only two previous studies examining longitudinal bidirectional associations between social support and symptom severity among sexual abuse survivors, both conducted in the same sample (Ullman & Peter-Hagene, 2016; Ullman & Relyea, 2016). In these studies, the association of posttraumatic stress symptoms (PTSS) with both positive social support and negative social reactions from significant others (e.g. stigma, victim blaming) was examined in a three-wave study of more than a thousand survivors of adult sexual assault. The results provided strong evidence for social erosion, and partial evidence for social causation. Specifically, PTSS symptoms at baseline predicted both positive social support and negative social reactions measured at one and two year follow-up, whereas only negative social reactions, and not positive social support, predicted PTSS in these subsequent study waves (Ullman & Peter-Hagene, 2016; Ullman & Relyea, 2016).

3. Existing literature gaps

While the above-mentioned studies addressed longitudinal bidirectional associations between social support and symptom severity, none included survivors of CSA, providing no information about the long-term associations between social support and symptom severity among adult CSA-survivors specifically.

Furthermore, it is plausible that social selection and social erosion processes may not play out uniformly across different symptom domains. The previously described cross-lagged studies, however, focused only on a limited selection of mental health symptoms, precluding detection of potential heterogeneity in the association between social support and symptoms across different symptom domains. Identifying heterogeneity across different symptom domains is relevant for theoretical frameworks aiming to understand longitudinal associations between perceived social support levels and symptom severity, and could as such contribute to a sophistication of these frameworks over time. Such heterogeneity across symptoms could also have implications for treatment planning in clinical practice. To address these gaps in the literature, there is a need for studies examining longitudinal reciprocal associations between perceived social support and symptom levels among adult CSA-survivors.

Another literature gap pertains to the role of relational problems, in the present study operationalized as difficulties with engaging in close relationships, trusting others, attaching to others, growing fond of others, and believing one is a likable/lovable person, as a predictor of perceived social support levels among CSA survivors. CSA predicts relational problems in the form of relationship dysfunction, lower quality of intimate relationships (Colman & Widom, 2004; Roberts, O'Connor, Dunn, & Golding, 2004) and insecure attachment styles (Aspelmeier, Elliott, & Smith, 2007; Raby, Labella, Martin, Carlson, & Roisman, 2017), the latter of which has also been shown to mediate the association between CSA and adult symptomatology (Whiffen & Macintosh, 2005). Most likely, such problems could affect the quality of a person's social network, with subsequent negative downstream effects on perceived social support and symptom levels. Yet, we are aware of no previous studies that has examined relational problems as a predictor of perceived social support and symptom levels over time among CSA-survivors, highlighting the need for studies addressing this issue.

4. Study Aims and Hypotheses

Based on the above, the aim of the present study was to examine longitudinal, bidirectional associations between perceived social support and mental health symptoms, in a four-year, three-wave study in a large, primarily female sample of adult CSA-survivors recruited from support centers for sexual abuse survivors in Norway. Specifically, we examined the longitudinal bidirectional relationship between perceived social support levels and symptoms of PTSS, depression, anxiety and insomnia. This statistical model investigated a social causation model (where social support is regarded as an antecedent of mental health, implying that less social support would precede and contribute to more mental health problems in subsequent study waves), a social erosion model (where social support is determined by mental health status, such that more mental health problems would precede and contribute to less social support in subsequent study waves), and a bidirectional influence model. Since our sample comprised adults who were subjected to CSA during childhood, we hypothesized that associations between perceived social support and PTSS would be most consistent with a social erosion framework, based on previous findings indicating that social erosion processes become more prominent over time compared to social causation processes (Kaniasty & Norris, 2008). Due to a lack of previous longitudinal studies examining bidirectional associations of perceived social support with depression, anxiety and insomnia symptoms among CSA-survivors, no specific hypotheses were made for these symptoms, nor regarding heterogeneity in observed patterns across different symptoms. Furthermore, to explore the potential role of relational problems, we examined whether relational problems (difficulties with engaging in close relationships, trusting others, attaching to others, growing fond of others, and believing one is a likable/lovable person) measured in the first study wave, independently contributed to explained variance in perceived social support and mental health symptoms in the cross-lagged panel model. Although previous studies examining this among CSA-survivors are lacking, we hypothesized that relational problems would predict higher mental health symptom scores based on the large literature linking the quality and availability of social relationships to better health outcomes (Broadhead et al., 1983; Cohen, 2004; House, Landis, & Umberson, 1988; Rueger et al., 2016; Uchino, Cacioppo, & Kiecolt-Glaser, 1996; Umberson & Montez, 2010). Similarly, we hypothesized that relational problems would predict lower perceived social support levels based on studies showing that relational problems in the form of difficulties attaching to significant others and trusting others are associated with lower levels of social support (Blain, Thompson, & Whiffen, 1993; Collins & Feeney, 2004; Mortenson, 2009; Schetter, Folkman, & Lazarus, 1987).

5. Methods

5.1. Procedure and samples

The sample was obtained from the project "Longitudinal Investigation of Sexual Abuse (LISA)", which was a collaboration between the University of Bergen, Norway, and the four largest support centers for sexual abuse survivors in Norway. In Norway, support centers for sexual abuse survivors are established in all counties, providing low threshold help to sexual abuse survivors in the form of information, free individual consultations, support groups, talks and social events. In 2009, all registered users of the centers were invited to enroll in the study. The invitations were sent via postal mail, along with information about the confidential and voluntary nature of participation, a detailed description of the study, a questionnaire, and a pre-paid return envelope. The questionnaire assessed exposure to sexual abuse according to definitions by the Norwegian criminal code, which distinguishes between sexually abusive behaviors (e.g., peeking, sexual exposure), acts (e.g. touching/fondling of genitalia) and intercourse (e.g. penetration of penis/fingers/object into the victim's vagina/anus/mouth) (The Norwegian General Civil Penal Code., 2005). In addition, the questionnaire assessed perceived social support, relational problems, and symptoms of PTSS, depression, anxiety, and insomnia. All participants were assigned a unique code that remained associated with their names to enable longitudinal measurement. In order to ensure anonymity of the participants, employees at the centers, who were also the only ones who had access to the list linking the participant names to the codes, mailed the questionnaires to the participants. In 2011, new center users since the first data collection wave were invited to enroll in order to increase the overall sample size. Wave two and three of the study were carried out approximately two and four years after the first data collection, respectively.

In the first data collection taking place in 2009 (wave 1), 458 people responded to the survey, representing a response rate of 32.7%. In 2011, an additional 79 new center users enrolled, which increased the total number of wave 1 participants to 537. The response rate of this additional data collection wave is unknown due to shortcomings of registration routines in this wave. Of the 537 wave 1 participants, 263 (48.9%) responded to wave 2 of the study and 193 (73.4% of wave 2 responders) to wave 3 of the study.

The study was conducted in line with the Declaration of Helsinki, and was approved by the Regional Committee for Medical and Health Research Ethics, Western Norway (approval numbers 264.08), the Norwegian Directory of Health, and by the Norwegian Social Science Data Services.

5.2. Measures

5.2.1. Perceived social support

The *Multidimensional Scale of Perceived Social Support (MSPSS)* was used to measure perceived social support. The MSPSS is a 12-item questionnaire addressing perceived social support from family, friends, and significant others at the current time. The MSPSS provides a continuous score ranging from 12-84, with higher scores indicating higher levels of perceived social support. The MSPSS has shown good test-retest and internal reliabilities and moderate construct validity (Zimet, Dahlem, Zimet, & Farley, 1988; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). Cronbach's α (measuring internal reliability) for the scale was .91 in wave 1, .93 in wave 2, and .94 in wave 3, respectively.

5.2.2. Relational problems

Five items constructed for the purpose of the study assessed the person's subjectively experienced relational problems at the current time. This measure was included in the first wave of the study only, as the inclusion of new measures in subsequent study waves required omitting several measures included in the first study wave due to survey length constraints. The items were as follows: "I have difficulties trusting others", "I find it difficult to engage in close relationships with others", "I find it difficult to grow fond of others", "I attach to others easily" (reverse coded) and "I believe that others like me/are fond of me" (reverse coded). Response categories (coded from 1-5) were "strongly disagree", "disagree", "neither disagreeing nor agreeing", "agree", and "strongly agree". The scores were summarized, providing total scores ranging from 5-25, with higher scores reflecting more relational difficulties. Cronbach's α for the total scale was .76.

5.2.3. Post-traumatic stress symptoms (PTSS)

In all three waves, PTSS was assessed using the *Impact of Event Scale-Revised (IES-R)*. The IES-R is a 22-item questionnaire measuring core symptoms of posttraumatic stress: Intrusion of trauma-related memories/emotions, avoidance of trauma-related stimuli, and hyperarousal (Weiss & Marmar, 1997; Weiss, 2004). Participants indicate the extent to which they have experienced trauma-related distress in the past seven days. Response categories (coded from 0-4) are "not at all", "a little bit", "moderately", "quite a bit", and "extremely", providing total scores ranging from 0-88, where higher scores indicate more pronounced PTSS (Weiss & Marmar, 1997). The scale has shown good psychometric properties (Creamer, Bell, & Failla, 2003; Weiss, 2004). Cronbach's α for the IES-R sum score was .95 in wave 1, .95 in wave 2, and .96 in wave 3.

5.2.4. Depression and anxiety symptoms

To measure depression and anxiety symptoms, we used *The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)* in all three study waves. The HADS consists of two sub-scales, measuring respectively anxiety (HADS-A) and depression (HADS-D) symptoms the past week. Each subscale consists of seven items (coded from 0-3), providing possible subscale scores ranging from 0-21. Examples of items addressing anxiety are "I get sudden feelings of panic" and "I feel tense or wound up". Examples of items

addressing depression are “*I feel as if I am slowed down*” and “*I have lost interest in my appearance*”. Cronbach’s α for the HADS-Anxiety scale was .83, .85, and .85 in the three study waves, respectively. Cronbach’s α for the HADS-Depression scale was .83, .84, and .84 in the three study waves.

5.2.5. Insomnia symptoms

Insomnia symptoms were assessed using the Bergen Insomnia Scale (BIS). The BIS is a 6-item questionnaire assessing nocturnal and daytime symptoms of insomnia. Respondents indicate how many days per week during the past month they experienced: 1) sleep onset difficulties, 2) night-time awakenings, 3) early morning awakenings, 4) feelings of not getting sufficient rest during the night, 5) daytime tiredness/sleepiness affecting personal or occupational life, and 6) overall dissatisfaction with sleep. The BIS provides a continuous score ranging from 0-42, with higher scores indicating more insomnia symptoms (Pallesen et al., 2008). Cronbach’s α was .84 in wave 1, .90 in wave 2, and .90 in wave 3.

5.3. Exogenous variables

5.3.1. Cumulative childhood maltreatment

The presence and frequency of exposure to other types of childhood maltreatment was assessed using the short form of the Childhood Trauma Questionnaire (CTQ-SF) (Bernstein & Fink, 1998). The CTQ-SF measures five types of childhood maltreatment: 1) physical abuse (e.g., being hit hard enough to leave bruises), 2) physical neglect (e.g. not having enough to eat), 3) emotional abuse (e.g. feeling hated by one’s own family), 4) emotional neglect (e.g. not feeling loved), and 5) sexual abuse (e.g. was touched sexually or made to do sexual things). Response categories (coded from 1-5) are “never true”, “rarely true”, “sometimes true”, “often true”, and “very often true”. Total subscale scores range from 5-25, with higher scores reflecting more childhood maltreatment. Additionally, a qualitative threshold reflecting the severity of the maltreatment has been established, comprising the categories “None”, “Low”, “Moderate” and “Severe” childhood maltreatment. In the present study, a cumulative trauma score based on these categories was used. Respondents were classified as either “No childhood maltreatment” (coded as “0”), “1-5 childhood maltreatment types at low level” (coded as “1”), “1 type of childhood maltreatment at moderate to severe level” (coded as “2”), or “2 childhood maltreatment types at moderate to severe level” (coded as “3”), “3 childhood maltreatment types at moderate to severe level” (coded as “4”), “4 childhood maltreatment types at moderate to severe level” (coded as “5”), or “5 childhood maltreatment types at moderate to severe level” (coded as “6”). The CTQ-SF has shown good psychometric properties (Bernstein et al., 2003), among other in a Norwegian clinical sample (Dovran et al., 2013). Cronbach’s α for the total scale was .84 in the current sample.

5.3.2. Characteristics of the abuse, perpetrator and victim

An open-ended question assessed the victim’s age at the first abusive incident. The identity of the perpetrator(s) was assessed using a checklist comprising a wide range of possible perpetrators. Based on this, dichotomized variables (1 = yes; no = 0) were created to indicate whether or not the perpetrator had been a *unknown perpetrator* versus someone known to the victim (1 = yes, 0 = no) or a *trusted person* (1 = yes, 0 = no). Similarly, dichotomous variables were created based on whether the abuse had involved *penetration* (vaginal, anal or oral penetration of penis/fingers/objects), the use of *threats* by the perpetrator (e.g., of being rejected, sent away, or that the victim/a loved one would be harmed if they told anyone about the abuse), *violence* (e.g., the victim was attacked, held in place, or subjected to violence by the perpetrator), or *manipulation* (e.g., the victim was manipulated by the perpetrator to assume responsibility for the abuse). Finally, a composite score comprising other aspects of the abuse was created (*other abuse aspects*), based on how many of the following abuse-related aspects the respondents endorsed: 1) having reacted to the abuse with intense anxiety, helplessness or fear, 2) the abuse caused serious physical injury, 3) the abuse caused diseases or infections, 4) the abuse was particularly painful, 5) other people had been present during the abuse, 6) they were commanded to participate in abusive acts, and 7) the abuse was video recorded/photographed. The composite score ranged from 0-7, with higher scores reflecting the presence of more of these adverse aspects.

5.4. Statistical Analyses

5.4.1. Cross-lagged panel analyses

In order to examine the longitudinal relationship between perceived social support and symptoms of posttraumatic stress, depression, anxiety, and insomnia, we used structural equation modeling with maximum likelihood estimation to conduct three-wave autoregressive cross-lagged panel analyses in the statistical software AMOS, version 25 (IBM, New York, USA). Cross-lagged panel models provide estimates of cross-lagged effects while controlling for correlations within time-points as well as autoregressive effects (the amount of stability in constructs over time) (Kearney, 2017). Cross-lagged effects, thus, represent effects of the temporally preceding variable on the variable of interest, after controlling for the stability of the variables at the different measurement time points. Controlling for prior levels of the outcome construct allows one to rule out the possibility that cross-lagged effects are due simply to the fact that X and Y were correlated at time 1 (Selig & Little, 2012). Cross-lagged panel analyses are particularly suited for testing hypotheses of causal predominance, which can be evaluated by comparing standardized coefficients of the cross-lagged paths (Kearney, 2017). Hence, these analyses were deemed appropriate for the purpose of investigating the social causation and social erosion hypotheses in the present study. Because of the relatively high loss to follow-up in our sample (49%), we chose a conservative approach in which only participants who responded to at least two study waves were included in the cross-lagged panel analyses (n = 314), as opposed to the conventional approach of also including those who responded to only one study wave. Model fit was

evaluated using the established goodness-of-fit indices in terms of the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA) and the Hoelter Index (HOELTER) (Hoelter, 1983; Schreiber, Nora, Stage, Barlow, & King, 2006). Based on recommended guidelines, we applied the fit indices criteria of a CFI and TLI close to .95, a RMSEA close to .06, and a Hoelter Index higher than 200 as indicators of good fit between the model and the data (Hoelter, 1983; Hu & Bentler, 1999), while simultaneously recognizing the cautions put forth by multiple experts of not treating these suggested cutoff values as absolute cut-off rules (Iacobucci, 2010; Marsh, Hau, & Wen, 2004; Schermelleh-Engel, Moosbrugger, & Müller, 2003). Another goodness-of-fit test of relevance in cross-lagged panel analyses is the Chi square goodness-of-fit test (χ^2), where a non-significant χ^2 test indicates a good fit between the model and the data. While the use of the Chi square goodness-of-fit test is suitable in smaller samples (e.g. samples of up to 200 people), its use is recognized as problematic in larger samples, as larger samples are known to affect the Chi square test by decreasing the likelihood of a non-significant test (Hooper, Coughlan, & Mullen, 2008; Vandenberg, 2006). As the present sample size was well above 200, the χ^2 was not used as a criterion to evaluate goodness of fit of the path models in the present study.

The cross-lagged panel model included three data points (Wave 1, Wave 2, and Wave 3) of perceived social support and the symptom measures as endogenous variables. Residual variances between perceived social support and the symptom outcomes measure were correlated across variables within each time point. In order to investigate whether relational problems were predictive of perceived social support levels, we allowed relational problems to precede perceived social support and symptom outcomes in the model. Furthermore, the model included ten exogenous variables measuring the participants age at study enrollment, cumulative exposure to other types of childhood maltreatment (specifically physical and emotional abuse and neglect) as well as characteristics of the abuse, perpetrator and victim, that were regressed on the relational problem variable. The latter variables were chosen based on previous studies reporting more severe outcomes among CSA-survivors as a function of cumulative exposure to other forms of maltreatment, lower age at abuse onset, and characteristics of the abuse and perpetrator (Cloitre et al., 2009; Fergusson, McLeod, & Horwood, 2013; Lind, Aggen, Kendler, York, & Amstadter, 2016; Steine et al., 2019; Steine, Winje, Krystal et al., 2017; Steine, Winje, Skogen et al., 2017), including lower social support levels and more relational problems specifically (Golding, Wilsnack, & Cooper, 2002; Steine, Winje, Krystal et al., 2017). For a simplified model of the analyses, see Fig. 1.

6. Results

Descriptive statistics for all variables used in the study are provided in Table 1 and 2. Supplementary Table 1 displays bivariate correlation coefficients between all the main variables in the study.

6.1. Sample

Of the 537 people responding to the first study wave, 506 were classified as CSA-cases based on reporting sexual abuse before age 18. Of these, 311 women (94.9%) and men (5.1%) responded to at least two study waves and were included in the cross-lagged panel analyses. Independent samples t-tests showed that those who responded to the first study wave only were significantly younger ($M = 35.8$ years, $SD = 11.3$ years) than those who responded to more than one study wave ($M = 41.5$ years, $SD = 12.1$ years) ($t(450) = 5.34, p < 0.001$). However, no statistically significant differences were found between these groups in terms of their mean total scores on perceived social support (mean difference = 0.51, $p = .714$), relational problems (mean difference = 0.19, $p = .611$), PTSS (mean difference = 3.40, $p = .068$), anxiety (mean difference = 0.48, $p = .226$), depression (mean difference = 0.32,

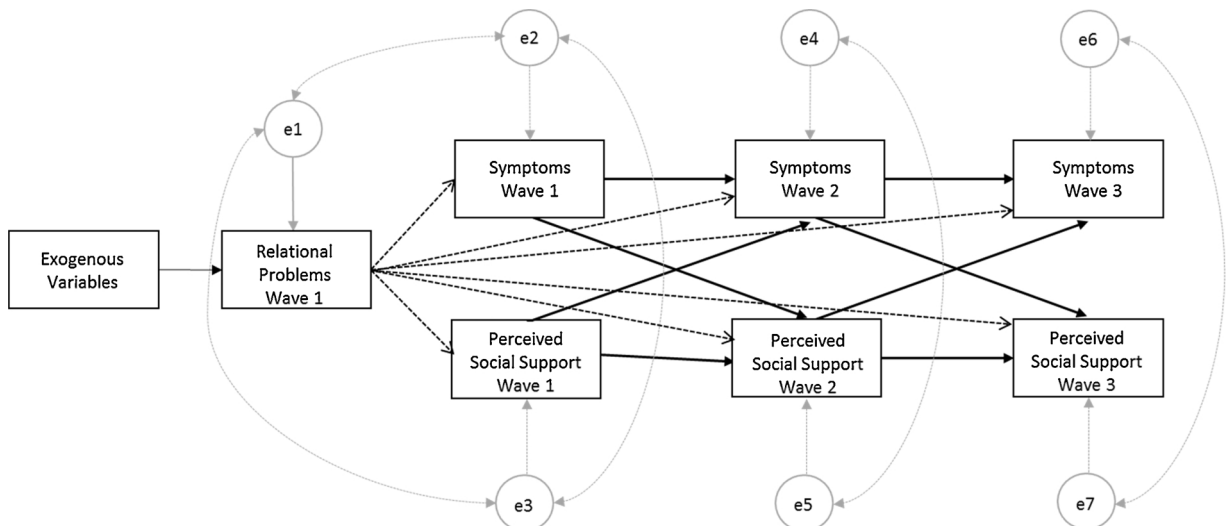


Fig. 1. Simplified conceptual diagram of the cross-lagged panel model.

Table 1
Descriptive statistics of study participants.

| <i>Continuous variables</i> | M | SD | Range |
|--|--|-------|-------|
| Age, women (years) | 39.6 | 12.1 | 18-73 |
| Age, men (years) | 37.9 | 12.6 | 18-58 |
| Age at <i>first</i> abusive incident (years) | 6.3 | 3.6 | 0-17 |
| Age at <i>last</i> abusive incident (years) | 16.7 | 8.0 | 3-54 |
| MSPSS total score, wave 1 | 52.4 | 15.0 | 12-84 |
| MSPSS total score, wave 2 | 52.3 | 14.8 | 12-84 |
| MSPSS total score, wave 3 | 53.9 | 15.3 | 12-84 |
| <i>Categorical variables</i> | | | |
| Proportion of sample (%) | | | |
| Work status | Full time employed | 25.7% | |
| | Retired | 1.6% | |
| | Part-time employed | 13.5% | |
| | Student | 9.3% | |
| | Disability/occupational rehabilitation pension | 44.4% | |
| | Unemployed | 3.9% | |
| | Homemaker | 1.0% | |
| | Unknown | 1.0% | |
| Highest education level achieved | Undergraduate degree | 30.2% | |
| | High school | 23.5% | |
| | Professional/vocational education | 14.5% | |
| | Graduate degree | 15.8% | |
| | Primary school | 13.8% | |
| | Did not complete primary school | 1.3% | |
| Abuse/perpetrator characteristics | Unknown | 1.0% | |
| | Perpetrator was a <i>known person</i> | 79.5% | |
| | Abuse involved <i>penetration</i> | 77.5% | |
| | Was <i>manipulated</i> by perpetrator | 76.0% | |
| | Perpetrator was <i>trusted person</i> | 71.5% | |
| | Abuse involved <i>physical violence</i> | 48.8% | |
| | Was <i>threatened</i> by perpetrator | 39.7% | |

Note: M = Mean. SD = Standard Deviation

Table 2
Descriptive statistics of variables used in cross-lagged panel analyses

| | M | SD | Range |
|-------------------------------------|------|------|-------|
| Relational problems (wave 1 only) | 16.1 | 4.2 | 5-25 |
| MSPSS total score, wave 1 | 52.6 | 14.3 | 18-90 |
| MSPSS total score, wave 2 | 52.5 | 14.8 | 12-84 |
| MSPSS total score, wave 3 | 54.2 | 15.2 | 18-88 |
| IES-R (PTSS) total score, wave 1 | 42.1 | 19.6 | 0-87 |
| IES-R (PTSS) total score, wave 2 | 37.2 | 20.5 | 0-83 |
| IES-R (PTSS) total score, wave 3 | 35.0 | 20.8 | 0-81 |
| HADS-Anxiety total score, wave 1 | 10.8 | 4.5 | 1-21 |
| HADS-Anxiety total score, wave 2 | 10.1 | 4.5 | 0-21 |
| HADS-Anxiety total score, wave 3 | 10.1 | 4.6 | 0-21 |
| HADS-Depression total score, wave 1 | 6.5 | 4.5 | 0-20 |
| HADS-Depression total score, wave 2 | 6.2 | 4.5 | 0-20 |
| HADS-Depression total score, wave 3 | 6.0 | 4.6 | 0-21 |
| BIS (Insomnia), wave 1 | 22.3 | 10.7 | 0-42 |
| BIS (Insomnia), wave 2 | 21.5 | 10.8 | 0-42 |
| BIS (Insomnia), wave 3 | 18.9 | 11.0 | 0-42 |

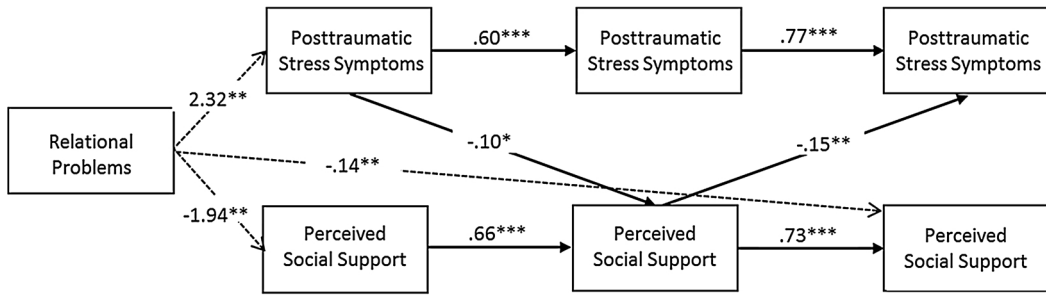
Note: M = Mean. SD = Standard Deviation. MSPSS = Multidimensional Scale of Perceived Social Support. IES-R = Impact of Event Scale-Revised. HADS-Anxiety = Anxiety subscale of the Hospital Anxiety and Depression Scale. HADS-Depression = Depression subscale of the Hospital Anxiety and Depression Scale. BIS = Bergen Insomnia Scale.

$p = .414$), or insomnia (mean difference = 0.55, $p = .558$).

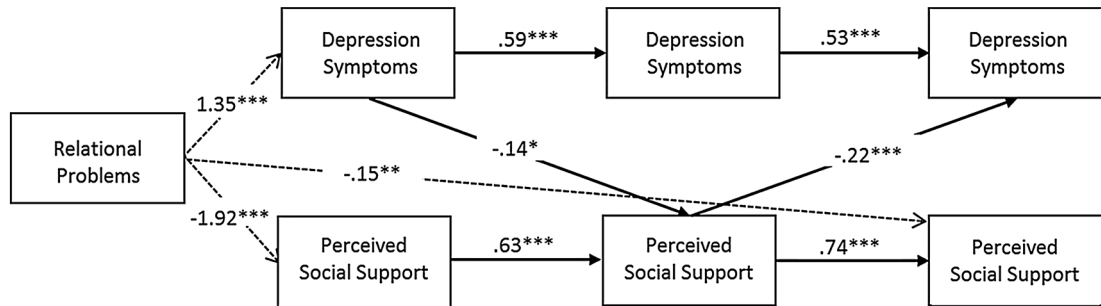
6.1.1. Cross-lagged panel analyses

Path-coefficients for the autoregressive and cross-lagged pathways are displayed in Fig. 2a–d.

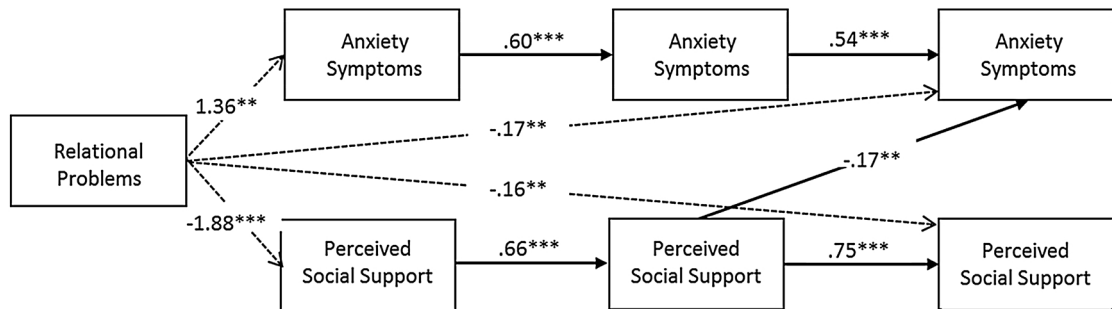
(a)



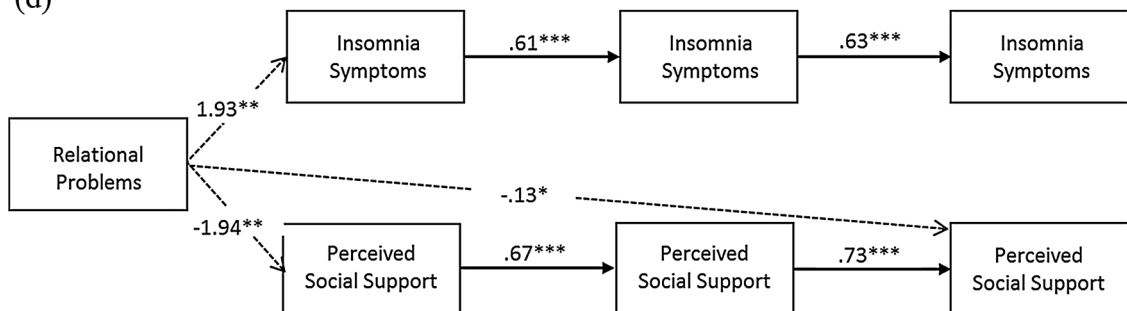
(b)



(c)



(d)



(caption on next page)

Fig. 2. a) Simplified cross-lagged panel analysis showing standardized regression weights for PTSS and perceived social support (only statistically significant pathways shown). *Note:* * $p < .05$, ** $p < .01$, *** $p < .001$.
 b) Simplified cross-lagged panel analysis showing standardized regression weights for depression symptoms and perceived social support (only statistically significant pathways shown). *Note:* * $p < .05$, ** $p < .01$, *** $p < .001$.
 c) Simplified cross-lagged panel analysis showing standardized regression weights for anxiety symptoms and perceived social support (only statistically significant pathways shown). *Note:* * $p < .05$, ** $p < .01$, *** $p < .001$.
 d) Simplified cross-lagged panel analysis showing standardized regression weights for insomnia symptoms and perceived social support (only statistically significant pathways shown). *Note:* * $p < .05$, ** $p < .01$, *** $p < .001$.

6.1.2. Post-traumatic stress symptoms

Results for PTSS are displayed in Fig. 2a. The model yielded good fit indices (CFI = .974, TLI = .937, RMSEA = .036, HOELTER = 326. χ^2 (df = 62) = 87.59, $p = .018$). Autoregressive pathway showed a medium to strong stability of PTSS scores over time ($\beta = .60$ from W1-W2, $\beta = .77$ from W2-W3), and a medium to strong stability of perceived social support levels ($\beta = .66$ from W1-W2, $\beta = .73$ from W2-W3). Posttraumatic stress symptoms measured in the first study wave was a statistically significantly predictor of perceived social support in the second study wave, albeit the same pattern was not found between the second and third study wave. In contrast, perceived social support measured in the first study wave did not predict posttraumatic stress symptoms in the second study wave, whereas perceived social support measured in the second study wave was a statistically significantly predictor of posttraumatic stress symptoms measured in the third study wave.

6.1.3. Depression symptoms

Results for depression symptoms are displayed in Fig. 2b. The model yielded good fit indices (CFI = .964, TLI = .911, RMSEA = .043, and HOELTER = 292. χ^2 (df = 62) = 97.97, $p = .002$). The autoregressive pathway showed a medium stability of depression symptom scores over time ($\beta = .59$ from W1-W2, $\beta = .53$ from W2-W3), and a medium to strong stability of perceived social support levels ($\beta = .63$ from W1-W2, $\beta = .74$ from W2-W3). Patterns for the cross-relation pathways between depression symptoms and perceived social support over time showed the same patterns that were found for posttraumatic stress symptoms.

6.1.4. Anxiety symptoms

Results for anxiety symptoms are displayed in Fig. 2c. The model yielded good fit indices (CFI = .963, TLI = .909, RMSEA = .043, and HOELTER = 293. χ^2 (df = 62) = 97.48, $p = .003$). The autoregressive pathway showed a medium stability of anxiety symptom scores over time ($\beta = .60$ from W1-W2, $\beta = .54$ from W2-W3), and a medium to strong stability of perceived social support levels ($\beta = .66$ from W1-W2, $\beta = .75$ from W2-W3). As was found for posttraumatic stress symptoms and depression symptoms, perceived social support measured in the second study wave was a statistically significantly predictor of anxiety symptoms measured in the third study wave. Apart from this, none of the other cross-relations yielded statistically significant path coefficients at any of the other time points.

6.1.5. Insomnia symptoms

The model yielded in part suboptimal fit indices (CFI = .936, TLI = .843, RMSEA = .054, and HOELTER = 237. χ^2 (df = 62) = 123.47, $p < .001$). Autoregressive pathways showed a medium to strong stability of insomnia scores over time ($\beta = .61$ from W1-W2, $\beta = .63$ from W2-W3), and a medium to strong stability of perceived social support levels ($\beta = .67$ from W1-W2, $\beta = .73$ from W2-W3). As shown in Fig. 2d, none of the cross-lagged pathways between insomnia symptoms and perceived social support yielded statistically significant path coefficient across any of the study waves.

6.1.6. Relational problems

As shown in Fig. 2a-d, relational problems measured in the first study wave were statistically significantly and negatively associated with perceived social support measured in the first and third study wave, but not the second study wave. Relational problems were also statistically significantly positively associated with symptoms of posttraumatic stress, depression, anxiety, and insomnia measured in the first study wave, but did not predict symptom levels in subsequent study waves apart from anxiety symptom in the third study wave.

6.1.7. Exogenous variables

Of the exogenous variables, *cumulative childhood maltreatment* was the only variable showing a statistically significant association with relational problems, with standardized regression coefficients across the four models ranging from .11 - .17 (all p 's < .05).

7. Discussion

The present study examined longitudinal associations between perceived social support and mental health symptoms, as well as the role of relational problems in predicting perceived social support and symptoms levels, in a sample of primarily female CSA-survivors recruited from support centers for sexual abuse survivors in Norway. Contrary to our hypothesis of finding evidence of mainly social erosion processes, cross-lagged panel analyses revealed statistically significant weak reciprocal associations between perceived social support and depression, posttraumatic stress symptoms and anxiety symptoms over time. The directionality of

associations was partly overlapping over time and across symptoms. No statistically significant cross-lagged associations were found between perceived social support and insomnia symptoms. Relational problems assessed in the first study wave was a strong predictor of perceived social support and mental health symptoms cross-sectionally, a weak predictor of perceived support levels longitudinally, and not a significant predictor of symptom levels longitudinally.

8. Cross-lagged panel analyses

The cross-lagged panel analyses revealed weak, partly overlapping, partly variable reciprocal associations between perceived social support and depression, PTSS and anxiety symptoms over time, but not insomnia symptoms. For depression and PTSS, symptom levels in wave 1 negatively predicted perceived social support levels in wave 2, whereas perceived social support levels in wave 2 negatively predicted symptom levels in wave 3. These results may be interpreted as the presence of social erosion processes between the first and second study wave, and of social causation processes between the second and third study wave. At first glance, this may suggest that more severe symptoms result in less support, subsequently resulting in more severe symptoms. If this is the case however, it is not clear why a reverse pattern would not also have manifested, specifically patterns indicative of social causation between the first and second study wave, and of social erosion between the second and third study wave. For anxiety symptoms, only the latter pattern was observed, with perceived social support levels in wave 2 negatively predicting symptom levels in wave 3. It is not clear why only a pattern indicative of social causation, and not of social erosion, was observed for anxiety symptoms, although this may indicate heterogeneity across symptom domains in terms of the relative dominance of social erosion and social causation processes over time. The lack of cross-lagged effects between perceived social support and insomnia symptoms may indicate that insomnia symptoms are less influenced by, and influencing, perceived social support levels across time compared to the other symptoms that were examined in the present study, at least in this sample of CSA-survivors. However, replications of our findings are warranted before any conclusions regarding the observed patterns can be drawn.

We recognize that the present study does not provide any data regarding the *mechanisms* underlying the associations between perceived social support and symptoms over time. Furthermore, the present study did not assess other factors that might have affected perceived social support and/or symptom levels during the two-year intervals between our three study waves, such as for example positive or negative major life events/changes, exposure to new traumatic events, medication use, other therapeutic interventions, or spontaneous changes. To obtain a more comprehensive understanding, there is a need for sophisticatedly designed longitudinal studies examining associations between social support and symptom outcomes at multiple, more frequent time intervals than was the case in the present study, preferably using a mixed methods approach to elucidate qualitative aspects of these arguably complex processes.

Despite our limited capability to provide an explanation for the observed patterns, the overall results of the panel data analysis provide preliminary evidence that both social erosion and social causation processes may continue to exist between perceived social support and symptom levels over time among adult survivors of CSA even decades after the CSA happened, and that heterogeneous effects may exist across different symptom domains. This sheds light on the complexity of the nature of the associations between perceived social support and symptom severity over time, and highlights the need for more research on this topic, especially given its clinical relevance (see *Clinical Implications*).

9. Cumulative childhood maltreatment, relational problems and perceived social support

Higher scores on the cumulative childhood maltreatment variable was a strong predictor of relational problems in the present study. This finding converge with numerous studies documenting a dose-response relation between cumulative childhood adversities and the severity of later health outcomes (Anda et al., 2006; Clark, Caldwell, Power, & Stansfeld, 2010; Koskenvuo, Hublin, Partinen, Paunio, & Koskenvuo, 2010; Schilling, Aseeltine, & Gore, 2008; Steine, Winje, Krystal et al., 2017; Turner, Finkelhor, & Ormrod, 2010).

Furthermore, relational problems assessed in the first study wave was a strong predictor of explained variance in perceived social support measured cross-sectionally. This raises the question of whether relational problems could be one mechanism underlying the inverse association of CSA and perceived social support levels in adulthood. Specifically, CSA and other forms of maltreatment during the developmentally sensitive period of childhood could lead to difficulties trusting and attaching to other people, or with engaging in close relationships, subsequently affecting the person's capacity to build, maintain or utilize socially supportive relationships, ultimately leading to lower perceived social support levels. In support of such interpretation, longitudinal studies have shown that CSA and other types of childhood maltreatment increase the risk of relational problems in the form of relationship dysfunction, lower quality of intimate relationships, less satisfaction with intimate partners, as well as poor quality of communication with intimate partners (Colman & Widom, 2004; Roberts et al., 2004). Moreover, previous studies have shown that CSA is predictive of insecure attachment styles (Aspelmeier et al., 2007; Raby et al., 2017) and emotion regulation difficulties, (Burns, Jackson, & Harding, 2010; Stevens et al., 2013; Walsh, DiLillo, & Scalora, 2011), both of which are likely to negatively interfere with social and relational functioning.

Taken together, our findings and the overall empirical literature indicates that CSA and cumulative childhood maltreatment compromise the development of proximal protective factors important for health and stress resilience such as perceived social support, potentially via relational problems. Given that our sample consisted exclusively of CSA-survivors recruited as adults, however, our findings do not allow for any conclusions regarding the potential mechanistic role of relational problems in this association. Still, the present finding implicates relational problems as a potential candidate mechanism warranting further

exploration in longitudinal cohort studies that have followed CSA-survivors and non-abused comparisons from childhood to adulthood.

Higher scores on the relational problems variable also predicted lower perceived social support levels at four-year follow-up, however the effect sizes were small, showing that variation in this variable over time is mostly explained by variables that were not measured in the present study. Moreover, the same pattern was not observed for perceived social support levels measured at two-year follow-up. The inconsistent findings for the two- and four-year follow-ups are hard to interpret. Since this is the first study of its kind, this finding, alongside other findings from the present study, should be regarded as preliminary data that need to be replicated before any meaningful conclusions regarding the longitudinal patterns can be drawn.

10. Relational problems and mental health symptoms

Relational problems also positively predicted mental health symptoms cross-sectionally. Although we lack comparisons from studies using a comparable measure of relational problems among CSA-survivors specifically, these findings add to the large literature linking social relationships to better health outcomes (Broadhead et al., 1983; Cohen, 2004; Holt-Lunstad et al., 2010; House et al., 1988; Rueger et al., 2016; Uchino et al., 1996; Umberson & Montez, 2010). While, again, the present study does not provide any information about potential mechanisms underlying the association between relational problems and mental health symptoms, and also cannot establish the directionality of this cross-sectional association, the association between relational problems, mental health symptoms and perceived social support have implications for clinicians working with CSA-survivors (see *Clinical Implications*)

Relational problems measured in the first study wave was, however, not a statistically significant predictor of mental health symptoms measured in the second and third study wave, with the exception of anxiety symptoms in the third study wave. The lack of longitudinal associations between relational problems and symptoms over time may indicate that relational problems, at least as measured in the present study, is not a strong predictor of symptoms of depression and posttraumatic stress over time among CSA-survivors, at least not in the present sample. However, since we did not measure relational problems in the second and third study waves, we do not know whether the lack of association of relational problems with symptoms over time may have been caused by changes over time in the relational problems variable. The lack of longitudinal associations could also have been caused by other variables that we did not measure that may have affected either relational problems and symptoms, or both, over time. It is also not obvious why relational problems predicted anxiety levels measured in the third study wave, but not in the second. Taken together, the overall findings calls for replication in other samples before any conclusions can be drawn regarding the role of relational problems in these symptom domains over time.

11. Clinical Implications

The present study findings and the broader evidence linking supportive relationships to better health outcomes, as established by numerous studies showing that people who report more supportive social relationships have better physical and mental health, engage in more positive health behaviors and have lower mortality rates than their counterparts (Cohen & Wills, 1985; Holt-Lunstad et al., 2010; Rueger et al., 2016; Uchino, 2006; Umberson & Montez, 2010), has important clinical implications. Perceived social support is a factor that is likely to be modifiable, making it a vital target of interventions among patients who report low support levels. Furthermore, our finding that relational problems predicted lower perceived social support levels both cross-sectionally and longitudinally highlights the importance of assessments and interventions targeting relational problems, as well as the potential of such interventions to generate positive downstream effects on perceived social support levels. The importance of interventions targeting relational problems is particularly important in light of studies showing that relational problems predict greater functional impairment among CSA-survivors (Cloitre, Miranda, Stovall-McClough, & Han, 2005).

However, given the complexity of the association between perceived social support and mental health problems among survivors of sexual abuse and childhood trauma, a “one-size-fits-all” approach is not likely to be feasible. Rather, the complexity of the association and multiple factors that may underlie lower perceived social support calls for an idiosyncratic approach to case formulations and treatment planning. Particularly, clinicians encountering survivors of sexual abuse and/or other types of childhood maltreatment who report low social support levels should thoroughly assess the patient’s past and present social network and potential support sources, identify factors that are likely to contribute to a lack of support, and then tailor interventions based on each patient’s unique circumstances and experiences.

For some patients, a lack of support may be a consequence of avoidance of close relationships due to basic difficulties with trusting or attaching to others, ultimately resulting in a lack of support sources. Indeed, both insecure attachment and avoidant coping styles have been identified as important mediators in the association between CSA and adult symptomatology (Whiffen & Macintosh, 2005). When this applies to a patient, interventions to increase support may take the form of targeting core beliefs regarding the trustworthiness of others, coping strategies, and the building of close relationships (e.g., skills training to increase social competence; Allen, 2001).

For others, a lack of support may reflect involvement in non-supportive relationships, in which case potential interventions might include helping the patient disengaging from strained or unhealthy relationships (Allen, 2001).

For yet others, a lack of support may be a consequence of severe symptoms such as self-harm behavior, suicide attempts, or emotion regulation difficulties that might drive potential support sources away. In such cases, treating these symptoms might have positive downstream effects on social relationships and subsequent perceived social support levels. On a similar note, depression symptoms are associated with social isolation (Choi, Irwin, & Cho, 2015; Ge, Yap, Ong, & Heng, 2017), in which case the treatment

should target breaking this negative pattern. In addition, CSA-survivors often experience persistent feelings of shame and guilt, and shame has been shown to mediate the relationship of CSA-history with conflicts with intimate partners (Kim, Talbot, & Cicchetti, 2009) as well as emotional distress in adulthood (Whiffen & Macintosh, 2005), highlighting shame as an important intervention target with implications for social relationships. Similarly, trauma-related symptoms such as dissociation, feelings of detachment and emotional numbing may affect the trauma survivors' ability to engage in close relationships or seek support (Dorahy et al., 2013; Evans et al., 2013), underlining the importance of treating such symptoms as important foundational work in the process of building social supportive relationships.

For others, low perceived support levels may result from not seeking or utilizing potentially socially supportive relationships even when these may be available, making viable support sources functionally useless. This could for example be the case if the individual has negative attitudes related to utilizing ones network to ask for help and support, or a *negative network orientation* (Clapp & Gayle Beck, 2009). In such cases, interventions may target cognitions and attitudes related to seeking and accepting help from others in order to promote increased utilization of existing support sources.

Furthermore, survivors of repeated and prolonged interpersonal trauma such as sexual, physical or emotional abuse during childhood, often have complex, multi-symptoms clinical presentations involving difficulties within many of the above-mentioned domains (Herman, 1992; van der Kolk, 2005). This may include problems in the domains of *affect* (e.g., explosive or inhibited affect, dysthymia), *self-perception* (e.g., shame, guilt, self-blame, self-hate), *relationships* (e.g., distrust, withdrawal, clinging) and *behavior* (e.g. re-enactment, self-harm), *cognition* (e.g., dissociation, depersonalization), which may manifest as impairments in multiple areas of functioning, including relational dysfunctions (Cloitre et al., 2011; Dorahy et al., 2013; Herman, 1992; van der Kolk, 2005). Such complex symptomatology is likely to require long-lasting treatment, and may in addition warrant a phase-oriented treatment approach where interventions are tailored to the individual patient's most prominent symptoms and treatment needs (Cloitre et al., 2012). In light of studies indicating that positive effects of social support on trauma symptoms vary as a function of the severity of childhood maltreatment (Evans et al., 2013), the present and previous studies linking cumulative childhood maltreatment to more severe outcomes, including relational problems specifically, highlight the importance of assessing exposure to childhood maltreatment in clinical practice.

12. Study Limitations and Strengths

The present findings should be interpreted in light of several methodological limitations. Firstly, our sample comprised support center users, who may not be representative of the overall population of CSA-survivors. For example, we do not know whether users of such centers may have more or less mental health problems or social support in their lives compared to those who do not seek help at such centers, leaving the generalizability of those findings to the larger population of CSA-survivors uncertain. Also, the majority of the sample were women, which raises questions regarding the generalizability of the findings to men. In addition to this, the response rate in our study was relatively low (32.7% in the first study wave, of which 48.9% responded to wave 2 of the study, of which 73.4% responded to the third study wave), introducing additional uncertainty regarding generalizability of the findings. While we do not know the exact reasons for the loss to follow-up, the support centers- who were the ones who sent the surveys to the study participants- reported that many of the surveys were returned to them due to wrong addresses, although they did not register the number of surveys for which this was the case. It is also possible that there could have been biases in who responded to the subsequent study waves. Of relevance, several studies have reported a more negative health status among survey non-responders (Kjoller & Thoning, 2005; Mattila, Parkkari, & Rimpelä, 2007), including more mental health problems (Pietilä, Rantakallio, & Läärä, 1995). If sexual abuse survivors with more health problems were less likely to respond to subsequent study waves, this would have skewed our sample toward the less severe end of the symptom spectrum. However, other studies reported that the severity of problems among CSA-survivors responding to a survey was overall similar to those who do not respond (Edwards et al., 2001), and in analyzing loss to follow-up we found that non-responders did not differ from responders on neither the mental health outcome variables (PTSS, anxiety, depression, and insomnia), nor the social and relational variables (perceived social support and relational problems). Overall, therefore, we regard it as unlikely that the loss to follow-up affected the result of the present study.

Secondly, there was substantial heterogeneity with regards to the time passed since the first/last abusive incident in the support center sample, with the victim's age at the first abusive incident ranging from 0-17 and the age at the last abusive incident ranging from 3-54 years. Consequently, there is likely to have been large variability within the sample in terms of time elapsed since the abuse of which the hypothesized transactional processes between social support and symptoms would emerge. This may have affected the results of the cross-lagged panel analyses, potentially attenuating effects that might have been more prominent if the sample was more homogeneous in terms of this variable. To overcome these limitations, our findings should be replicated in samples comprising individuals that have been followed longitudinally since the time of abuse disclosure.

Thirdly, since our sample comprised adult survivors of CSA, we lack data on the quality and availability of social support directly following detection or disclosure of CSA, precluding any inferences regarding the role of social support in symptom outcomes during these time periods. In order to address this limitation, longitudinal reciprocal associations between perceived social support and mental health symptoms should be addressed in a sample of adult survivors of CSA followed from childhood to adulthood.

Fourthly, our study included measures of perceived *positive* social support only, and did not include any measures of *negative* social reactions. Given the comparatively greater predictive validity of negative social reactions compared to positive social support for long-term mental health outcomes among sexual abuse survivors reported by previous studies (Ullman & Peter-Hagene, 2016; Ullman & Relyea, 2016), future studies should integrate negative social reactions in their analyses.

Fifthly, it is possible that our measure of relational problems and perceived support share some conceptual overlap with each

other or are aspects of *social connectedness*; a multi-factorial umbrella construct including structural, functional, and qualitative aspects of social relationships (Holt-Lunstad, Robles, & Sbarra, 2017). In order to address this issue, future studies should thus include measures of social connectedness (see for example Lee, Draper, & Lee, 2001)

Finally, there are multiple variables of relevance for perceived social support levels that were not measured in the present study. For example, previous studies among survivors of CSA and other trauma types have shown that the perception and protective effect of social support vary based on attachment style (Declercq & Palmans, 2006), the type of support (e.g. emotional versus tangible support) (Gabert-Quillen et al., 2012; Hyman et al., 2003), and personality traits (Borja, Callahan, & Rambo, 2009). To obtain a more complete picture of the most influential variables affecting perceived social support levels over time, future studies should also examine these constructs as predictor variables. Despite these limitations, the present study adds to the existing literature by providing important and new findings in several previously understudied areas.

13. Conclusions

In this longitudinal study of a sample of mainly female CSA-survivors, we found preliminary evidence of both social selection and social erosion processes in the longitudinal associations between perceived social support and symptom severity among adult survivors of CSA, with both overlapping and heterogeneous effect observed across different symptom outcomes and measurement time points. These findings suggest that reciprocal relationships continue to exist between perceived social support and symptom severity even decades after CSA and other types of childhood maltreatment, highlighting the complexity of the association between perceived social support and symptom severity, and the need for further research addressing underlying mechanisms to improve the understanding of this clinically significant topic.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.chiabu.2020.104566>.

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