Longitudinal pathways of sexual victimization, sexual self-esteem, and depression in women and men. *Psychological Trauma: Theory, Research, Practice, and Policy, 9*, 147-155. doi: 10.1037/tra0000198

Longitudinal Pathways of Sexual Victimization, Sexual Self-Esteem, and Depression in Women and Men[1]

Barbara Krahé and Anja Berger

University of Potsdam, Potsdam, Germany

[1] Correspondence concerning this article should be addressed to Barbara Krahé, University of Potsdam, Department of Psychology, Karl-Liebknecht-Str. 24-25, D-14476 Potsdam, Germany, E-mail: krahe@uni-potsdam.de. The research reported in this paper was supported by a grant from the German Research Foundation to the first author (Kr 972/11-1). The authors are grateful to Robert Busching for his methodological advice.

Abstract

Objective: This paper presents a longitudinal analysis of the links between sexual assault victimization, depression, and sexual self-esteem by examining their cross-lagged paths among both men and women.

Method: 2,425 male and female college students in Germany participated in the study that comprised three data waves in their first, second, and third year of university, separated by 12-month intervals. Sexual assault victimization was assessed at T1 since the age of 14 and at T2 and T3 for the last 12 months. Depression, and sexual self-esteem were measured at each wave.

Results: Random-intercept cross-lagged panel analyses, controlling for individual differences in depression and sexual self-esteem, showed that sexual assault at T1 predicted depression and lower sexual self-esteem at T2, and depression and lower self-esteem at T2 predicted sexual assault victimization at T3. In addition, significant paths were found from T1 depression to T2 sexual assault victimization and from T2 sexual assault victimization to depression at T3. Sexual victimization at T1 was indirectly linked to sexual victimization at T3 via depression at T2. Both depression and sexual self-esteem at T1 were indirectly linked to sexual victimization at T3. The paths did not differ significantly between men and women.

Conclusions: Sexual assault victimization was shown to be a risk factor for both depression as a general mental health indicator and lowered sexual self-esteem as a specific outcome in the domain of sexuality. Moreover, depression and sexual self-esteem increased the vulnerability for sexual assault victimization, which has implications for prevention and intervention efforts.

Key words: Sexual assault victimization, depression, sexual self-esteem, longitudinal study, Germany

Longitudinal Pathways of Sexual Victimization, Sexual Self-Esteem, and Depression in Women and Men

Sexual victimization is a serious problem among young adults in general and college students in particular, as shown by a large body of evidence from many parts of the world (e.g., Hines, 2007; Krahé, Tomaszewska, Kuyper, & Vanwesenbeeck, 2014; Sinozich & Langton, 2014). It has long been established that the experience of sexual assault may have severe and lasting effects on survivors' physical, mental, and sexual health (Koss & Harvey, 1991; Martin, Macy, & Young, 2011). Among these adverse outcomes, heightened levels of depression and post-traumatic stress disorder (PTSD) have been demonstrated by many studies in both male and female survivors of sexual assault (e.g., Aosved, Lang, & Voller, 2011; Walsh, Galea, & Koenen, 2012).

In addition, specific negative outcomes of sexual assault have been widely demonstrated in relation to survivors' sexuality, including a heightened risk of experiencing further victimization (Classen, Palesh, & Aggarwal, 2005; Littleton & Ullman, 2013). Given the strong associations between sexual assault and self-blame as well as feelings of shame (Amstadter & Vernon, 2008; Campbell, Dworkin, & Cabral, 2009), it is not surprising that the experience of sexual assault has been found to significantly affect survivors' sexual self-esteem. Sexual self-esteem (also referred to as sexual esteem) is conceptualized as an individual's self-evaluation of worth as a sexual being (Buzwell & Rosenthal, 1996) and established as a critical part of the overall sexual self-concept (Deutsch, Hoffman, & Wilcox, 2014). The association between sexual assault victimization and lowered sexual self-esteem has been established by several studies (e.g., Turner, Finkelhor, & Ormrod, 2010; Van Bruggen, Runtz, & Kadlec, 2006).

However, the current state of the evidence leaves several issues unaddressed. Many of the studies are cross-sectional, included only women, or employed global measures of self-esteem without reference to the domain of sexuality. To address these issues, the present

three-wave study examined the longitudinal associations between sexual victimization, depression, and sexual self-esteem among both female and male college students in Germany assessed in their first, second, and third year at university.

Sexual Victimization and Depression

Depression has been conceptualized and demonstrated both as an outcome of sexual victimization and as a vulnerability factor for subsequent revictimization. Several cross-sectional studies found elevated levels of depression in female as well as male survivors of sexual assault (Aosved et al., 2011; Chang et al., 2015; Kucharska, 2016; Masho & Anderson, 2009). Only a few studies have addressed the question whether heightened levels of depression are a consequence of, or a vulnerability factor for, sexual victimization or possibly both. Longitudinal studies that reported a path from depression to sexual victimization almost exclusively studied survivors of sexual assault and found that heightened levels of depression following an experience of sexual victimization increase the risk of revictimization (e.g., Banyard, Williams, & Siegel, 2002). The explanations offered for depression as a vulnerability factor for revictimization can also be applied to the prediction of a path from depression to primary sexual victimization: Depression may undermine the ability to resist an assault, send out signals of vulnerability to perpetrators, and give rise to coping behavior that increases the risk of sexual victimization, such as alcohol use or engaging in sexual behavior as a strategy for handling negative affect (Orcutt, Cooper, & Garcia, 2005). Based on these findings, it may be assumed that depression, irrespective of whether it was caused by prior sexual victimization or other factors, may be a vulnerability factor for sexual victimization. To address the proposition that depression may be both an outcome and a predictor of sexual victimization, the present study investigated the temporal paths from depression to sexual victimization and vice versa.

Sexual Victimization and Sexual Self-Esteem

Evidence that sexual assault victims have lower self-esteem than non-victims was found in several studies using general measures of self-esteem (Shapiro & Chwarz, 1997; Turner et al., 2010). Most of these studies included victims of child sexual abuse (e.g., Van Bruggen et al., 2006), and the studies that addressed adult sexual victimization largely focused on women (e.g., Kucharska, 2016). Studies reporting a negative relationship between sexual victimization and sexual self-esteem as a specific facet of self-esteem also mostly studied all-female samples (e.g., Kelley & Gidycz, 2015; Perilloux, Duntley, & Buss, 2013). In fact, one of the first measures for assessing sexual self-esteem was explicitly directed at women (Zeanah & Schwarz, 1996). However, studies including both gender groups suggest that sexual self-esteem is a relevant construct for understanding the sexual behavior of both women and men and may yield different relationships in the two gender groups (Deutsch et al., 2014; Maas & Lefkowitz, 2014). Therefore, we examined whether the negative associations between general measures of self-esteem and sexual victimization would also be found for a domain-specific measure of sexual self-esteem. Moreover, the question whether low self-esteem predicts sexual victimization has only been addressed with regard to the path from childhood sexual abuse to subsequent revictimization, with reduced sexual self-esteem identified as one of the mediating variables (Van Bruggen et al., 2006). As with depression, evidence is lacking on low sexual self-esteem as a vulnerability factor for sexual victimization, independent of prior experiences of sexual assault victimization.

The Current Study

Although past research on the association between sexual assault victimization and depression as well as sexual self-esteem as two aspects of mental health has yielded a number of significant findings, several critical limitations remain. First, the majority of studies linking sexual assault to depression and self-esteem have studied the impact of childhood sexual abuse, and only a few studies have addressed the link in young adults. Second, the designs of many studies do not permit a conclusive analysis of the associations between mental health

variables and sexual victimization. Cross-sectional studies cannot address the directionality of the paths between the constructs (e.g., Chang et al., 2015), longitudinal studies that assess depression as an outcome variable only at the final data wave are unable to control for baseline levels of depression (e.g., Exner-Cortens, Eckenrode, & Rothman, 2013), and studies including only two data waves cannot examine full mediation models that would require at least three data waves (e.g., Turner et al., 2010). Studies with sexual assault survivors typically do not have information about participants' pre-assault mental health status and are therefore unable to separate assault-related variance in the post-victimization outcomes from variance due to factors that existed prior to the assault (e.g., Steenkamp, Dickstein, Salters-Pedneault, Hofmann, & Litz, 2012). Finally, studies including only women cannot address the question of the association between mental health and sexual victimization among men or examine possible gender differences.

To address these limitations, the present study examined the relationship among sexual victimization, sexual-self-esteem, and depression in a large sample of both male and female college students in Germany, including three data waves separated by intervals of 12 months. Due to the focus on women, the issue of gender differences in the associations of sexual assault, self-esteem, and depression has received little attention so far. One exception is the longitudinal study by Turner et al. (2010), who found no evidence that the association of sexual victimization with self-esteem and depression was moderated by gender in their adolescent sample. In the present sample, multigroup analyses were conducted to test the proposition that sexual assault affects women's and men's depression and sexual self-esteem scores in a similar way.

The focus of our study was on examining the cross-lagged paths between sexual victimization and two mental health variables, depression as a general construct and sexual self-esteem as a specific construct in the domain of sexuality. First, in line with a large body of evidence, we predicted that sexual victimization would be a prospective predictor of

depressive symptoms and lowered sexual self-esteem. Second, again backed up by several previous studies, we predicted that prior experience of sexual victimization would increase the odds of experiencing victimization at the later data waves. Furthermore, we sought to analyze the potential impact of depression and sexual self-esteem as prospective predictors of sexual victimization from T1 to T2 and from T2 to T3. By including three data waves, we were also able to examine the question of whether revictimization experiences at T2 have an additional impact on depression and self-esteem beyond the impact of the initial victimization experience, as measured at T1.

Method

Participants and Procedure

The sample of this three-wave study consisted of N = 2,425 students (1,415 women, 1,010 men) at different universities in the Federal States of Berlin and Brandenburg, Germany, who were in their first year at T1. Participants were enrolled in a wide range of academic degree courses. The T2 and T3 data waves were conducted when students were in their second and third year, with an interval of 12 months between each wave. Of the T1 participants, 1,685 (1,033 women and 652 men) took part in the second data wave, and 1,618 (1,000 women and 618 men) participated in the third data wave. This corresponds to dropout rates of 30.5% from T1 to T2 and 3.9% from T2 to T3. Comparing participants who dropped out after T1 with those who remained in the sample revealed that dropouts were more likely to be male and to have reported victimization experiences at T1. As explained below, all T1 participants were included in the analyses, and missing data were handled using Full Information Maximum Likelihood estimation.

In terms of sexual experience background at T1, the majority of participants (91.7% of men and 95.1% of women) reported having had consensual sexual contacts; 78.0% of men and 73.9% of women reported contacts with members of the opposite sex only, 9.4% of men and 20.0% of women reported sexual contacts with both opposite- and same-sex partners, and

4.3% of men and 1.2% of women reported exclusively same-sex contacts. By T3, all participants had consensual sexual experiences, with 84.4% of men and 74.3% of women reporting exclusively heterosexual contacts, 11.8% of men and 25.0% of women reporting both heterosexual and same-sex contacts, and 3.9% of men and 0.7% of women reporting exclusively same-sex contacts. At T1, 49.8% of men and 61.1% of women reported currently being in a steady relationship, and 75.1% of men and 78.9% of women reported having ever been in a relationship. The latter figure went up to 82.5% for men and 85.6% for women by T3. The mean age at first sexual intercourse as assessed at T1 was 16.9 years for men (*SD* = 1.90), and 16.4 years (*SD* = 1.86) for women. Men had a mean number of 5.74 coital partners (*SD* = 8.69), the mean for women was 4.24 (*SD* = 3.98). The gender difference was significant on both variables, multivariate F (df = 2,089) = 49.93, $p < .001$.

Instruments

Sexual assault victimization. To collect reports of sexual assault victimization, we used the Sexual Aggression and Victimization Scale (SAV-S) developed in Germany by Krahé and Berger (2013). The measure was derived from the revised Sexual Experiences Survey by Koss et al. (2007; 2008) but extended the scope of the SES by breaking down reports of victimization by relationship with the perpetrator. Moreover, the SAV-S addresses sexual assault victimization in different gender constellations by presenting participants with items referring to opposite-sex contacts, same-sex-contacts, or both, depending on their sexual experience. The SAV-S differentiates between three coercive strategies: the threat or use of physical force, the exploitation of the victim's inability to resist (e.g., due to alcohol consumption), and the use of verbal pressure (e.g., calling the person a failure). For each coercive strategy, three different victim-perpetrator relationships are presented (current or former partner, acquaintance, and stranger). Within each relationship constellation, four sexual activities are specified: sexual touch, attempted sexual intercourse, completed sexual intercourse, and other sexual acts (e.g., oral sex). A demo version of the SAV-S is available at

http://www.w-lab.de/sav-s.html. Altogether, participants received 36 items (three coercive strategies x three victim perpetrator constellations x four sexual acts). For each item, they were asked if they had experienced the particular behavior *once* (1), or *more than once* (>1). A response option "I did not experience any of these actions" was provided for each coercive strategy rather than providing a never (*0*) option for each item.[2] At T1, participants were asked to complete the items for the time period since their 14th birthday, the legal age of consent in Germany. At T2 and T3, they were asked to complete the items for the last 12 months.

The online format facilitated the assignment of participants to the appropriate version of the questionnaire depending on their sex and sexual experience with members of the opposite and/or the same sex. For example, a female participant who reported sexual contacts with a member of the opposite sex but no sexual contacts with a member of the same sex received the heterosexual version of the questionnaire from the perspective of a female victim/male perpetrator. By contrast, a woman who reported both heterosexual and same-sex sexual contacts received a version that elicited reports of sexual victimization separately for same-sex and opposite-sex perpetrators. The SAV-S has been used and validated in cross-cultural research, adopting both qualitative and quantitative methods (Krahé et al., 2015; 2016).

Depression. Depression was measured by the simplified Beck Depression Inventory for use with nonclinical samples by Schmitt, Altstötter-Gleich, Hinz, Maes, and Brähler (2006). It presents 20 symptoms of depression (example items: "I feel sad", "I have trouble making any decisions"), and participants indicated how often they experienced the respective symptom on a six-point scale ranging from 0 (*never*) to 5 (*almost all the time*). The internal consistency reported by Schmitt et al. (2006) was $\alpha = .91$. In the present study, Cronbach's

[2] At T1, a four-point scale of 0 (*never*), 1 (*once*), 2 (*twice*) and 3 (*three or more times*) was used for each item. Because the number of responses in the categories > 1 was very low, the format was changed to a dichotomous response scale of 1 (once) and 2 (more than once) at T2, with a summary response option ("I did not experience any of these actions") replacing the 0 category for each item to reduce the time needed to complete the survey.

alphas were .92 at each of the three data waves. A total depression score at each time point was calculated by averaging responses across the 20 items.

Sexual self-esteem. To measure sexual self-esteem, we used 12 items from the short form of the Sexual Self-Esteem Scale by Zeanah and Schwarz (1996). Although the scale was originally developed for women, it has been used in research with both males and females (Swenson, Houck, Barker, Zeanah, & Brown, 2012). Four items each from the Skill and Experience scale (ability to please, or be pleased by, a sexual partner and the availability of opportunities to engage in sexual activity; e.g., "I feel I am pretty good at sex"), the Control scale (ability to direct or manage one's own sexual thoughts, feelings, and interactions; e.g., "I feel physically vulnerable in a sexual encounter"; reverse coding), and the Adaptiveness scale (congruence of one's sexual experience or behavior with other personal goals or aspirations; e.g., "In general, I feel my sexual experiences have given me a more positive view of myself") were used. Responses were made on a five-point scale ranging from 1 (*do not agree at all*) to 5 (*totally agree*). The internal consistency was good, with Cronbach's alphas of .82 at T1, .84 at T2, and .84 at T3.

Sexual experience background and demographics. At the beginning of the questionnaire, participants were asked to indicate their sex, age, nationality, home university, and subject of study, whether they were currently in a steady relationship and whether they had been in a steady relationship in the past. In terms of sexual experience background, they were asked whether or not they had ever engaged in sexual contact with a member of the same sex and a member of the opposite sex (response options: no, yes without sexual intercourse; yes with sexual intercourse). Those who reported coital experience were asked to indicate their age at first intercourse and number of coital partners.

Procedure

Approval for the study and all materials was obtained from the Ethics Committee of the authors' university. Invitations to participate in the study were sent out to first year students of

the participating higher education institutions through the respective student offices or student associations. Students interested in participating registered in a data bank created for the purposes of this study and received the link to the online survey upon registration. Participants were required to give active consent on the first page of the survey before being able to proceed to the items. At each data wave, participants received a 10-Euro Amazon voucher (approx. 13 US dollars at the time of data collection).

Plan of Analysis

The hypotheses were tested with structural equation modeling using the Mplus software (Version 7.4). A random-intercept cross-lagged panel model (RI-CLPM) was estimated to account for the stability of individual differences on depression and self-esteem, following an approach suggested by Hamaker, Kuiper, and Grasman (2015). Unlike the standard cross-lagged panel design, the RI-CLPM facilitates the separation of between-person stability and within-person stability by including a random intercept that partials out the between-person stability over time, so that the lagged coefficients represent within-person patterns of change. Because only depression and sexual self-esteem are considered to have trait like qualities with relatively stable individual differences over time (sexual victimization is considered to be a situational experience), we included random intercepts for these two variables only.

We first estimated a multigroup model in which all paths were constrained to be equal for men and women. Next, we compared this model to a model in which all paths were allowed to vary between men and women. Based on the finding that the unconstrained model did not fit the data significantly better than the constrained model, a singlegroup model was estimated and adopted as the final model. The singlegroup model included gender as a covariate to account for the observed gender differences in mean scores, as described below. Missing data as well as non-normality of the distributions were handled by using a robust Full Information Maximum Likelihood (FIML) estimator (MLR; Muthén & Muthén, 1998-2012).

Indirect paths were tested through examining confidence intervals based on 10,000 bootstraps. Since bootstrapping is not available in combination with the MLR estimator, the ML estimator was used for these analyses.

Results

Sexual Assault Victimization Status and Severity

The percentage of female participants who reported at least one instance of sexual assault victimization was 28.8% at T1 (since the age of 14), 26.0% at T2 (last 12 months) and 25.4% at T3 (last twelve months). The corresponding rates for men were 14.2% at T1, 24.0% at T2, and 22.6% at T3. The gender difference was significant only at T1, Chi^2 (df=1) = 71.24, $p < .001$. These overall figures are aggregated across all items, thus they do not distinguish between sexual assault victimization differing in severity.

To arrive at a score of victimization status that takes the severity of the assault experience into account, we assigned participants to one of six categories, following the approach by Koss et al. (2008). Participants who did not endorse any of the victimization items were assigned to the *nonvictim* (1) category. Participants who reported at least one experience of unwanted sexual contact without penetration of the body through the use of verbal pressure, exploitation of victim's intoxicated state, threat or use of physical force, but no attempted sexual coercion, sexual coercion, attempted rape, and rape were classified as victims of unwanted *sexual contact* (2). Participants who reported at least one experience of attempted oral, vaginal, or anal penetration using verbal pressure, but no attempted and completed rape were classified as victims of *attempted sexual coercion* (3), those who endorsed at least one item of completed oral, vaginal, or anal penetration using verbal pressure, but no attempted or completed rape were categorized as victims of *sexual coercion* (4); those who reported attempted, but not completed, oral, vaginal, or anal penetration through exploitation of their intoxicated state or threat or use of physical force were classified as victims of *attempted rape* (5), and those who endorsed at least one item of completed oral,

vaginal, or anal penetration through exploitation of their intoxicated state or threat or use of physical force were categorized as victims of *completed rape* (6). The distribution of the six-level measure of sexual victimization at each data wave as well as the mean scores for men and women are shown in Table 1. At T1, victimization scores were significantly higher for women than for men, at T2 and T3, the gender difference was nonsignificant.

Measurement Invariance of Depression and Sexual Self-Esteem

For both depression and sexual self-esteem, a measurement model was estimated in which the factor loadings were freely estimated across the three data waves. This model was then compared to a model in which the factor loadings and intercepts were constrained to be equal across time. The change in CFI was used as an indicator of invariance, as recommended by Cheung and Rensvold (2002), with a decrease in the CFI of smaller than or equal to -.01 supporting the assumption of invariance. To account for item-level correlations over time, item-specific measurement factors were added to the models based on the inspection of the modification indices (14 items for depression; 10 items for self-esteem). For depression, the unconstrained model showed an acceptable fit with the data, Chi^2 (*df* = 1,607) = 5,579.72, $p <$ .001; RMSEA = 0.032 (C.I. .031; .033); CFI = 0.919; SRMR = 0.028. For the model in which the factor loadings and intercepts were constrained to equality, the fit was Chi^2 (*df* = 1,567) = 5,296.68, $p <$ .001; RMSEA = 0.031 (C.I. .030; .032); CFI = 0.924; SRMR = 0.032. The ΔCFI value of -.005 supports the assumption of strong measurement invariance. For the 12-item measure of sexual self-esteem, the model fit of the unconstrained model was good, Chi^2 (*df* = 495) = 1,524.87, $p <$ .001; RMSEA = 0.030 (C.I. .028; .032); CFI = 0.952; SRMR = 0.037. For the model in which the factor loadings and intercepts were constrained to equality, the change in Chi^2 was -.018, indicating that strong measurement variance was not given. Next, a model in which only the factor loadings were constrained to be equal across time was estimated. For this model, the fit was not significantly worse than for the unconstrained model, as indicated by a ΔCFI value of -.003, Chi^2 (*df* = 517) = 1,635.88, $p <$ .001; RMSEA =

0.030 (C.I. .029; .032); CFI = 0.949; SRMR = 0.039. Thus, the condition of weak measurement invariance across time was satisfied for the sexual self-esteem measure.

Depression and Sexual Self-Esteem: Means and Gender Differences

The mean levels of depression in the total sample were M = 1.29 (SD = 0.78) at T1, M = 1.36 (SD = 0.83) at T2, and M = 1.40 (SD = 0.83) at T3. Women had significantly higher scores at all three data waves, all ps < .01 (T1: M_{women} = 1.39, SD = 0.80; M_{men} = 1.14, SD = 0.72; T2: M_{women} = 1.46, SD = 0.85; M_{men} = 1.21, SD = 0.75; T3: M_{women} = 1.46, SD = 0.84; M_{men} = 1.30, SD = 0.81). The mean levels of sexual self-esteem in the total sample were M = 3.78 (SD = 0.64) at T1, M = 3.73 (SD = 0.64) at T2, and M = 3.69 (SD = 0.64) at T3. Men and women did not significantly differ in sexual self-esteem at any of the three data waves.

Path Analyses

To examine the cross-lagged relationships between sexual victimization, sexual self-esteem, and depression over time, we estimated the path model shown in Figure 1. The pathways of interest are the diagonal paths, which are controlled for the concurrent associations between the three constructs, their stability over time, and the individual differences on the two constructs of depression and self-esteem. In the first step, a multigroup model was tested in which all paths were constrained to be equal for the two gender groups. This model showed a good fit with the data, Chi² (df = 42) = 108.65, p < .001; RMSEA = 0.036 (C.I. .028; .045); CFI = 0.984; SRMR = .037. Next, an alternative model was estimated in which all paths were allowed to vary between men and women. This unconstrained model also had a good fit, Chi² (df =16) = 70.87, p = .001; RMSEA = 0.053 (C.I. .041; .066); CFI = 0.987; SRMR = 0.019. However, the unconstrained model did not fit better than the constrained model, Satorra-Bentler Scaled Difference Chi² statistic (df = 26) = 37.76, p = .06. Therefore, a singlegroup model was estimated in which gender was included as a covariate on all model variables to account for the gender differences in means. Again, this model showed

a good fit with the data, Chi² (*df* = 8) = 89.73, *p* = .001; RMSEA = 0.065 (C.I. 0.053; 0.077); CFI = .982; SRMR = .026 and was adopted as the final model, presented in Figure 1.[3]

The standardized path coefficients show a lagged effect of T1 depression on T2 sexual victimization (ß = .10, *p* < .01) as well as a lagged effect of T1 sexual victimization on T2 depression (ß = .10, *p* < .001). Sexual victimization at T1 negatively predicted sexual self-esteem at T2 (ß = -.08. *p* < .001). At T3, sexual victimization was predicted by higher depression scores at T2 (ß = .08, *p* < .05) and lower sexual self-esteem at T2 (ß = -.07, *p* < .05). T3 depression was predicted by sexual victimization at T2 (ß = .05, *p* < .05). Sexual self-esteem at T3 was unrelated to sexual victimization at T2. Moreover, there were significant paths over time for each of the three constructs. Controlling for individual differences in the mean levels of depression, the more depressed participants were at T1, the higher their depression scores at T2, and the more depressed they were at T2, the higher their depression scores at T3. Parallel findings were observed for sexual self-esteem. For sexual victimization, no stable individual differences were assumed and hence no random intercept was included. The regression coefficients indicate that the more severe participants' sexual victimization experience was at T1, the higher their victimization scores were at T2, and the higher their victimization score was at T2, the higher they scored at T3. No significant cross-lagged paths between depression and sexual self-esteem were found when the interindividual differences were partialled out.

The cross-sectional (partial) correlations in the model revealed that sexual victimization was positively correlated with depression at T1 (*r* = .18, *p* < .001) and T2 (*r* = .13, *p* < .01), and negatively correlated with sexual self-esteem at T1 (*r* = -.15, *p* < .001) and T2 (*r* = -.09, *p* < .05). Depression was negatively correlated with sexual self-esteem at T1, *r* = -.38, *p* < .001 and T2, *r* = -.33, *p* < .001.

[3] As the sexual victimization scores were not normally distributed, the analyses were also run using log-transformed sexual victimization scores. All significant paths were replicated in these analyses.

Indirect effects from T1 to T3 were tested for significance through bootstrapped confidence intervals. The indirect paths within each construct from T1 to T3 were significant at $p < .01$, sexual victimization: ß = .043, depression: ß = .025, sexual self-esteem: ß = .017. The significant indirect pathways between the constructs are shown in Table 2. The more depressed participants were at the beginning of the study in their first year at university, the higher their victimization scores were in their second year, which in turn increased their depression and vulnerability for victimization in their third year. Initial levels of depression also predicted T3 sexual victimization through higher levels of depression at T2. Furthermore, the lower participants' sexual self-esteem was at T1, the lower they scored on sexual self-esteem at T2, which predicted a higher vulnerability for sexual victimization at T3. Sexual victimization at T1 indirectly predicted victimization at T3 via increased depression at T2, and also indirectly predicted depression at T3 via its impact on both sexual victimization and depression at T2. Finally, sexual victimization at T1 was indirectly linked to lower sexual self-esteem at T3, mediated by T2 sexual self-esteem.

Discussion

This study examined the association between sexual assault victimization and depression as well as sexual self-esteem in a large sample of undergraduate college students in Germany, using a three-wave longitudinal design. Participants differed in terms of sexual experience background: the majority reported exclusively opposite-sex contacts, but a sizeable proportion (25% of women and 11.8% of men) reported both same-sex and opposite-sex contacts by the end of the study. The gender difference was reversed for exclusively same-sex contacts, which were reported by 3.9% of men and 0.7% of women at the final data wave. This distribution is consistent with research on so-called "mostly straight" individuals, showing that women's sexuality is more nonexclusive, which means more likely to include sexual contacts with members of both the opposite and the same sex, whereas as men's

sexuality is more likely to be binary in terms of either opposite- or same-sex contacts (see Savin-Williams & Vrangalova, 2013, for a review).

On a dichotomous measure of sexual victimization, women had significantly higher rates of victimization than men since the age of 14, as assessed at T1, whereas no gender difference was found at the two subsequent data waves, covering the first two years at university. To put the prevalence rates into perspective, the T2 and T3 rates, covering the period since enrolment at university, can be compared to the findings of the large-scale Campus Climate Survey (CCS) in the U.S. that included similar coercive strategies and sexual acts (Cantor et al., 2015). About 25 percent of women in the present study reported victimization at T1 and T2, which matches the rate of one in four obtained by the CCS. By contrast, the male rates of 24% at T1 and 23% at T2 are substantially higher than the rate of 5.4% found in the CCS. However, other studies from the U.S. (e.g., French, Tilghman, & Malebranche 2015) and Europe (e.g., Krahé et al., 2015) found that male college students reported rates similar to those found for women.

The main objective of our study was to examine the longitudinal associations between sexual assault victimization and depression as an indicator of general psychological health and sexual self-esteem as a domain-specific indicator of sexual health. A recent extension of the standard cross-lagged panel model, the random-intercept cross-lagged panel model (RI-CLPM; Hamaker et al., 2015), was used to separate within-person variance, representing intraindividual change, from between-person variance reflecting individual differences on the constructs of depression and sexual self-esteem. In combination, the findings support the assumption of reciprocal relationships between sexual victimization and depression as well as sexual self-esteem. First, it is worth noting that the model constraining the paths to be equal for men and women showed a good fit with the data and did not fit worse than a model in which the paths were allowed to vary, indicating that the proposed associations held for both men and women. Second, replicating previous studies (Kucharska, 2016; Masho & Anderson,

2009), we found that sexual victimization since the age of 14, as reported at T1, significantly predicted depression 12 months later at T2 and still had a significant indirect effect on depression levels 24 months later at T3, controlling for depression at T1. In addition, and again in line with previous evidence (e.g., Banyard et al., 2002), we found that depression as assessed at T2 was a significant mediator in the path from victimization at T1 to revictimization at T3, explaining variance over and above revictimization at T2. To our knowledge, our findings are the first to provide a test of a full mediational model in which the predictor, the mediator, and the criterion were assessed at consecutive points in time, and each variable was measured at all three waves. Our findings are consistent with those reported by Najdowski and Ullman (2011), who found that sexual assault survivors who were revictimized showed higher levels of depression than victims who were not victimized again. However, by controlling for depression scores at the first assessment, these authors could not determine the impact of the initial victimization experience, as only survivors were included in their sample. It is worth noting that sexual victimization at T2 also had a direct impact on depression at T3 over and above the indirect impact of victimization assessed at T1, suggesting that repeated experiences of sexual assault added to the intensity of depressive symptoms in this nonclinical population (see also Campbell et al., 2009).

Second, we demonstrated the impact of depression as a vulnerability factor for sexual victimization, which has received little attention in past research. The more depressed participants were at the beginning of the study, the more likely they were to experience sexual victimization in the following 12 months, controlling for sexual victimization experience at T1, and the more depressed they were at T2, the more likely they were to report victimization 12 months later at T3, again controlling for sexual victimization at T2. In addition, initial levels of depression indirectly predicted sexual victimization at T3 via both higher depression scores and a higher probability of sexual victimization at T2, controlling for initial victimization status. This finding goes beyond correlational evidence on depression and

sexual victimization (e.g., Combs, Jordan, & Smith, 2014) and is consistent with the proposition that depression is not only a consequence of, but also a vulnerability factor for, sexual victimization. This pattern may be explained with reference to research that linked depression to the use of sex as a strategy for coping with negative emotions (Littleton, Grills-Taquechel, Buck, Rosman, & Dodd, 2013), which was found to be associated with a higher number of sexual partners, a known risk factor for sexual victimization (Cooper, Shapiro, & Powers, 1998; Orcutt et al., 2005).

Furthermore, our findings are the first to elucidate the role of sexual self-esteem as a domain-specific facet of self-esteem in the relationship between sexual assault victimization and mental health. As expected, sexual victimization led to a reduction in sexual self-esteem, both directly from T1 to T2 and indirectly from T1 to T3 via lower scores at T2. As the path model controlled for levels of depression, these findings suggest that including lowered sexual self-esteem as an outcome of sexual victimization explains additional variance beyond the impact of sexual victimization on depression as a global indicator of mental health. In the RI-CLPM, where person variance was partialled out, the lagged paths between depression and sexual self-esteem that reflect intraindividual change were nonsignificant, supporting the conceptual distinction between the two constructs. Considering low sexual self-esteem as a vulnerability factor for sexual victimization, we did not find a direct path from sexual self-esteem at T1 to sexual victimization at T2. Such a path was found, however, from T2 to T3. In addition, lower sexual self-esteem at T1 indirectly predicted sexual victimization at T3 via lower sexual self-esteem at T2.

The present study went beyond previous research in several ways: It employed a three-wave design that facilitated the testing of mediational effects in a conclusive way, included both female and male college students, and addressed sexual assault, depression, and self-esteem both as outcomes and as vulnerability factors, including a domain-specific measure of sexual self-esteem. At the same time, the study has its limitations. The main limitation is that

the level of depression was at the low end of the scale range, whereas sexual self-esteem was at the high end. Whilst this is a positive finding in terms of participants' mental health and not unexpected in an unselected sample of college students, it may have created problems of floor and ceiling effects for our analyses. Even though we studied a large sample, the sample size did not warrant the selection of subgroups of participants with high depression and low sexual self-esteem scores that would still have a sufficiently high prevalence of victimization. Therefore, the findings need to be replicated with samples at greater risk of mental health problems, scoring higher on depression and lower on sexual-self-esteem. Moreover, our analysis started when our participants were emerging adults and did not include prior experiences of abuse or other traumatic events that might affect depression, nor did it assess the experience of traumatic events in the course of the two-year period covered by our study. Finally, the present student sample is not representative of the young adult population as a whole, and future research is needed to replicate the results in non-student samples.

Despite these limitations, the present findings show that sexual assault victimization is a significant longitudinal predictor of increased depression and lowered sexual self-esteem. Moreover, they indicate that both depression and low sexual self-esteem may make women and men more likely to experience sexual assault, suggesting that both variables should be recognized not only as outcomes, but also as vulnerability factors for sexual victimization. In combination with studies linking depression and low self-esteem to patterns of behavior, such as drinking and risky sexual behavior, that increase the risk of sexual victimization, this research can contribute to the development of evidence-based strategies for preventing sexual assault victimization and breaking the revictimization cycle.

References

Amstadter, A. B., & Vernon, L L. (2008). Emotional reactions during and after trauma: A comparison of trauma types. *Journal of Aggression, Maltreatment & Trauma, 16,* 391-408. doi:10.1080/10926770801926492

Aosved, A. C., Long, P. J., & Voller, E. K. (2011). Sexual revictimization and adjustment in college men. *Psychology of Men & Masculinity, 12*, 285-296. doi: 10.1037/a0020828

Banyard, V. L., Williams, L. M., & Siegel, J. A. (2002). Retraumatization among adult women sexually abused in childhood: Exploratory analyses in a prospective study. *Journal of Child Sexual Abuse, 11*, 19-48. doi: 10.1300/J070v11n03_02

Buzwell, S., & Rosenthal, D. (1996). Constructing a sexual self: Adolescents' sexual self-perceptions and sexual risk-taking. *Journal of Research on Adolescence, 6*, 489-513.

Campbell, R., Dworkin, E., & Cabral, G. (2009). An ecological model of the impact of sexual assault on women's mental health. *Trauma, Violence, & Abuse, 10*, 225-246. doi: 10.1177/1524838009334456

Cantor, D., Fisher, B., Chibnall, S., Townsend, R., Lee, H., Bruce, C., & Thomas, G. (2015). Report on the AAU Campus Climate Survey on Sexual Assault and Sexual Misconduct. Retrieved from: http://www.aau.edu/uploadedFiles/AAU_Publications/AAU_Reports/Sexual_Assault_Campus_Survey/AAU_Campus_Climate_Survey_12_14_15.pdf

Chang, E. C., Lin, J., Fowler, E. E., Yu, E. A., Yu, T., Jilani, Z.,… Hirsch, J. K. (2015). Sexual assault and depressive symptoms in college students: Do psychological needs account for the relationship? *Social Work, 60*, 211-218. doi: 10.1093/sw/swv017

Cheung, G. W. & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233–25. doi:10.1207/S15328007SEM0902_5

Classen, C. C., Palesh, O. G., & Aggarwal, R. (2005). Sexual revictimization: A review of the empirical literature. *Trauma, Violence, & Abuse, 6*, 103–129. doi. 10.1177/1524838005275087

Combs, J. L., Jordan, C. E., & Smith, G. T. (2014). Individual differences in personality predict externalizing versus internalizing outcomes following sexual assault.

Psychological Trauma: Theory, Research, Practice, and Policy, 6, 375-383. doi: 10.1037/a0032978

Cooper, M. L., Shapiro, C. M., & Powers, A. M. (1998). Motivations for sex and risky sexual behavior among adolescents and young adults: A functional perspective. *Journal of Personality and Social Psychology, 75,* 1528–1558. doi:

Deutsch, A. R., Hoffman, L., & Wilcox, B. L. (2014). Sexual self-concept: Testing a hypothetical model for men and women. *Journal of Sex Research, 51,* 932-945. doi: 10.1080/00224499.2013.805315

Exner-Cortens, D., Eckenrode, J., & Rothman, E. (2013). Longitudinal associations between teen dating violence victimization and adverse health outcomes. *Pediatrics, 131,* 71-78. doi: 10.1542/peds.2012-1029

French, B. H., Tilghman, J. D., & Malebranche, D.A. (2015). Sexual coercion context and psychosocial correlates among diverse males. *Psychology of Men & Masculinity, 16,* 42-53. doi: 10.1037/a0035915

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20*, 102-116. doi: 10.1037/a0038889

Hines, D. A. (2007). Predictors of sexual coercion against women and men: A multilevel, multinational study of university students. *Archives of Sexual Behavior, 36,* 403-422. doi: 10.1007/s10508-006-9141-4

Kelley, E. L., & Gidycz, C. (2015). Differential relationships between childhood and adolescent sexual victimization and cognitive–affective sexual appraisals. *Psychology of Violence, 5,* 144-153. doi: 10.1037/a0038854

Koss, M. P., Abbey, A., Campbell, R., Cook, S., Norris, J., Testa, M., … & White, J. (2007). Revising the SES: A collaborative process to improve assessment of sexual aggression and victimization. *Psychology of Women Quarterly, 31,* 357-370. doi:10.1111/j.1471-6402.2007.00385.x

Koss, M. P., Abbey, A., Campbell, R., Cook, S., Norris, J., Testa, M., … & White, J. (2008). Revising the SES: A collaborative process to improve assessment of sexual aggression and victimization: Erratum. *Psychology of Women Quarterly, 32*, 493. doi:10.1111/j.1471-6402.2008.00468.x

Koss, M. P., & Harvey, M. R. (1991). *The rape victim: Clinical and community interventions (2nd ed.)*. Newbury Park, CA: Sage.

Krahé, B., & Berger, A. (2013). Men and women as perpetrators and victims of sexual aggression in heterosexual and same-sex encounters: A study of first-year college students in Germany. *Aggressive Behavior, 39,* 391-404. doi: 10.1002/ab.21482.

Krahé, B., Berger, A., Vanwesenbeeck, I. , Bianchi, G., Chliaoutakis, J., Fernández-Fuertes, A. A. … Zygadło, A. (2015). Prevalence and correlates of young people's sexual aggression perpetration and victimisation in 10 European countries: A multilevel analysis. *Culture, Health & Sexuality, 17*, 682-699. doi: 10.1080/13691058.2014.989265

Krahé, B., de Haas, S., Vanwesenbeeck, I., Bianchi, G., Chliaoutakis, J., Fernández-Fuertes, A. A. … Zygadło, A. (2016). Interpreting survey questions about sexual aggression in cross-cultural research: A qualitative study with young adults from nine European countries. *Sexuality & Culture, 20,* 1-23. doi: 10.1007/s12119-015-9321-2

Krahé, B., Tomaszewska, P., Kuyper, L., & Vanwesenbeeck, I. (2014). Prevalence of sexual aggression among young people in Europe: A review of the evidence from 27 EU countries. *Aggression and Violent Behavior, 19*, 545-558. doi: 10.1016/j.avb.2014.07.005.

Kucharska, J. (2016). Sexual and non-sexual trauma, depression and self-esteem in a sample of Polish women. A cross-sectional study. *Clinical Psychology & Psychotherapy*. Online first publication. doi: 10.1002/cpp.1994

Littleton, H. L., Grills-Taquechel, A. E., Buck, K. S., Rosman, L., & Dodd, J. C. (2013). Health risk behavior and sexual assault among ethnically diverse women. *Psychology of Women Quarterly, 37,* 7-21. doi: 10.1177/0361684312451842

Little, H. L., & Ullman, S. E. (2013). PTSD symptomatology and hazardous drinking as risk factors for sexual assault revictimization: Examination in European American and African American women. *Journal of Traumatic Stress, 26,* 345-353. doi: 10.1002/jts.21807

Maas, M. K., & Lefkowitz, E. S. (2014). Sexual esteem in emerging adulthood: Associations with sexual behavior, contraception use, and romantic relationships. *Journal of Sex Research, 52,* 795-806. doi: 10.1080/00224499.2014.945112

Martin, S. L., Macy, R. J., & Young, S. K. (2011). Health and economic consequences of sexual violence. In J. W. White, M. P. Koss, & A. E. Kazdin (Eds.), *Violence against women and children, Vol. 1: Mapping the terrain* (pp. 173–195). Washington, DC: American Psychological Association.

Masho, S. W., & Anderson, L. (2009). Sexual assault in men: A population-based study of Virginia. *Violence and Victims, 24*, 98-110. doi: 10.1891/0886-6708.24.1.98

Muthén, L.K., & Muthén, B.O. (1998-2012). *Mplus User's Guide* (7th ed.). Retrieved online: https://www.statmodel.com/ugexcerpts.shtml

Najdowski, C. J., & Ullman, S. E. (2011). The effects of revictimization on coping and depression in female sexual assault victims. *Journal of Traumatic Stress, 24*, 218-221. doi: 10.1002/jts.20610

Orcutt, H. K., Cooper, M. L., & Garcia, M. (2005). Use of sexual intercourse to reduce negative affect as a prospective mediator of sexual revictimization. *Journal of Traumatic Stress, 18,* 729–739. doi:10.1002/jts.20081

Perilloux, C., Duntley, J. D., & Buss, D. M. (2013). The costs of rape. *Archives of Sexual Behavior, 41,* 1099-1106. doi: 10.1007/s10508-011-9863-9

Savin-Williams, R. C., & Vrangalova, Z. (2013). Mostly heterosexual as a distinct sexual orientation group: A systematic review of the empirical evidence. *Developmental Review, 33,* 58-88. doi: 10.1016/j.dr.2013.01.001

Schmitt, M., Altstötter-Gleich, C., Hinz, A., Maes, J., & Brähler, E. (2006). Normwerte für das Vereinfachte Beck-Depressions-Inventar (BDI-V) in der Allgemeinbevölkerung [Norms for the simplified Beck Depression Inventory (BDI-V) in a non-clinical population]. *Diagnostica, 52,* 51-59. doi: 10.1026/0012-1924.52.2.51

Shapiro, B. L., & Chwarz, J. C. (1997). Date rape. Its relationship to trauma symptoms and sexual self-esteem. *Journal of Interpersonal Violence, 12,* 407-419. doi: 10.1177/088626097012003006

Sinozich, S. & Langton, L. (2014). *Rape and sexual assault victimization among college-age females, 1995–2013*. Retrieved 19 February 2016 from http://www.bjs.gov/content/pub/pdf/rsavcaf9513.pdf.

Steenkamp, M. M., Dickstein, B. D., Salters-Pedneault, K., Hofmann, S. G., & Litz, B. T. (2012). Trajectories of PTSD symptoms following sexual assault: Is resilience the modal outcome? *Journal of Traumatic Stress, 25*, 469-474. doi: 10.1002/jts.21718

Swenson. R., Houck, C. D., Barker, D., Zeanah, P. D., & Brown, L. K. (2012). Prospective analysis of the transition to sexual experience and changes in sexual self-esteem among adolescents attending therapeutic schools. *Journal of Adolescence, 35*, 77-85. doi: 10.1016/j.adolescence.2011.06.002

Turner, H. A., Finkelhor, D., & Ormrod, R. (2010). The effects of adolescent victimization on self-concept and depressive symptoms. *Child Maltreatment, 15,* 76-90. doi: 10.1177/1077559509349444

Van Bruggen, L. K., Runtz, M. G., & Kadlec, H. (2006). Sexual revictimization: The role of sexual self-esteem and dysfunctional sexual behaviors. *Child Maltreatment, 11*, 131-145. doi: 10.1177/1077559505285780

Walsh, K., Galea, S., & Koenen, K. C. (2012). Mechanisms underlying sexual violence exposure and psychosocial sequelae: A theoretical and empirical review. *Clinical Psychology: Science and Practice, 19*, 260-275. doi: 10.1111/cpsp.12004

Zeanah, P. D., & Schwarz, J. C. (1996). Reliability and validity of the Sexual Self-Esteem Inventory for Women. *Assessment, 3*, 1-15.

Table 1

Severity Score of Sexual Victimization

	T1 (*N* = 2,408)		T2 (*N* = 1,671)		T3 (*N* = 1,613)	
Percent	F	M	F	M	F	M
No victimization (1)	71.2	85.8	74.0	76.0	74.6	77.4
Sexual contact (2)	5.1	3.4	11.6	6.3	11.7	7.6
Attempted sex. coercion (3)	1.6	0.5	1.0	1.1	1.6	1.0
Sexual coercion (4)	7.6	3.2	3.9	2.2	3.2	1.9
Attempted rape (5)	3.0	0.8	2.0	1.8	2.2	1.9
Rape (6)	11.5	6.3	7.5	12.6	6.6	10.2
Mean	2.01[a]	1.49[b]	1.71	1.86	1.67	1.74
SD	1.77	1.35	1.48	1.74	1.43	1.61

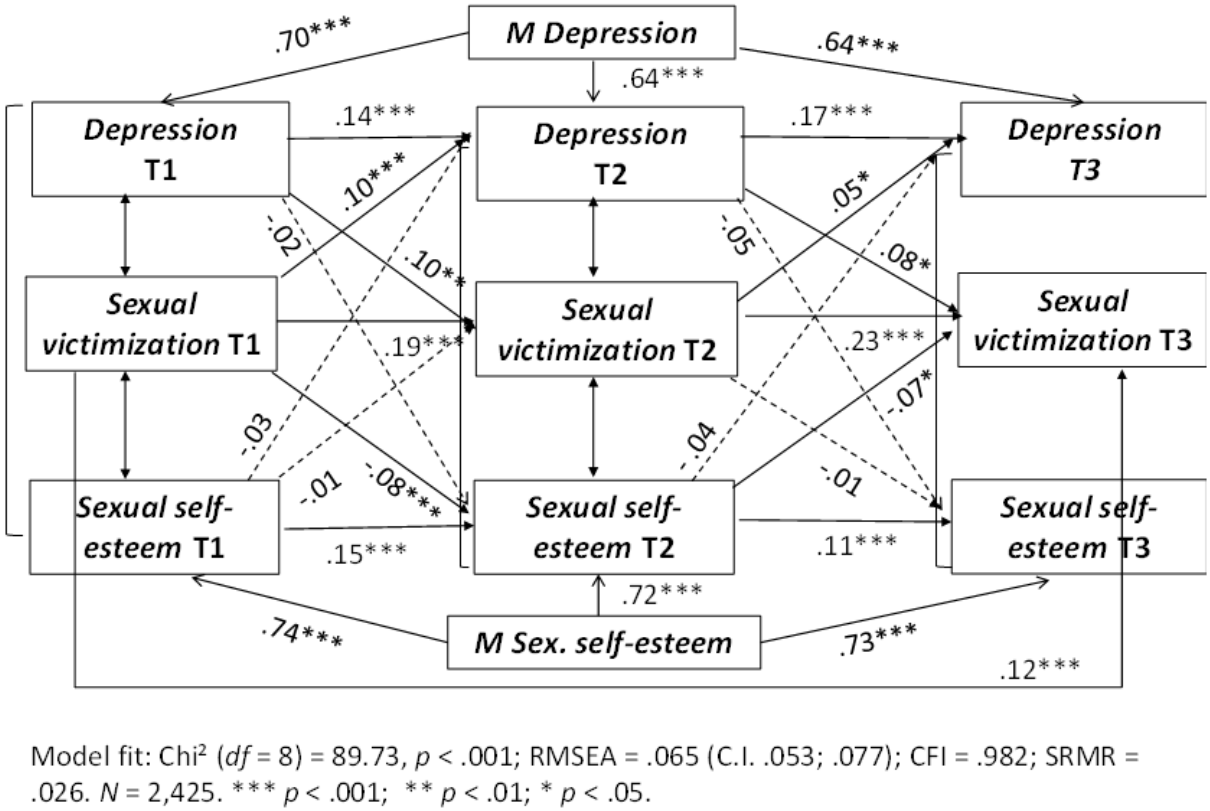
[a,b] $p < .001$; [c,d] $p < .05$. F = Female; M = Male.

Table 2

Significant Indirect Paths between Sexual Victimization, Depression, and Sexual Self-Esteem (Standardized Coefficients)

Indirect paths	*ß*	*Bootstrapped C. I.*
Depression T1 -> Sex. victimization T2 -> *Sex. victimization T3*	.022**	.005; .044
Depression T1 -> Depression T2 -> *Sex. victimization T3*	.011*	.002; .027
Sex. self-esteem T1 -> Sex. self-esteem T2 -> *Sex. victimization T3*	-.010*	-.025; -.001
Sex. victimization T1 -> Depression T2 -> *Sex. victimization T3*	.008*	.001; .019
Sex. victimization T1 -> Depression T2 -> *Depression T3*	.017**	.006; .035
Sex. victimization T1 -> Sex. victimization T2 -> *Depression T3*	.009*	.001; .023
Depression T1 -> Sex. victimization T2 -> *Depression T3*	.005*	.001; .013
Sex. victimization T1 -> Sex. self-esteem T2 -> *Sex. self-esteem T3*	-.009*	-.022; -.003

* 95% confidence interval, $p < .05$; ** 99% confidence interval, $p < .01$.



Model fit: Chi² (*df* = 8) = 89.73, *p* < .001; RMSEA = .065 (C.I. .053; .077); CFI = .982; SRMR = .026. *N* = 2,425. *** *p* < .001; ** *p* < .01; * *p* < .05.

Note. All variables controlled for gender; Gender differences and cross-sectional correlations are reported in the text.

Figure 1. Random-Intercept Cross-Lagged Panel Model of longitudinal relations between sexual victimization, depression, and sexual self-esteem.