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Longitudinal Relationships of Social Reactions, PTSD Symptoms, and Revictimization in Sexual Assault Survivors

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Abstract

Sexual assault survivors receive various positive and negative social reactions to assault disclosures, yet little is known about the directionality of associations of social reactions to posttraumatic stress disorder (PTSD) symptoms over time. Data from a large, diverse sample of women who had experienced adult sexual assault was analyzed with hierarchical linear modeling (HLM) to examine how negative and positive reactions relate to PTSD symptoms over 3 years and to test the hypothesis that the relationship between negative social reactions and PTSD symptoms is reciprocal. We found that, as predicted, social reactions predicted subsequent PTSD symptoms, and in turn PTSD symptoms predicted subsequent social reactions. We also investigated the role of sexual revictimization by comparing women who suffered (versus not) additional sexual victimization during the course of our study. Revictimized women had greater PTSD symptoms and more negative social reactions, but associations of social reactions with PTSD symptoms did not vary according to revictimization status. Implications for practice and suggestions for future research are discussed.

Keywords

sexual assault; PTSD symptoms; social reactions; revictimization; longitudinal Longitudinal Relationships of Social Reactions; PTSD Symptoms; and Revictimization in Sexual Assault Survivors

Sexual assault is associated with long-term negative outcomes such as posttraumatic stress disorder (PTSD) and risk of revictimization (Campbell, Dworkin, & Cabral, 2009; Walsh, Kmetz Danielson, McCauley, Saunders, Kilpatrick, & Resnick, 2012). PTSD is a common psychological consequence of sexual assault with 16-60% of victims developing the disorder (Elliott, Mok, & Briere, 2004; Kilpatrick, Edmunds, & Seymour, 1992; Resnick et al., 2000). Most sexual assault victims (80% or more) tell at least one person about their experience (Ahrens, Campbell, Ternier-Thames, Wasco, & Sefl, 2007; Starzynski, Ullman, Filipas, & Townsend, 2005; Ullman & Filipas, 2001), and most receive both positive and negative social reactions in response to their disclosure (Filipas & Ullman, 2001; Starzynski et al., 2005). Significant research shows that social reactions from persons told about the assault are related to PTSD symptoms, with negative reactions related to greater PTSD

(Littleton, 2010; Ullman, 2000; Ullman, Filipas, Townsend, & Starzynski, 2007a) and positive reactions weakly or nonsignificantly related to PTSD symptoms (Andrews, Brewin, & Rose, 2003; Ullman, 2000; Ullman, Filipas, Townsend, & Starzynski, 2006; Zoellner, Foa, & Brigidi, 1999).

In addition to studies of adult sexual assault victims, two studies of intimate partner violence also show that social reactions relate to PTSD symptoms in both cross-sectional (Sullivan, Schroeder, Dudley, & Dixon, 2010) and longitudinal designs (DePrince, Welton-Mitchell, Srinivas, 2014). Most research has shown that negative social reactions, such as blame, taking control of one's decisions, and stigma, relate to greater PTSD symptoms in sexual assault and domestic violence victims. Because most studies are cross-sectional, however, we do not know if reactions to disclosure lead to greater symptoms or if more symptomatic survivors elicit more negative reactions, or both. In addition, it is possible that revictimization, which is likely in those who are assaulted in adulthood (Walsh et al., 2012), may impact the relationship of disclosure-related social reactions to PTSD symptoms.

Although few longitudinal studies exist, some studies show that general social support relates to PTSD symptoms in survivors of violence against women (Andrews et al., 2003; Zoellner et al., 1999). Social support refers to the ongoing availability of help (i.e., perceived available help and/or objective received assistance) and is one of the most protective factors against PTSD symptoms (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Social reactions are specific responses to sexual assault disclosure from other people and have been found to relate to recovery above and beyond effects of social support in general (Ullman et al., 2007b). Cross-sectional research shows that negative social reactions relate to worse PTSD symptoms in sexual assault victims, even controlling for various other factors like maladaptive coping, assault severity, and self-blame (Littleton, 2010; Ullman et al., 2007a). In several smaller longitudinal studies of treatment-seeking victims, unsupportive reactions and more interpersonal friction with others predicted worse PTSD symptoms at follow-up (Andrews et al., 2003; Zoellner, Foa, & Brigidi, 1999). Thus, positive support and reactions appear to be protective against PTSD, whereas negative reactions relate to greater PTSD symptomatology (Ullman, 2010). There is evidence, however, that the relationship might be reciprocal. For example, DePrince et al. (2014) studied victims of intimate partner violence (IPV) shortly after assault and found that PTSD symptoms predicted receiving more negative social reactions over time. However, this study did not have data on initial social reactions to partner abuse at Wave 1, so the longitudinal association of social reactions to later PTSD symptoms could not be evaluated. In contrast, in a 2-wave study of 555 adult sexual assault victims, Najdowski and Ullman (2011) found that PTSD symptoms did not affect the amount of subsequent positive or negative reactions. We therefore wanted to test, in a more conclusive manner using a longitudinal design and measures of PTSD symptoms and social reactions at all waves, whether the relationship is reciprocal among victims of sexual assault.

The value of studying PTSD symptoms and social reactions over time is highlighted by research showing that more severe PTSD symptoms are related to greater risk of revictimization (Najdowski & Ullman, 2011). In turn, revictimization was related to increased negative, but not positive, social reactions over one year, while positive reactions

predicted less revictimization over a year. Research shows that revictimization is common among victims of adult sexual assault. In one study of adult victims, two-thirds were revictimized sexually over a one year follow-up (Ullman, 2010). Furthermore, national studies show rape revictimization is common in adult victims with 59% of community-residing women reporting sexual revictimization (27% also report current PTSD, Walsh et al., 2012). Revictimization might not only affect recovery from PTSD, but may also moderate the effect of social reactions on PTSD symptoms over time. Revictimized women may have more disclosures and be likely to receive additional negative reactions, and these reactions might continue to thwart recovery from PTSD. Thus, the relation between PTSD symptoms and negative reactions might be stronger for women who suffered additional victimizations over time. In addition, increased PTSD symptomatology in response to revictimization might elicit more negative responses from others. Finally, revictimization typically has a greater stigma associated with it and can lead people to assume there must be something wrong with a woman who is repeatedly assaulted (Ullman 2010). Thus, we reasoned that revictimization might moderate the influence of social reactions on PTSD symptoms or the effect of PTSD symptoms on later social reactions to assault disclosures, given the greater vulnerability of revictimized women.

The present study examines the directionality of social reactions and PTSD symptoms using hierarchical linear modeling (HLM) in large 3-wave sample of adult sexual assault victims recruited from the community. We also examine whether sexual revictimization between survey waves impacts the association of reactions and PTSD symptoms and test several hypotheses. First, we hypothesized that initial (i.e., Wave 1) PTSD symptoms would relate to increased negative reactions and decreased positive reactions at all three waves, but that the relationship would become weaker over time. We also hypothesized the reciprocal relationship: Initial (i.e., Wave 1) negative reactions (and perhaps positive reactions) would predict high levels of PTSD at all three waves, but that this relationship would also become weaker over time – as other intervening factors diminish the role of initial reactions on recovery. Second, we hypothesized that PTSD and negative social reactions would covary over time. Thus, we expected concurrent negative social reactions to predict PTSD at all time-points (i.e., their relationship would not diminish over time) and vice-versa. Third, we expected revictimization to play a moderating role, such that revictimized women would have more PTSD symptoms and receive more negative, but not positive, social reactions; and that revictimized women would have a stronger association of negative reactions to PTSD symptoms over time, as well as a stronger relationship of initial PTSD symptoms with later social reactions. The use of both initial and concurrent predictors would allow us to establish a stronger causal link between initial levels of the predictor and time-varying levels of the outcome, while exploring how the two constructs relate over time (e.g., whether the strength of their relationship is maintained or diminished).

Method

Sample

A sample of volunteer women ($N = 1,013$) from the Chicago metropolitan area, age ranging from 18 to 71 ($M = 37.89$, $SD = 12.72$), completed all three waves of our survey (the initial

Wave 1 sample was 1,863). The final sample was ethnically diverse (47% African-American, 35% White, 2% Asian, 10% other, and 6% multiracial; 13%; 14% were of Hispanic origin, assessed separately from ethnicity) and overall well-educated: 33% had a college degree or higher, 43% some college education, 15% graduated high-school, and 9% less than high school. Just under half of the sample (43%) was employed at the time the survey started, and income levels were relatively low, with 71% of women having household incomes of less than \$30,000.

Our sexual victimization measure was a modified version of the Sexual Experiences Survey (SES, Koss, Gidycz, & Wisniewski, 1987) created by Testa, VanZile-Tamsen, Livingston, & Koss (SES-Revised, 2004). Women were asked to indicate no/yes for each question on the SES-R measure. In terms of the highest severity experience, the measure revealed that at Wave 1, 80% of victims experienced completed rape, 7% attempted rape, 8% coercion, 4% unwanted contact, and 1% did not endorse any items, but had some other unspecified unwanted sexual experience. Out of the initial sample of 1863, 1259 (67.6%) responded to the victimization question at Wave 2. Out of these, 462 (37%) reported some kind of sexual victimization since the Wave 1 survey (i.e., past year). At Wave 3, 963 women responded to the victimization question: 310 (32%) reported some kind of sexual victimization since the Wave 2 survey (i.e., past year). The majority (58%) of the women who were revictimized at Wave 2 were revictimized again by Wave 3.

Procedure

Recruitment was accomplished via weekly advertisements in local newspapers, on Craigslist, and through university mass email. In addition, we posted fliers in the community, at other Chicago colleges and universities, as well as at agencies that cater to community members in general and victims of violence against women specifically (e.g., community centers, cultural centers, substance abuse clinics, domestic violence and rape crisis centers). Interested women called the research office and were screened for eligibility using the following criteria: a) had an unwanted sexual experience at age of 14 or older, b) were 18 or older at the time of participation, and c) had previously told someone about their unwanted sexual experience. We sent eligible participants packets containing the survey, an informed consent form, a list of community resources for dealing with victimization, and a stamped return envelope for the completed survey. The final question on the survey assessed whether women were interested in participating again. Recruitment for Wave 1 lasted approximately 10 months. One year after each participant was sent the initial Wave 1 survey. Women who indicated interest in further surveys were contacted via phone and email and sent the Wave 2 surveys. The same procedure was repeated for Wave 3 (the final wave). Participants were paid \$25 at each wave and the response rates were 85% for Wave 1, 76% for Wave 2, and 56% for Wave 3. The university's Institutional Review Board approved all study procedures.

Measures

Social reactions to disclosure—Women completed the Social Reactions Questionnaire (SRQ; Ullman, 2000), reporting how often they received 48 different social reactions from any support provider since the assault on a scale ranging from 0 (*never*) to 4 (*always*).

Responses were averaged to create subscales assessing the frequency with which participants received negative (28 items) and positive (20 items) reactions. Both scales were reliable with Cronbach's alphas of .93 for negative reactions and .92 for positive reactions. Overall, women received few negative reactions (Wave 1: $M = .95$, $SD = .80$; Wave 2: $M = .57$, $SD = .70$; Wave 3: $M = .52$, $SD = .70$) and a moderate number of positive reactions (Wave 1: $M = 2.23$, $SD = .95$; Wave 2: $M = 1.76$, $SD = 1.16$; Wave 3: $M = 1.61$, $SD = 1.21$).

Posttraumatic stress symptoms associated with sexual assault—PTSD

symptoms were assessed with the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995), a standardized 17-item instrument based on DSM-IV criteria. On a scale ranging from 0 (*not at all*) to 3 (*almost always*), women rated how often each symptom (i.e., reexperiencing/ intrusion, avoidance/numbing, hyperarousal) bothered them in relation to their most serious sexual assault during the past 12 months. The PDS has acceptable test–retest reliability for a PTSD diagnosis in assault survivors over two weeks ($\kappa = .74$; Foa, Cashman, Jaycox, & Perry, 1997) with $\alpha = .93$ in this sample). The 17 items were summed to assess the extent of posttraumatic symptomatology: Wave 1: $M = 21.06$, $SD = 12.92$, Wave 2: $M = 16.77$, $SD = 12.03$; Wave 3: $M = 15.41$, $SD = 12.11$).

Revictimization—At both Wave 2 and Wave 3, we assessed whether our participants had suffered any unwanted sexual experience over the past year by asking them to complete the SES only for the past year, since they completed our last survey. We dichotomized their answers into 0 (no additional sexual victimization) and 1 (any form of sexual victimization in the past year). Revictimization rates were 37% at Wave 2 and 32% at Wave 3.

Control variables—Several variables were included in the models to control for factors known to be associated with PTSD symptoms and social reactions. They included: race (White, African-American, other, multiracial), age, education, income, time since initial sexual assault at Wave 1 (in years), level of physical violence used during the initial assault, and perceived life threat assessing whether the victim felt her life was in danger during the assault (no/yes).

Results

Preliminary Analyses

Women who were sexually revictimized between Wave 1 and Wave 2 were more likely to have been revictimized between Wave 2 and 3, $\chi^2(954) = 166.97$, $p < .05$. In addition, independent-sample *t*-tests revealed that PTSD symptoms and negative social reactions scores were higher at all three timepoints (i.e., both preceding and following revictimization) for women who were revictimized (versus not) at either Wave 2 or Wave 3 (all *ts* between -4.81 and -10.17 , $ps < .01$). Positive social reactions scores at Wave 3 only were higher for women who were revictimized (compared to not), *ts* = -2.25 , -2.84 , $ps < .01$.

In general, correlations between PTSD symptoms and social reactions at all three waves were positive and significant (see Table 1), although negative social reactions had stronger relationships with PTSD symptoms than positive social reactions. Negative and positive reactions were overall positively related, consistent with prior research (Ullman, 2010), and

this relationship was stronger for concurrent reactions. For example, negative reactions at Wave 2 were strongly correlated with positive reactions at Wave 2 (.44), but not with positive reactions at Wave 1 (.14) or Wave 3 (.25). This pattern suggests that the frequency of social reactions in general might largely depend on the number of people told by victims – the more people they tell, the more positive and negative reactions they receive. Yet, only negative reactions appear to affect subsequent PTSD symptoms (Wave 1 and 2 negative reactions are strongly related to Wave 2 and 3 PTSD symptoms, $r_s = .38-.44$), and in turn PTSD symptoms affects primarily subsequent negative reactions (providing support for our bi-directionality hypothesis as well).

Analysis Strategy

Hierarchical linear models were used to investigate the growth trajectories for PTSD symptoms and social reactions, as well as the relationship between them as a function of sexual revictimization. These models reveal both individual differences in change trajectories, and average rates of change, taking into account both differences in initial status (i.e., Wave 1 scores) and differences in change over time (i.e., slopes). Focusing only on between-subject differences in PTSD symptoms and social reactions would fail to capture recovery trajectories over time. Alternatively, focusing on changes in outcome variables over time would fail to capture between-subject variability. Finally, these models also allow us to test the effects of both initial and concurrent (as time-varying covariates) social reactions and PTSD symptoms on each other. For all models, we centered time and time-varying covariates at Wave 1, allowing the intercept to indicate dependent variable values at the onset of the study.

Given our hypotheses that PTSD symptoms and social reactions have complex (i.e., bidirectional) causal relationships, we conducted three sets of analyses (with PTSD symptoms, negative reactions, and positive reactions as outcome variables), all of which included revictimization at both Waves as moderators. Before describing our main results, however, we will discuss the random effects for all three variables of interest, which were roughly the same for all models (see Table 2). We observed significant variance in PTSD symptoms and social reactions scores at the initial survey wave, which supports our choice of multilevel modeling approaches. There was also significant variance among participants in the growth slopes (i.e., recovery trajectories) for all three variables. The negative intercept/slope covariance coefficient (i.e., the relation between the starting point and the slope) was also significant for PTSD symptoms and negative social reactions (although not for positive social reactions), indicating that the higher the intercept (the PTSD symptoms and negative social reactions scores at Wave 1), the slower the decline in PTSD symptoms and negative reactions over time. In other words, women who reported greater PTSD symptoms and more negative reactions at the onset of our study recovered the least over the next two years. In contrast, there was no significant relationship between the amount of positive social reactions at Wave 1 and their evolution over time.

Effects of Positive and Negative Social Reactions on PTSD Symptoms

In all models, we controlled for age, education, income, ethnicity, time since the assault, and life threat and levels of physical violence during the assault. Greater perceived life threat and

higher violence in the assault were related to more PTSD symptoms. Higher education, higher income, and more time elapsed since assault were related to fewer PTSD symptoms, and White participants had more PTSD symptoms than African-American participants. Some of these control variables were also associated with social reactions. For example, greater perceived life threat was related to more negative and positive social reactions. Less educated victims received more negative reactions. Black victims received more positive reactions. Finally, longer time since assault was related to receiving more positive reactions.

Initial social reactions—First, we aimed to replicate the more traditional finding that negative (but not positive) social reactions affect PTSD symptoms, as well as to test their effect over time. To this end, we first tested the effects of initial (Wave 1) social reactions on PTSD symptoms overall, as well as their effects as a function of time and revictimization. We fixed all values of social reactions to the Wave 1 value for all participants, allowing them to vary between, but not within, participants. We conducted 2-step multilevel regression analyses. In the first step, we included the effect of time, initial negative and positive reactions, interactions between social reactions and time, and main effects of revictimization (see Table 3, Initial reactions). We found that PTSD symptoms decreased significantly over time, as was expected. Initial negative social reactions were positively related to PTSD symptoms, but this effect became weaker over time, as indicated by the negative and significant interaction coefficient between time and negative reactions. Positive social reactions did not significantly predict PTSD symptoms. Women who were revictimized by Wave 2 or by Wave 3 reported higher levels of PTSD symptoms, as expected. In Step 2, we added interaction terms between (a) Wave 2 and Wave 3 revictimization, (b) Wave 2 revictimization and negative reactions, (c) Wave 3 revictimization and negative reactions, (d) Wave 2 revictimization and positive reactions, (e) Wave 3 revictimization and positive reactions. None of the interactions were significant, suggesting that the relationship between social reactions and PTSD symptoms does not differ for women who were or were not revictimized during our study.

Concurrent social reactions—We conducted identical analyses with negative and positive social reactions as time-varying covariates (see Table 3, Concurrent reactions or same-wave). In these analyses, instead of fixing social reactions at the initial (Wave 1) values, we allowed them to vary over time for all participants (centered at Wave 1). In Step 1 (i.e., before interaction terms with revictimization were added), we found the same pattern of results as for initial reactions: PTSD symptoms decreased over time, was higher for women who received more negative reactions and who were revictimized. Unlike initial negative reactions, however, concurrent reactions maintained their significant and positive effect on PTSD symptoms over time (i.e., no significant interaction between time and negative reactions). In Step 2, none of the interactions between revictimization and social reactions were significant.

Effects of PTSD Symptoms on Negative Social Reactions

Some of our control variables were related to negative social reactions (result not shown). Women who thought their lives were in danger during the sexual assault reported at Wave 1

received more negative reactions, and higher levels of education were related to fewer negative reactions.

Initial PTSD Symptoms—To test the effects of initial (Wave 1) PTSD symptoms on social reactions, as well as its effects as a function of time, we fixed all values of PTSD symptoms to the Wave 1 value for all participants, allowing them to vary between, but not within, participants. The models were identical to those testing the effects of social reactions on PTSD symptoms (see Table 4). We found that negative social reactions also decreased over time. Higher PTSD levels were significantly related to more negative reactions, but this relationship became weaker with time. Women who were revictimized by Wave 2 or by Wave 3 received more negative reactions than women who were not. At Step 2, the interaction terms between PTSD symptoms and revictimization were not significant.

Concurrent PTSD—We conducted identical analyses with PTSD symptoms as a time-varying covariate (see Table 4, Concurrent PTSD symptoms). We found the same pattern of results as for initial PTSD symptoms, with one exception: The effect of concurrent PTSD symptoms on negative reactions did not diminish over time (the interaction between PTSD symptoms and time was not significant). In Step 2, none of the interactions with revictimization were significant.

Effects of PTSD on Positive Social Reactions

Although we did not predict a significant effect of PTSD symptoms on positive reactions, nor were the effects of initial and concurrent positive reactions on PTSD symptoms significant, we modeled the same multilevel regression analyses as we did for negative social reactions. Our models for positive social reactions did not converge, however, suggesting that the results are not robust and should be interpreted with care—thus the validity of these models is uncertain. Prior research has generally failed to find strong relationships between positive social reactions and negative outcomes or predictors such as PTSD symptoms, revictimization, and assault violence—thus it is possible that the models containing these predictors are inadequate in explaining variance in positive social reactions. In these models, we found that positive social reactions decreased over time, but were not affected by PTSD symptoms or revictimization. Women who felt their life was in danger received more positive reactions, and Black (versus White) victims received more positive reactions. The longer the time since the initial sexual assault, the fewer positive reactions women received.

Discussion

The present study is the first to test whether social reactions to sexual assault disclosure affect PTSD symptoms and vice-versa in a large diverse sample of women using a longitudinal design and analyses. As expected, initial (Wave 1) and concurrent (same-wave) social reactions predicted PTSD symptoms longitudinally with negative reactions related to greater symptoms. In turn, initial and concurrent PTSD symptoms predicted negative social reactions longitudinally. These associations remained statistically significant when controlling for demographics and assault characteristics.

PTSD symptoms declined over time, although they did so less for women who started out with higher PTSD levels at Wave 1 (i.e., victims with more severe PTSD symptoms at the onset of our study recovered the least). In addition, as expected, PTSD symptomatology was higher for women who received more negative reactions and who were revictimized. This is not surprising as research shows a decline in PTSD symptoms in at least some sexual assault victims (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992; Steenkamp, Dickstein, Salters-Pedneault, Hofmann, & Litz, 2012). Also, some past research shows that both PTSD symptoms and revictimization are associated with more negative social reactions (Ullman & Najdowski, 2011). Findings for concurrent social reactions followed the same pattern as for initial social reactions, however, unlike initial reactions, concurrent reactions maintained significant and positive effects on PTSD symptoms over time. Perhaps new reactions to disclosures during the study affect PTSD symptoms more strongly because they occurred more recently and in greater proximity to subsequent symptoms.

Although revictimized women reported greater PTSD symptoms and negative reactions, we did not observe a stronger relationship of negative social reactions to PTSD symptoms in the revictimized (versus non-revictimized) group, as we had predicted. Negative reactions predicted PTSD symptoms. Positive reactions did not predict PTSD symptoms and no interactions were significant, thus the association of social reactions and PTSD symptoms over time does not vary according to revictimization status.

In the models testing the reverse direction – whether PTSD symptoms at the onset of the study and over time were related to increased positive and negative reactions -- we found that initial PTSD symptoms was related to more negative reactions, although this relationship became weaker over time. This suggests that PTSD symptoms may give rise to more problematic responses from others when disclosing sexual assault as suggested in DePrince et al.'s (2014) study of domestic violence. Concurrent PTSD symptoms had the same effects as initial PTSD symptoms, yet effect of concurrent PTSD symptoms on negative reactions did not diminish over time. Perhaps this was observed because these symptoms were more proximate to social reactions. Alternatively, these women may have had higher rates of maladaptive forms of coping, known to be related to both negative social reactions and PTSD symptoms (Ullman, Townsend, Filipas, & Starzynski, 2007b).

We also found that, as predicted, revictimized women received more negative social reactions over time, but revictimization did not moderate the effect of PTSD symptoms on these reactions. Greater negative social reactions in revictimized women are most likely due to their disclosing to more assaults and/or to more people, which typically leads to receiving more negative reactions (Ullman, 2010). However, the relationship between PTSD symptoms and negative reactions did not vary for revictimized versus nonrevictimized women. Thus, there does not appear to be a stronger relationship between PTSD symptoms and negative reactions for revictimized women, contrary to our hypothesis. This is important in suggesting that treatment or intervention aimed at modifying this particular association may not have to be tailored for women with different victimization histories. This finding, however, should be replicated in studies of women in the general population, including both women who have a sexual assault history and those who do not. Because our sample included only adult sexual assault survivors from the beginning, it might have been more

homogenous and higher risk for revictimization to begin with – in fact, many of our victims had already suffered multiple sexual assaults. Thus, longitudinal studies that include non-victims might reveal a stronger moderating effect of revictimization.

The models did not converge for positive social reactions but this is consistent with past research not finding strong relationships of these reactions with PTSD symptoms or revictimization or assault related violence. Positive reactions declined over time but were not affected by PTSD symptoms or revictimization.

Some of our control variables were significantly related to PTSD symptoms and social reactions. Perceptions of life threat and violence during the assault were related to more PTSD symptoms, consistent with past research (Bownes, O’Gorman, & Sayers, 2007; Ullman & Filipas, 2001; Ullman et al., 2007a). Education, income, and time since assault were related to less PTSD, also consistent with some past work (Rothbaum et al., 1992; Steenkamp, 2012; Ullman & Brecklin, 2002; Ullman & Filipas, 2001). Finally, Whites had greater PTSD symptoms than African-Americans, as some past research, but not all, has shown (see Campbell et al., 2009).

Women who thought their lives were in danger during the sexual assault reported at Wave 1 received more negative and positive reactions, perhaps because these were more violent assaults reported to more people and/or formal sources who tend to react more negatively to victims (Ullman, 2010). Higher levels of education among women were related to fewer negative reactions, consistent with past research (Ullman & Filipas, 2001), a finding which may be due to those reacting to the women also being more educated, and thus having more awareness, less rape myth acceptance and/or more positive attitudes towards sexual assault (Ullman, 2010). Black (versus White) victims received more positive reactions, but it is not clear why we observed this finding so further work is needed to replicate this effect. The longer the time since the initial sexual assault, the fewer positive reactions women received, perhaps because women are less likely to disclose or less are distressed when talking about assaults far in the past.

This study had a number of limitations. Although suitably large for our purposes, our sample was not representative – rather, we relied on volunteer women who contacted us to share their experiences. Our measures were self-report in nature and may have been subject to memory bias for women assaulted some years ago. Our sample was, however, ethnically and socio-economically diverse enough to offer adequate generalizability. We were not able to disentangle reactions given by specific providers, because participants evaluated each social reaction globally across various providers. Also, we did not include data on the number and nature of disclosures in these analyses, both of which may affect social reactions and PTSD symptoms.

Our study also had a number of strengths. This is one of the first longitudinal studies of the relationship of social reactions and PTSD symptoms in a large sample of sexual assault victims. No prior study has included three waves of data with measures of both constructs at all time-points. It is also the very first study examining bi-directional relationships of reactions and PTSD symptoms in sexual assault victims. This design allowed us to show for

the first time that in fact the relationship of social reactions and PTSD symptoms is bidirectional, which prior cross-sectional studies could not ascertain. We were also able to evaluate both initial and concurrent effects of reactions on PTSD symptoms and PTSD symptoms on reactions with this design – and to show that the negative effects of early negative reactions on PTSD symptoms diminish over time, but sustained negative reactions continue to hinder women's recovery. Our study is also the first to examine these relationships, taking into account revictimization experiences, which is crucial given that revictimization is common among sexual assault victims. Finally, our study was diverse with respect to age, race/ethnicity and socioeconomic status, and thus our findings can be generalized to women in metropolitan areas.

Our study has several practical implications for educational and clinical interventions. Teaching informal social network members and formal support providers the helpful and unhelpful effects of various reactions to assault disclosure may enhance their ability to respond supportively in ways that encourage survivors' recovery process. In addition to education on the potential circumstances and effects of sexual assaults, support providers should also be informed of typical PTSD symptomatology, and encouraged to maintain a supportive attitude despite the victims' discouraging symptoms. Clearly, PTSD symptoms may trigger negative reactions as much as negative reactions thwart recovery from PTSD symptoms, and this cycle is particularly detrimental to victims. Thus, training social network members how to deal with PTSD symptomatology in particular is recommended. We also need more research to better understand why and how PTSD symptoms may be related to later social reactions, as research is lacking in this area. Existing experimental and survey research evidence suggests that disclosure per se either does not affect PTSD symptoms and/or may even lead to fewer PTSD symptoms (see Ullman, 2011 for a review), but instead that it is the reaction to disclosure that matters for PTSD symptoms. We also need more research on how PTSD may lead victims to disclose their sexual assaults as it is likely that more distressed victims may be more likely to reach out for help (Starzynski et al., 2005). Future research is also needed replicating these analyses in a sample of women not all of whom already have sexual assault, as perhaps the role of revictimization would be more salient not only in predicting PTSD symptoms, but also in affecting the relationships of social reactions and PTSD symptoms over time. Finally, earlier experiences of child sexual abuse and other traumas may also affect PTSD symptoms, but were not controlled here and should also be examined in future studies. While several demographic and assault-related variables known to be related to PTSD symptoms were controlled here, others were not including type and number of various lifetime traumatic experiences.

Assessing survivors' symptomatology may also lead to better understanding of how survivors can manage their symptoms in a way that does not lead others to respond negatively, as initial work with college students shows that support providers can be taught how to respond supportively and avoid negative social reactions (Foyne & Freyd, 2013). That work should be expanded to formal and informal sources that interact with survivors. Given the salience and impact of social reactions on women's PTSD symptoms and the fact that more symptomatic women appear to elicit more negative social reactions, interventions are needed to address how women's PTSD symptoms may thwart receiving positive support.

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References

- Ahrens C, Cabral G, Abeling S. Healing or hurtful: Sexual assault survivors' interpretations of social reactions from support providers. *Psychology of Women Quarterly*. 2009; 33:81–94.
- Ahrens C, Campbell R, Ternier-Thames K, Wasco S, Sefl T. Deciding whom to tell: Expectations and outcomes of sexual assault survivors' first disclosures. *Psychology of Women Quarterly*. 2007; 31:38–49.
- Andrews B, Brewin CR, Rose S. Gender, social support, and PTSD in victims of violent crime. *Journal of Traumatic Stress*. 2003; 16:421–427. [PubMed: 12895025]
- Bownes IT, O'Gorman EC, Sayers A. Assault characteristics and posttraumatic stress disorder in rape victims. *Acta Psychiatrica Scandinavica*. 1991; 83:27–30. [PubMed: 2011952]
- Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for PTSD in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*. 2000; 68:748–766. [PubMed: 11068961]
- Campbell R, Ahrens CE, Sefl T, Wasco SM, Barnes HE. Social reactions to rape victims: Healing and hurtful effects on psychological and physical health outcomes. *Violence & Victims*. 2001; 16:287–302. [PubMed: 11437118]
- Campbell R, Dworkin E, Cabral G. An ecological model of the impact of sexual assault on women's mental health. *Trauma, Violence, & Abuse*. 2009; 10:225–246.
- DePrince A, Welton-Mitchell C, Srinivas T. Longitudinal predictors of women's experiences of social reactions following intimate partner abuse. *Journal of Interpersonal Violence*. 2014; 29:1–15.
- Elliott DM, Mok DS, Briere J. Adult sexual assault: Prevalence, symptomatology, and sex differences in the general population. *Journal of Traumatic Stress*. 2004; 17:203–211. [PubMed: 15253092]
- Filipas H, Ullman S. Social reactions to sexual assault victims from various support sources. *Violence and Victims*. 2001; 16:673–692. [PubMed: 11863065]
- Foa, EB. *Posttraumatic Stress Diagnostic Scale manual*. Minneapolis: National Computer Systems; 1995.
- Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of PTSD: The Posttraumatic Stress Diagnostic Scale. *Psychological Assessment*. 1997; 9:445–451.
- Foyne M, Freyd J. An exploratory study evaluating responses to the disclosure of stressful life experiences as they occurred in real time. *Psychological Trauma*. 2013; 5:295–300.
- Kilpatrick, DG.; Edmunds, CN.; Seymour, AK. *Rape in America: A report to the nation*. Arlington, VA: National Victim Center; 1992.
- Koss MP, Gidycz CA, Wisniewski N. The scope of rape: Incidence and prevalence of sexual aggression and victimization in a national sample of students in higher education. *Journal of Consulting and Clinical Psychology*. 1987; 55:162–170. [PubMed: 3494755]
- Littleton H. The impact of social support and negative disclosure reactions on sexual assault victims: A cross-sectional and longitudinal investigation. *Journal of Trauma and Dissociation*. 2010; 11:210–227. [PubMed: 20373207]
- Ozer EJ, Best SR, Lipsey TL, Weiss DS. Predictors of PTSD and symptoms in adults: A meta-analysis. *Psychological Bulletin*. 2003; 129:52–73. [PubMed: 12555794]
- Najdowski C, Ullman SE. The effects of revictimization on coping in women sexual assault victims. *Journal of Traumatic Stress*. 2011; 24:218–221. [PubMed: 21394789]
- Resnick HS, Holmes MM, Kilpatrick DG, Clum G, Acierno R, Best CL, Saunders BE. Predictors of post-rape medical care in a national sample of women. *American Journal of Preventive Medicine*. 2000; 19:214–219. [PubMed: 11064223]

- Rothbaum BO, Foa EB, Riggs DS, Murdock T, Walsh W. A prospective examination of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress*. 1992; 5:455–475.
- Starzynski L, Ullman S, Filipas H, Townsend S. Correlates of women's sexual assault disclosure to informal and formal support sources. *Violence and Victims*. 2005; 20:417–432. [PubMed: 16250409]
- Steenkamp MM, Dickstein BD, Salters-Pedneault K, Hofmann SG, Litz BT. Trajectories of PTSD symptoms following sexual assault: Is resilience the modal outcome? *Journal of Traumatic Stress*. 2012; 25:469–474. 10.1002/jts.21718 [PubMed: 22807251]
- Sullivan TP, Schroeder JA, Dudley DN, Dixon JM. Do differing types of victimization and coping strategies influence the type of social reactions experienced by current victims of intimate partner violence? *Violence Against Women*. 2010; 16:638–657. [PubMed: 20445076]
- Testa M, VanZile-Tamsen C, Livingston JA, Koss MP. Assessing women's experiences of sexual aggression using the Sexual Experiences Survey: Evidence for validity and implications for research. *Psychology of Women Quarterly*. 2004; 28:256–265.
- Ullman SE. Psychometric characteristics of the Social Reactions Questionnaire: A measure of reactions to sexual assault victims. *Psychology of Women Quarterly*. 2000; 24:257–271.
- Ullman, SE. *Talking about sexual assault: Society's response to survivors*. Washington DC: American Psychological Association; 2010.
- Ullman SE, Brecklin LR. Sexual assault history, PTSD, and mental health service seeking in a national sample of women. *Journal of Community Psychology*. 2002; 30:261–279.
- Ullman SE, Filipas HH. Predictors of PTSD symptom severity and social reactions in sexual assault victims. *Journal of Traumatic Stress*. 2001; 14:369–389. [PubMed: 11469163]
- Ullman SE, Filipas HH, Townsend SM, Starzynski L. Correlates of PTSD and drinking problems among sexual assault survivors. *Addictive Behaviors*. 2006; 31:128–132. [PubMed: 15899554]
- Ullman SE, Filipas HH, Townsend SM, Starzynski L. Psychosocial correlates of PTSD symptom severity in sexual assault survivors. *Journal of Traumatic Stress*. 2007a; 20:821–831. [PubMed: 17955534]
- Ullman SE, Townsend SM, Filipas HH, Starzynski LL. Structural models of the relations of assault severity, social support, avoidance coping, self-blame, and PTSD among sexual assault survivors. *Psychology of Women Quarterly*. 2007b; 31:23–37.
- Walsh K, Kmett Danielson C, McCauley JL, Saunders BE, Kilpatrick DG, Resnick HS. National prevalence of posttraumatic stress disorder among sexually revictimized adolescent, college, and adult household-residing women. *Archives of General Psychiatry*. 2012; 69:935–942. [PubMed: 22566561]
- Zoellner LA, Foa EB, Brigidi BD. Interpersonal friction and PTSD in female victims of sexual and nonsexual assault. *Journal of Traumatic Stress*. 1999; 12:689–700. [PubMed: 10646187]

Table 1
Correlations Between PTSD Symptoms and Social Reactions at all Survey Waves

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. W1 PTSD Symptoms	—	.65*	.59*	.44*	.39*	.36*	.15*	.22*	.22*
2. W2 PTSD Symptoms			.74*	.38*	.39*	.33*	.00	.14*	.16*
3. W3 PTSD Symptoms				.31*	.35*	.39*	-.03	.10*	.17*
4. W1 Negative Reactions				—	.48*	.40*	.17*	.16*	.17*
5. W2 Negative Reactions					—	.53*	.14*	.44*	.25*
6. W3 Negative Reactions						—	.11*	.22*	.46*
7. W1 Positive Reactions							—	.44*	.40*
8. W2 Positive Reactions								—	.52*
9. W3 Positive Reactions									—

* $p < .001$.

Table 2
Random Intercept and Slope Variance-Covariance Matrix for PTSD Symptoms and Social Reactions

Parameter	Coefficient	Standard error	95% CI
<i>PTSD Symptoms</i>			
Intercept Variance	119.30*	5.87	[108.34, 131.37]
Slope Variance	12.38*	1.98	[9.05, 16.43]
Intercept/Slope Covariance	-15.39*	2.68	[-20.64, -10.14]
<i>Negative social reactions</i>			
Intercept Variance	.37*	.02	[.32, .42]
Slope Variance	.05*	.01	[.03, .07]
Intercept/Slope Covariance	-.08*	.01	[-.10, -.05]
<i>Positive social reactions</i>			
Intercept Variance	.31*	.04	[.24, .40]
Slope Variance	.04*	.02	[.01, .13]
Intercept/Slope Covariance	.04	.02	[.01, .13]

Note: The table represents the variance in intercept (i.e., PTSD symptoms and social reactions scores at Wave 1) and slope (i.e., PTSD symptoms and social reactions trajectories for all women across the three waves), as well as the covariance between them, based on an unstructured matrix. Significant coefficients indicate that participants differed both in PTSD symptoms and reactions levels at Wave 1, and in the subsequent growth slopes. The negative covariance coefficient indicates that women with higher PTSD symptoms and negative reactions levels at Wave 1 also had more gradual recovery slopes.

* $p < .01$.

Table 3
Effects of Social Reactions on PTSD Symptoms with Revictimization as a Moderator

Parameter	Initial Social Reactions		Concurrent Social Reactions	
	Coefficient	Standard error	Coefficient	Standard error
<i>Step 1</i>				
Intercept	23.09*	1.87	23.80*	1.90
Wave	-2.79*	.20	-2.33*	.24
Negative reactions	5.04*	.53	3.30*	.42
Positive reactions	-.11	.41	.30	.32
Wave 2 revictimization	3.81*	.77	4.06*	.78
Wave 3 revictimization	3.48*	.79	3.54*	.80
Wave * Negative reactions	-.90*	.27	-.23	.32
Wave * Positive reactions	-.28	.21	-.38	.21
<i>Step 2</i>				
Intercept	22.92*	1.89	23.80*	1.90
Wave	-2.79*	.20	-2.27*	.24
Negative reactions	4.90*	.69	3.79*	.54
Positive reactions	-.22	.52	.42	.37
Wave 2 revictimization	4.18*	.98	4.29*	1.01
Wave 3 revictimization	3.96*	1.11	3.84*	1.13
Wave * Negative reactions	-.90*	.27	-.17	.32
Wave * Positive reactions	-.28	.21	-.40	.21
Wave 2 revictimization * Wave 3 revictimization	-.95	1.59	-1.11	1.60
Wave 2 revictimization * Negative reactions	.37	.97	-.22	.68
Wave 3 revictimization * Negative reactions	-.03	.96	.86	.69
Wave 2 revictimization * Positive reactions	.52	.76	-.26	.48
Wave 3 revictimization * Positive reactions	-.25	.78	-.17	.48

Notes. In all models, we controlled for the following variables: victim age, education, income, race, time since the assault, whether the victim believed her life was in danger, and the level of violence during the assault.

The interaction terms included only in Step 2 are bolded.

* $p < .05$.

Table 4
Effects of PTSD Symptoms on Negative Social Reactions with Revictimization as a Moderator

Parameter	Initial PTSD		Concurrent PTSD	
	Coefficient	Standard error	Coefficient	Standard error
<i>Step 1</i>				
Intercept	.80*	.10	.82*	.10
Wave	-.22*	.02	-.17*	.02
PTSD	.02*	.00	.02*	.00
Wave 2 revictimization	.12*	.04	.12*	.04
Wave 3 revictimization	.21*	.04	.19*	.04
Wave * PTSD	-.01*	.00	-.01	.00
<i>Step 2</i>				
Intercept	.79*	.10	.81*	.10
Wave	-.22*	.02	-.18*	.02
PTSD	.02*	.02	.12*	.00
Wave 2 revictimization	.14*	.05	.15*	.05
Wave 3 revictimization	.24*	.06	.23*	.06
Wave * PTSD	-.01*	.00	-.01	.00
Wave 2 revictimization * Wave 3 revictimization	-.07	.08	-.09	.08
Wave 2 revictimization * PTSD	.01	.00	.01	.00
Wave 3 revictimization * PTSD	.01	.00	.01	.00

Notes. In all models, we controlled for the following variables: victim age, education, income, race, time since the assault, whether the victim believed her life was in danger, and the level of violence during the assault.

The interaction terms included only in Step 2 are bolded.

* $p \leq .01$.