Dimensions of Functional Social Support and Depressive Symptoms: A Longitudinal Investigation of Women Seeking Help for Intimate Partner Violence

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Abstract

Objective—We examined four separate dimensions of functional social support (tangible, appraisal, self-esteem support, and belonging) as predictors of change in depression over a four and a half year period in a sample of women reporting intimate partner violence.

Method—Participants were recruited as they sought help for violence perpetrated by a current or former male partner. Three hundred eighty-eight participants completed the Interpersonal Support Evaluation List (ISEL; Cohen, Mermelstein, Kamarack, & Hoberman, 1985), the Conflict Tactics Scale-2 (Straus et al. 1996), and the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) at the baseline assessment. Participants were re-evaluated on 9 follow-up assessment occasions over an approximately four and a half year period during which they completed the CES-D.

Results—Growth curve analyses revealed that belonging, or the perceived availability of people one can do things with, was the only dimension that predicted changes in depressive symptoms when controlling for initial depressive symptom levels. Higher levels of belonging support reported at the baseline assessment were associated with larger decreases in depression.

Conclusions—The findings of the current study suggest that interventions should consider ways to get survivors connected to informal social networks. Neither perceived availability of material aid, nor availability of someone to talk about one's problems, or availability of a positive comparison when comparing one's self to others was associated with decreased depression over time. Only perceived availability of people one can do things with (i.e., belonging support) exhibited salutary effects.

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Approximately 1.5 million women are physically assaulted and/or raped by an intimate male partner in the United States annually and 25% of women report lifetime exposure, according to the National Violence Against Women Survey (Centers for Disease Control and Prevention, 2003; Coker et al., 2002; Tjaden & Thoennes, 1998). In addition to direct (fatal and nonfatal) injuries and physical health problems experienced by intimate partner violence (IPV) survivors, a range of psychosocial and mental health problems may result from abuse exposure (Campbell, 2002; Coker et al., 2002). Among these, depression is highly common, with rates of depressive symptomatology three to four times higher in women experiencing abuse relative to nonabused women (Golding, 1999; Hathaway et al., 2000). Depressive symptoms can be devastating in their own right and are associated with other difficulties such as suicidal ideation and behavior (Kaslow et al., 1998; Weaver et al., 2007) and poor physical and functional health (Nurius et al., 2003; Sutherland, Bybee, & Sullivan, 2002). Elucidating factors that may reduce or prevent depression among IPV survivors can inform intervention, prevention, and advocacy efforts.

Social support has received the greatest attention among risk and resilience factors for mental health problems among women exposed to intimate partner aggression, with numerous investigations demonstrating that higher levels of support are associated with more positive adaptation (Anderson, Saunders, Yoshihama, Bybee, & Sullivan, 2003; Campbell & Davidson, 1995; Carlson, McNutt, Choi, & Rose, 2002; Thompson et al., 2000). Social support may lead to lower depression by enhancing self-esteem and sense of well-being, increasing coping skills and available social and tangible resources, and assisting in the processing of traumatic material (see Carlson et al., 2002). To date, however, relatively little empirical research has examined the role of social support with respect to the impact of IPV on depressive symptoms in women. Mertin and Mohr (2001), in a cross-sectional examination of posttraumatic stress disorder (PTSD), depression, and anxiety among 59 domestic violence shelter residents in Australia found that reports of higher perceived social support, assessed using a single item inquiring about the perception of availability of general support from friends and family, was associated with lower levels of each of the outcomes of interest. Measures of social support and each of the outcomes were assessed 12 months following shelter residence. Similarly, Nurius et al. (2003) found that positive social relations as measured by items from the Social Adjustment Scale (Weissman, Prusoff, Thompson, Harding, & Myers, 1978) was associated with less depression, and negative social relations was related to more depression in a cross-sectional study of a sample of 448 women with a police-reported incident of abuse or a filing of a protective order. Further, these associations remained even when controlling for other predictors of depression including abuse severity, women's appraisal of vulnerability, and socioeconomic resources.

A small group of studies have examined longitudinal associations between measures of intimate partner aggression, social support, and depressive symptoms. Campbell, Sullivan, and Davidson (1995) examined changes in depression across three time points over eight and a half months in a sample of 141 women leaving a shelter. Findings suggested that higher perceived quantity and quality of social support (operationalized using a single score combining perceived quantity and quality of social support across a number of domains) was associated with lower depression both cross-sectionally at 6-month follow-up and

longitudinally (10-week post-shelter social support predicted 6-month follow-up depression controlling for prior depression severity) in regression analyses accounting for feelings of powerlessness and abuse severity.

In a more recent study of a subsample of the larger study that the Campbell et al. (1995) data were drawn from, Anderson, Saunders, Yoshihama, Bybee, and Sullivan (2003) examined longitudinal predictors of depressive symptoms among those women leaving shelter who remained separated from their abusers across a 2-year time period ($N = 94$). This study utilized a longer assessment period and more data points than the previous investigation, as well as a growth curve analysis approach. Consistent with the earlier study, findings suggested that higher social support (again operationalized using a single score combining perceived quantity and quality of social support across a number of domains) was associated with less depressive symptoms across time. The researchers also tested a "buffering" model, in which they examined whether social support would be particularly strongly associated with reduced depression among those experiencing higher exposure to stressors. Results were not supportive of the buffering model, as evidenced by a lack of an interactive effect of stressor exposure and social support on depressive symptoms.

In contrast to findings obtained by Anderson et al. (2003), Carlson et al. (2002), who divided participants into low and high support groups based on their responses on a measure assessing four dimensions of social support (emotional, appraisal, informational, and instrumental support) did find an interactive effect of abuse victimization and social support on depressive symptoms in their cross-sectional survey of women in two primary care settings ($N = 557$). However, the pattern of findings was such that social support buffered the effects of low-level abuse and these buffering effects were reduced with higher levels of abuse. These findings suggest that social support is less helpful in lessening the impacts of IPV on depression among women who experience higher levels of IPV. Other investigations have similarly shown that social support does not serve as a buffer against revictimization among women who report high levels of IPV (Goodman, Dutton, Vankos, & Weinfurt, 2003).

Recently, Beeble, Bybee, Sullivan, and Adams (2009) conducted the most methodologically sophisticated examination of social support and depressive symptoms in an IPV sample to date. They assessed 150 female IPV survivors recruited from community-based domestic violence programs on six occasions over a two year period. At each time point, participants' satisfaction with the quality and quantity of their social support and depressive symptoms were assessed. They derived a single social support score from a measure that assessed perceived quality and quantity of various types of social support, including emotional support, advice, and companionship. Using multilevel regression growth curve analysis, these researchers found that baseline levels of social support were negatively associated with baseline levels of depression, and higher levels of baseline social support were associated with steeper declines in depressive symptoms across the two year period. They also found that the association between baseline physical IPV and depressive symptoms was completely mediated by social support. In addition, there were no significant interactions between baseline social support and physical IPV in the prediction of either baseline depressive symptoms or change over time in these symptoms, indicating that the relationship

between baseline physical IPV and depressive symptoms was not moderated by social support.

In sum, there is a relative dearth of longitudinal studies examining the impact of social support on depressive symptoms among women who experienced IPV. Findings from extant studies consistently indicated that higher levels of social support at the baseline assessment are associated with lower depression levels at subsequent assessments. On the other hand, findings regarding an interaction between baseline levels of IPV and baseline levels of social support are mixed with only one study reporting a significant interaction, suggesting that social support was more indicative of lower levels of depression for participants reporting lower levels of IPV compared to those reporting higher levels of IPV.

Studies examining the impact of social support on depressive symptoms in IPV survivors have almost exclusively used a single score to operationalize social support. However, social support is most often conceptualized as a multidimensional construct. For instance, Cohen and colleague's influential model (e.g., Cohen, Mermelstein, Kamarck, & Hoberman, 1985) guiding the development of the widely used Interpersonal Support Evaluation List (ISEL; Cohen et al., 1985) specifies four separate domains of social support corresponding to four separate ISEL subscales. *Tangible* support refers to perceived availability of material aid; *appraisal* refers to the perceived availability of someone to talk about one's problems; *self-esteem support* refers to the perceived availability of a positive comparison when comparing one's self to others; and *belonging* refers to perceived availability of people one can do things with.

This multidimensional conceptualization of social support has been validated by research demonstrating differential associations between of each of the dimensions and depressive symptoms. For example, Cohen & Hoberman (1983) demonstrated that the buffering effect of social support between life stress and depressive symptoms was primarily accounted for by appraisal and self-esteem support, and not belonging and tangible support in a sample of college students. Schonfeld (1991) reported that cross-sectionally, all four of these dimensions of social support were significantly and negatively associated with depressive symptoms. However, only belonging prospectively predicted future depressive symptoms.

The purpose of the current investigation was to replicate and extend the work of Beeble et al. (2009) by examining longitudinal associations between social support and depressive symptoms in a large sample of women who sought help for IPV who were evaluated on 10 occasions over a four and a half year period. We expected to replicate the finding of Beeble et al. such that higher levels of baseline social support would be associated with larger decreases in depressive symptoms over time. However, instead of analyzing one composite social support score, we examined the impact of the four dimensions of social support described by Cohen and colleagues. We had no a prior theoretical/conceptual basis to specify a hypothesis concerning the differential impact of different domains of social support on depression trajectories. However, based on the findings of Schonfeld (1991), we tentatively hypothesized that belonging would be the only dimension of social support that would predict changes in depressive symptoms over time. We also examined: a) initial depression levels x baseline social support interactions predicting change in depression to

test whether the dimensions of social support impacted trajectory of depression symptoms more for participants reporting higher initial depression levels compared to those reporting lower initial levels of depression (i.e., a "buffering" effect), and (b) a significant baseline IPV victimization levels x baseline social support interaction predicting depression trajectory to investigate whether social support would be associated with larger decreases in depression for participants who reported higher levels of IPV victimization compared to participants reporting lower levels of IPV victimization.

Method

Participants

Data for this study were collected as part of a larger longitudinal study of 406 women who were recruited from one of three sites in a mid-Atlantic city as they sought help for violence perpetrated by a current or former male partner (for more details, see Goodman, Dutton, Weinfurt, & Cooke, 2003). The three sites were: (a) a crises shelter for victims of IPV ($n = 68$), (b) the Civil Division of the District Court that handles petitions for civil protection orders ($n = 227$), and (c) the Domestic Violence Criminal Docket of the District Court, which is specialized to handle most misdemeanor IPV cases in the city ($n = 118$). Eligibility criteria included: (a) female victim of physical IPV from a current or former intimate partner, (b) over age 18, (c) English-speaking, (d) sober (i.e., free from apparent intoxication as assessed by the research staff who initially recruited the participant and administered the measures), and (e) without significantly impaired mental status at the time of initial contact.

The sample for the current study consisted of 388 participants (96% of the total sample) for whom there were complete data on the social support, depressive symptoms, and IPV victimization measures at the initial assessment. The majority (82%) of this sample was African-American, while 13% of the remaining participants identified as Anglo and 5% identified with a variety of other ethnic groups. One average, participants were 32.38 years old (SD = 8.48) upon entry into the study. Approximately half (43%) of participants had attended at least some college or graduate school. Although 59% were employed in a full- or part-time job at Time 1, 86% reported having a personal annual income of less than $25,000 a year. A large majority of participants (79%) had at least one child living with them.

Measures

Social support. Perceived availability of social support was assessed using the Interpersonal Support Evaluation List (ISEL; Cohen, Mermelstein, Kamarack, & Hoberman, 1985). The ISEL is a 40-item true–false self-report instrument that was designed to measures the perceived availability of four separate functions of social support. Four 10-items subscales assess the perceived ability of: (a), *tangible* support- material aid, (b) *appraisal* - someone to talk about one's problems, (c) *self-esteem* support- availability of a positive comparison when comparing one's self to others, and (d) *belonging*- availability of people one can do things with.

IPV victimization. A yes/no version of the Conflict Tactics Scale-2 (CTS2 Form A, Straus et al. 1996) assessed the endorsement of specific acts of IPV in the last year. The CTS2 is the

most widely used measure of abusive relationship behavior, and exhibits sound psychometric properties (Straus, 1979, 1990). The 12–item Physical Assault CTS2 subscale was used in this study. IPV victimization scores were computed by summing the number of positively endorsed items, with total scores ranging from 0 to 9. This computation method, known as the "variety score," has desirable psychometric properties (Moffitt et al., 1997). Variety scores reduce skewness caused by a small number of high-rate offenders, reduce estimation errors common in the recall of high frequency behaviors, and circumvent the need to weight different aggressive acts by their presumed severity.

Depressive Symptoms. The Center for Epidemiologic Studies Depression Scale (CES-D) Radloff, 1977) was used to assess depressive symptoms. Using a four-point scale ranging from "rarely or none of the time" to "most or all of the time," participants were asked to report the frequency with which they had experienced each of 20 depressive symptoms during the past month (Time 1) or week (Times 2–10). Summing the scores on these items provides an index of the severity of depression. The CES-D has been found to have adequate construct validity and to correlate highly with other depression measures in a number of other studies with low-income women (Bell & Goodman 2001; Belle 1982). The Cronbach alpha for this measure in the current sample was .78.

Procedure

Participants were recruited during the first 30 days of their stay in shelter ($n = 68$); as they began the process of petitioning for a civil protection order ($n = 220$); or as they exited the courtroom following the final disposition of a criminal case against their abusive partner ($n = 118$). Of those approached, 116 (29%) women refused to participate, largely due to time constraints; this differed significantly across sites, with women approached at criminal court being least likely and women in shelter being most likely to participate. Most participants ($n = 294$) completed the questionnaire in a private room on-site the day they were approached to participate. Women who wished to participate but were unable to stay the 45–60 minutes to do so were offered a stamped envelope and asked to return the questionnaire by mail ($n = 112$). Four female clinical psychology doctoral students conducted the follow-up calls, which were, on average, 45 to 60 minutes in length. Participants were re-evaluated on 9 follow-up assessment occasions over an approximately four and a half year period. The first four follow-up assessments were conducted every three months (Phase I: T2, T3, T4, and T5); the next five (Phase II: T6, T7, T8, T9, and T10) occurred every four to six months. Completion rates for the nine follow-up assessments were as follows: 291 (72%) at T2, 289 (72%) at T3, 288 (71%) at T4, 338 (83%) at T5, 282 (69%) at T6, 280 (69%) at T7, 204 (50%) at T8, 226 (56%) at T9, and 260 (64%) at T10. The study was conducted in compliance with Georgetown University Medical Center's Internal Review Board as well as the Institutional Review Boards of the University of Maryland and Boston College.

Data Analyses—We conducted growth curve analyses from a multilevel regression framework (e.g., Singer & Willet, 2003) to depict change over time in depressive symptoms and to examine the impact of social support and IPV severity on change over time in depressive symptoms. This approach is particularly well-suited for the current dataset because it readily handles varying time intervals between assessments. While data collection

followed the general schedule of the first five assessments (Times 1 through 5) occurring every three months for the first year and every four to six months after that (Times 6 through 10), there was considerable variability in the timing of the assessments across participants. Therefore, time was included in the models as a variable indicating the amount of time that had elapsed since the initial assessment. The multilevel regression approach is also very robust regarding missing data. All individuals who completed the initial assessment are included in the estimation of the final models regardless of how many times they were assessed.

All analyses were conducted using the software program Hierarchical Linear and Non-Linear Modeling (HLM6; Raudenbush, Bryk, & Congdon, 2005) using full maximum likelihood estimation. Because HLM does not produce a standardized regression coefficient, we report the partial correlation coefficients (pr) for each coefficient. Kirk (1996) suggested .10, .24, and .37 for small, medium, and large effect sizes respectively.

Results

Preliminary/Descriptive Analyses

Table 1 displays the bivariate correlations and descriptive statistics for all study variables at Time 1, and Table 2 displays descriptive statistics for the CES-D at all assessment occasions. The mean level of depressive symptoms at Time 1 (31.54) falls above the cutoff score of 27 that has been suggested to indicate severe depression (Radloff, 1977). Eighty-seven percent of the sample scored at above 16, the cutoff that has been used to indicate clinically significant depression (Radloff, 1977; Weissman, Sholomskas, Pottenger, Prosoff, & Locke, 1977). A standard deviation of 12.15 and a range of five to 60 suggest a considerable degree of variability in initial depressive symptoms levels. A mean score of 5.94 indicates that on average, participants endorsed being the recipient of almost six different types of physical IPV during the previous 12 months. There was also considerable variability in initial IPV victimization with CTS2 scores ranging from zero[1] to 12, the minimum and maximum values of the scale.

The bivariate correlations indicated significant negative associations between depressive symptoms and all of the ISEL subscales with correlation coefficients ranging from −.29 for ISEL-Approach to −.49 for ISEL-Self-Esteem. There was also a significant positive association between IPV victimization and depressive symptoms. Finally, all of the ISEL subscales were significantly correlated with each other with correlation coefficients ranging from .46 between ISEL-Self-Esteem and ISEL Approach to .74 between ISEL-Self-Esteem and ISEL-Tangible. These moderate to high associations suggest that the ISEL subscales tap related but distinct constructs, which is consistent with the theory underlying the development of the ISEL (Cohen et al., 1985).

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[1]Only 14 (3%) of participants endorsed no physical violence on the Physical Assault CTS2 subscale. However, these participants did endorse substantial psychological abuse.

Unconditional Change Model (Change in Depression without Predictors)

Prior to examining the impact of social support on change in depression, we adopted a model building approach (e.g., Bliese & Ployhart, 2002) to conduct unconditional growth models (i.e., examining change over time without any predictors) to carefully consider how to specify time in the conditional growth models. We evaluated several unconditional change models (i.e., examining change over time with no predictors) with several variations in how change over time was modeled. We examined linear change, non-linear change by including power polynomials of time (linear and quadratic terms), and non-linear change by using a natural-log transformation of time elapses. As detailed by Singer and Willett (2003), using a natural-log transformation of time to model change is one of a variety of methods used to model non-linear change that depicts a pattern of decelerating change (i.e., larger initial decreases that flatten out over time). HLM produces a log-likelihood based goodness of fit statistic referred to as the deviance statistic. To compare unconditional models, we evaluated change in the deviance statistic, computed by subtracting the deviance statistic of the more saturated (i.e., less parsimonious) model from the deviance statistics from the less saturated model (dev; which follows a chi-squared distribution with degrees of freedom equal to the difference between the number of parameters between the two models being compared; Raudenbush & Bryk, 2002) and compared change in sigma square ($\sigma2$), which represents how much of the within-subjects variance is accounted for by time. The model with the natural-log of the number of days elapsed since the initial assessment produced the smallest deviance statistic and largest σ^2 suggesting that this model fit the data best and accounted for the most within-subjects variance in depressive symptoms. This model produced four estimates of interest. The coefficient for the regression intercept term (b_0) indicates initial depressive symptom levels when averaged across all participants, while the regression slope term (b_1) indicates change over time in depressive symptoms averaged across all participants. As depicted via solid line in Figure 1, the average pattern of change was characterized by decreases in depressive symptoms that gradually diminished over time ($b_0 = 31.25$, $t = 49.52$, $p < .001$; $b_1 = -1.74$, $t = -17.20$, $p < .001$; $\sigma^2 = .29$). The unconditional change model also produces estimates of the variability of initial status and change over time in depressive symptoms across participants and indicated that there was significant variability in these two change parameters across participants. The two dashed lines in Figure 1 depict change at 1 *SD* above and below the regression slope, or change parameter. The variance component of the model also produced an estimate of the association between initial slope and status ($r = -.56$, $p < .001$), which indicated that individuals initially endorsing higher levels of depressive symptoms tended to show larger decreases in depressive symptoms, as also illustrated in Figure 1. In sum, the unconditional change model indicated that on average, participants demonstrated a non-linear decrease in depressive symptoms with the rate of decrease diminishing over time. There was significant variability in both initial status and change over time, and these two change parameters were negatively associated with higher initial levels of depressive symptoms associated with larger decreases over time.

For some conditional models (i. e., models including predictors of change over time) described below we included initial depression symptom levels as a predictor of the intercept and change parameters. With the raw (i.e., uncentered) time variable, this model

consists of having initial depression levels predicting the intercept, which also represents initial depression levels when the first time occasion is coded as zero. To avoid problems associated with having the predictor and the outcome variable being the same for the intercept component of the model we mean grand-centered the time variable by subtracting 5.26 (the mean of the natural log transformed number of days variable). Centering the time variable in this manner changes the meaning of the intercept term to the depression level at the mean level of the time variable. Thus, the intercept component of the model involved examining how initial depression levels predict depression levels 192 days after the baseline assessment. Although not the focus of the analyses (i.e., examining change over time) the intercept component of the models is important because it contains the main effects of the predictor variables (i.e., social support and depression levels), which need to be included in the model when examining time x predictor variable interactions. Because the main goals of the study involve the time, or slope, component of the model and not the intercept component of the models and to increase conciseness and clarity, we do not consider the intercept component of the growth curve models in the results section. However, the coefficients for the intercept component of the model are presented in Table 3.

Social Support as a Predictor of Change in Depression

To test our hypothesis that ISEL belonging would be associated with decreases in depression, the next step of the growth curve analyses consisted of adding the Time 1 ISEL subscales as predictors of initial status and change over time in depressive symptoms. All Level-2 predictor variables were mean centered. To control for what is common among the ISEL subscales (e.g., method effect, overall tendency to evaluate one's life in a positive manner), to limit the overall number of models that were evaluated, and to identify the most robust predictor(s) of change, we simultaneously examined the impact of all ISEL subscales. These results are summarized in the "Analysis 1" section of Table 3. Again for brevity, we focus on the prediction of changes in depressive symptoms over time. In Analysis 1, only the self-esteem subscale of the ISEL was significantly associated with change over time in depression. However, contrary to expectations, higher levels of self-esteem social support at Time 1 were associated with smaller decreases in depressive symptoms over time (See Figure 2). As reported above, initial status was substantially correlated with change over time in depressive symptoms such that individuals who reported higher initial depressive symptoms exhibited larger decreases in depressive symptoms. Thus, the tendency for individuals endorsing lower levels of perceived social support at Time 1 to exhibit larger decreases in depressive symptoms could be a spurious association driven by the negative correlation between social support and depressive symptoms at Time 1 (i.e., regression towards the mean).

To examine this possibility, we included baseline scores as covariates of the change parameters (e.g., Connor et al., 2011; Crowe, Connor, & Petscher, 2009; Li-Grining, Votruba-Drzal, Maldonado-Carreño, & Haas, 2010). Time 1 depressive symptoms was entered as a covariate in the growth curve model. These results are summarized in the "Analysis 2" section of Table 3. This revealed two notable findings. First, when controlling for Time 1 depressive symptoms levels, only the ISEL-Belonging emerged as a significant predictor of change over time in depressive symptoms. Second, the direction of this

relationship (illustrated in Figure 2b), was opposite of the association between ISEL- Self-esteem and change over time when initial depressive symptoms level was not entered as a covariate. That is, higher levels of belonging at Time 1 were associated with slightly larger decreases in depressive symptoms over time.

To test our hypothesis that Time 1 depressive symptom levels would interact with Time 1 social support to predict change over time in depressive symptoms, social support x initial depressive symptoms interaction (product) terms were entered into the growth curve model (see "Analysis 3" sections of Table 3). None of these terms reached statistical significance, suggesting that initial depressive symptoms levels did not impact how social support predicted change over time in depressive symptoms[2].

IPV Victimization as a Predictor of Change in Depression

Time 1 IPV victimization also exhibited a substantial correlation with T1 depression (see Table 1). Therefore, to control for the biasing effects of baseline levels we again included Time 1 depression as a covariate of the change parameters in the growth models examining the impact of IPV victimization on change over time in depressive symptoms. When controlling for initial depressive symptoms levels (Analysis 4), higher IPV victimization was associated with smaller decreases in depressive symptoms over time (Figure 3). Finally, the Time 1 IPV victimization x Time 1 depressive symptoms interaction was not statistically significant (Analysis 5).

The Simultaneous Impact of Social Support and IPV Victimization on Change in Depression

To test the hypothesis that baseline IPV victimization levels would interact with baseline social support measures, the final analyses examined interactions between Time 1 social support and Time 1 IPV victimization. These analyses were conducted in a hierarchical manner. In the first step, Time 1 depressive symptoms, social support, and IPV victimization were entered into the regression equations predicting the change parameters. In the second step, social support x IPV victimization interaction terms were added. To save space and because many of the results of these analyses are redundant with those reported above, these results are only summarized. The most notable finding to emerge from the first step was that in the growth curve analyses, when the social support subscales, initial IPV victimization, and initial depressive symptom levels were included as predictors, only one significant predictor of change over time in depressive symptoms emerged- ISEL-Belonging. None of the other social support subscales nor IPV victimization were significant predictors of change over time in depressive symptoms.

Finally, no significant interactions between social support and IPV victimization predicting change over time in depressive symptoms emerged[3]. This suggests that initial levels of IPV

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[2]Including all main effects, interaction terms, and depression as a covariate, Model 3 contained nine predictor variables. Given power issues related to detecting interactions (e.g., McClelland & Judd, 1993), to protect against making a Type II error, we examined the interaction terms in separate models. Even when examined separately, none of the social support x initial depression level interactions approached statistical significance.
[3]Again (see footnote 3), to protect against the possibility of making a Type II error, we examined the IPV victimization x ISEL subscales in separate analyses. None of the interaction terms were statistically significant.

did not moderate the relationship between social support and change in depressive symptoms over time. In other words, initial level of IPV victimization did not impact how social support affected change over time in depressive symptoms[4].

Post-hoc/Follow-up Analyses

We checked for the effects of missingness on outcomes by employing Hedeker and Gibbons's (1997) random-effects pattern-mixture model by including a continuous variable (1–10) representing how many data points each participant had available as a Level-2 predictor of initial status and slope. Number of data points available was not significantly related to initial depression levels or change over time in depression. We also included the number of assessment points as a covariate in all analyses reported above, and the patterns of results were identical.

Discussion

Initial levels of depressive symptoms were negatively associated with initial levels of all four dimensions of social support (i.e., appraisal, self-esteem, belonging, and approach). However, the central finding of the current study was that belonging, or the perceived availability of people one can do things with, was the only dimension of social support that predicted changes in depressive symptoms during the approximately 4.5 years following attempts to obtain help for IPV, with higher levels of belonging associated with larger decreases in depressive symptoms when controlling for initial depressive symptom levels. In addition, findings indicated that: (1) the impact of social support on change in depressive symptoms over time was not moderated by initial depressive symptoms levels, (2) the impact of social support on change in depressive symptoms remained significant when controlling for initial levels of IPV victimization and was not moderated by initial levels of IPV victimization, and (3) the association between initial levels of IPV victimization and change over time in depressive symptoms (higher levels of IPV associated with smaller decreases in depressive symptoms) was no longer statistically significant when controlling for belonging support.

The finding that belonging support predicted changes in depressive symptoms over time is consistent with recent findings of Beeble and colleagues (2009) who found that women's reports of satisfaction with quality and quantity of a variety of types of social support predicted larger decreases in depressive symptoms during the 1.5 years following attempts to obtain help. The current findings extend those of Beeble et al. by identifying perceived ability of people one can do things with (i.e., belonging) as the crucial aspect of social support that predicts changes in depressive symptoms. This is consistent with the findings of Schonfeld (1991) who also found that belonging was the only dimension of social support that predicted changes in depressive symptoms across time in a sample of college students. The current study demonstrated the robustness of this effect by replicating this finding in a more at-risk sample, women seeking assistance for IPV.

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[4]Because no statistically significant social support x CTS interactions emerged, to save space we did not include the results of these analyses in Table 3.

The replicated finding that belonging is the only dimension of social support that predicts changes in depression across time is consistent with the activation hypothesis underlying behavioral activation approaches to the treatment of depression (e.g., Jacobson et al., 1996). This hypothesis purports that the crucial mechanism of change occurring during treatment of depression is instigating clients to become active again by putting themselves in contact with available sources of reinforcement. It is likely that having a source of social support available to do things with would help individuals become active, increasing their contact with sources of reinforcement leading to a reduction in depressive symptoms. Future research carefully measuring activity levels, social support, and depressive symptoms is needed to empirically test increased behavioral activation as a mediator of the relationship between belonging and decreases in depression.

Although the central finding of the current study is consistent with the findings of Beeble et al. (2009), one important difference is worthy of discussion. Beeble et al. reported no significant associations between initial depressive symptom levels and changes in depressive symptoms over time ($r = -.04$), while this association was significant and substantial in the current study ($r = -.56$), indicating individuals with higher initial depression levels tended to exhibit larger decreases in depression. The results of the current study also indicated that this association was important, as the association between social support and change in depressive symptoms was dramatically different when controlling for initial symptom levels. Only when we included initial depressive symptoms as a covariate did our results match those of Beeble and colleagues, who did not control for initial depressive symptoms. Given the similarity between the samples of the two studies, that the same measure of depressive symptoms was utilized (CES-D), and that participants reported similar initial levels of depressive symptoms[5], it is unclear why the association between initial status and change over time in depressive symptoms was significant in the current study and not in the prior investigation. The most likely explanation is the timing of the first assessment. In the current study, the initial assessment occurred in the initial stages of a DV shelter stay, at the point of application for a personal protection order, or as the participant was leaving the courtroom from the final disposition of a criminal case against her assailant. These are all extremely stressful points in the lives of women who experience intimate partner violence - points at which depression and other symptoms are likely to be extremely elevated. On the other hand, Beeble et al. conducted the first assessment some time following departure from a shelter, when stress levels and associated depressive symptoms were likely not as elevated as in the current study. Regardless of the reason for the difference, we feel that this highlights an important methodological issue. When initial status is significantly associated with change over time in the outcome variable and one is interested in examining the effect of a predictor variable that is significantly associated with initial status of the outcome, it is important to control for initial status when examining change over time. The biasing effect of baseline scores on change over time has been discussed for several decades (e.g., Blomqvist, 1977; Cook & Campbell, 1979; Cook & Steiner, 2010; Kessler & Greenberg,

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[5]Beeble and colleagues (2009) used a non-standard scoring algorithm for the CES-D. Based on the description of the scoring procedures utilized, converting their scores using the standard scoring procedures of the CES-D results in a mean of 27.8 at the initial assessment (slightly lower than but comparable to M = 31.54 of the current study) and a standard deviation of 11.8 (comparable to SD = 12.15 of the current study).

1981). However, there is a dearth of examples describing how to control for the impact of baseline scores on change over time in naturalistic studies of psychopathology using multilevel growth curve analyses. The very different association between social support at T1 and change over time in depression that emerged in the models with and without T1 depression included as a covariate provides a concrete demonstration of the importance of evaluating the potentially biasing effects of baseline levels of the outcome variable when change over time is correlated with baseline levels.

A few methodological limitations should be noted. First, social support was not assessed at each assessment occasion. Therefore, we could not investigate the temporality of the relationship between social support and depressive symptoms. Research with PTSD symptoms as an outcome suggests that multiple processes are at play. Social support appears to be a protective resource against future symptoms. However, at the same time psychopathology sometimes results in the erosion of social support (King, Taft, King, Hammond, & Stone, 2006; Laffaye, Cavella, Drescher, & Rosen, 2008). More longitudinal research combined with quantitative methodologies that can make inferences about the temporality of the relationship between two variables across time (e.g., bivariate latent difference score modeling, see King et al., 2006) is needed to elucidate the complex relationship between adjustment and social support; in particular, research examining the effect of depressive symptoms on later social support.

Second, the ISEL, the measure of social support used in the current study, is a measure of *perceived* social support. The actual presence of sources of social support was not assessed. Future research attempting to further elucidate the exact mechanisms involved in the social support-depressive symptom association should include both subjective (perceived) and objective measures of multiple types of social support. Finally, the generalizability of the findings needs to be investigated in future research. As noted above, the initial assessment occurred in the initial stages of a DV shelter stay, at the point of application for a personal protection order, or as the participant was leaving the courtroom from the final disposition of a criminal case against her assailant- stressful situations that make it likely that depression levels were elevated and access to social support might be compromised. Thus, research is needed to assess whether or not the current findings would replicate: 1) when social support is assessed at different times and in different contexts, and 2) in samples of IPV survivors who did not seek assistance from shelters and the legal system. In addition, because the sample consisted of primarily low-income, urban, African American women seeking help for IPV victimization, the generalizability of the current findings needs to be established via replication across other samples. This is particularly important given the increased recognition that gender, class, and race represent three separate forms of oppression that can interact to shape the lives of IPV survivors in a complex manner (e.g., Sokoloff & Dupont, 2005). Not only do results have to be replicated across diverse samples, but to fully understand the potential synergistic effects of gender, class, and race, studies incorporating sophisticated sampling and recruitment strategies are needed to adequately test interactions among these variables and different types of social support across a range of important contextual factors. We also acknowledge that there are many other factors (e.g., personality variables, psychological treatment, subsequent IPV victimization) that fall outside of the

scope of the current study that are likely related to changes in depression among IPV survivors and encourage future multivariate research to investigate predictors of depression in IPV samples. Finally, due to our screening criteria and given the co-occurrence of IPV, mental illness and substance abuse, the results of this study may not generalize to those with serious addictions or serious mental illnesses.

Despite these limitations, our findings have theoretical and methodological implications that can help guide future research. Belonging was identified as an aspect of social support that is uniquely predictive of changes in depressive symptoms, and suggests behavioral activation as a potential mechanism explaining the social support-depressive symptom association. Study results also demonstrated the importance of controlling for initial symptom levels in samples when the following three conditions are present: (a) there is considerable variability in the outcome variable of interest at the initial assessment occasion, (b) initial status of the outcome variable is correlated with change over time, and (c) the predictor of interest is correlated with the outcome variable at the initial time point. In these situations, not controlling for initial symptom levels can lead to spurious associations between the predictor and change over time in the outcome that is merely driven by the initial association between the predictor and outcome.

While the inverse relationship between social support and psychopathology is one of the most consistent associations observed in trauma research (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003), there is a relative dearth of empirical investigations of specific factors that account for and impact this relationship. We hope that the results of the current finding inform future research endeavors further elucidating mediators and moderators of association between social support and depressive symptoms.

Finally, the findings of the current study suggest that interventions should consider ways to get survivors connected to informal/social networks. Perceived availability of people one can do things with (i.e., belonging support) was the only dimension of social support that exhibited potential salutary effects. Thus, getting survivors of intimate partner involved with organizations such as knitting circles, sports clubs, book clubs may represent an important component of a comprehensive approach to increasing the health and well being of this socially isolated and oppressed group (Goodman & Smyth, 2011). In addition, the results of the current study are consistent with research demonstrating that women victims of IPV benefit from advocacy programs (e.g., Bell & Goodman, 2001; Sullivan et al., 1992) as well as group interventions that primarily focus on increasing women's social support (Constantino et al., 2005; Tutty et al., 1996).

Acknowledgments

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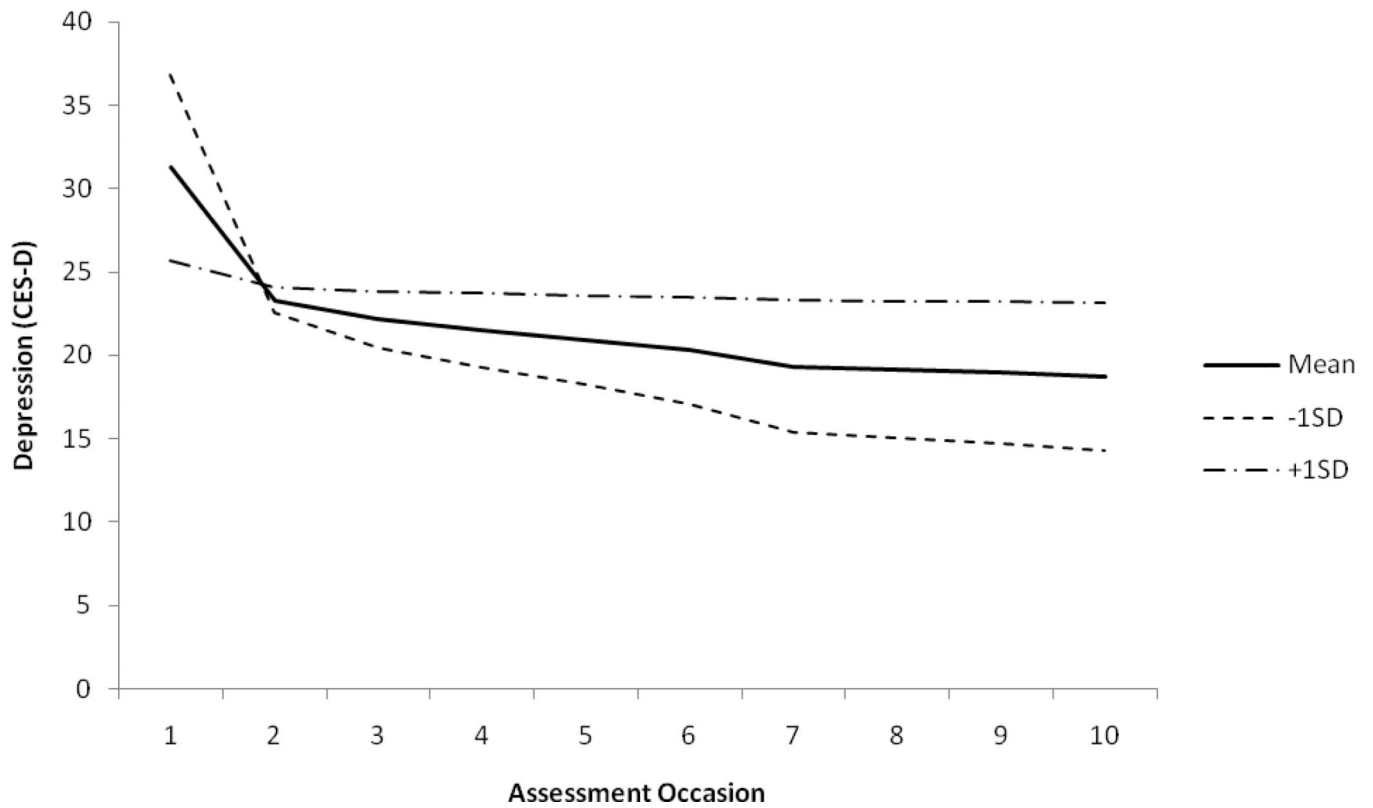
Figure 1.
Depiction of the unconditional change model with Time modeled as the natural log transformation of the number of days since the initial assessment. The solid line depicts the mean level of change across all participants. The dashed lines are included to illustrate the variability in change present in the sample and depict change at 1 SD above and below the mean level of change. Note: Because the mean of the slope paramter was negative 1 SD below the mean represents faster (steeper) decreases, while 1 SD above the mean represents slower (flatter) decreases.

Figure 2.
2a illustrates the effect of social support (ISEL-Self-esteem; SE) on change over time in depressive symptoms without Time 1 depressive symptoms included as a covariate. The solid line depicts change over time for individuals scoring 1 SD above the Time 1 ISEL-SE mean, while the dashed line depicts change over time in depressive symptoms for individuals scoring 1 SD below the Time 1 ISEL-SE mean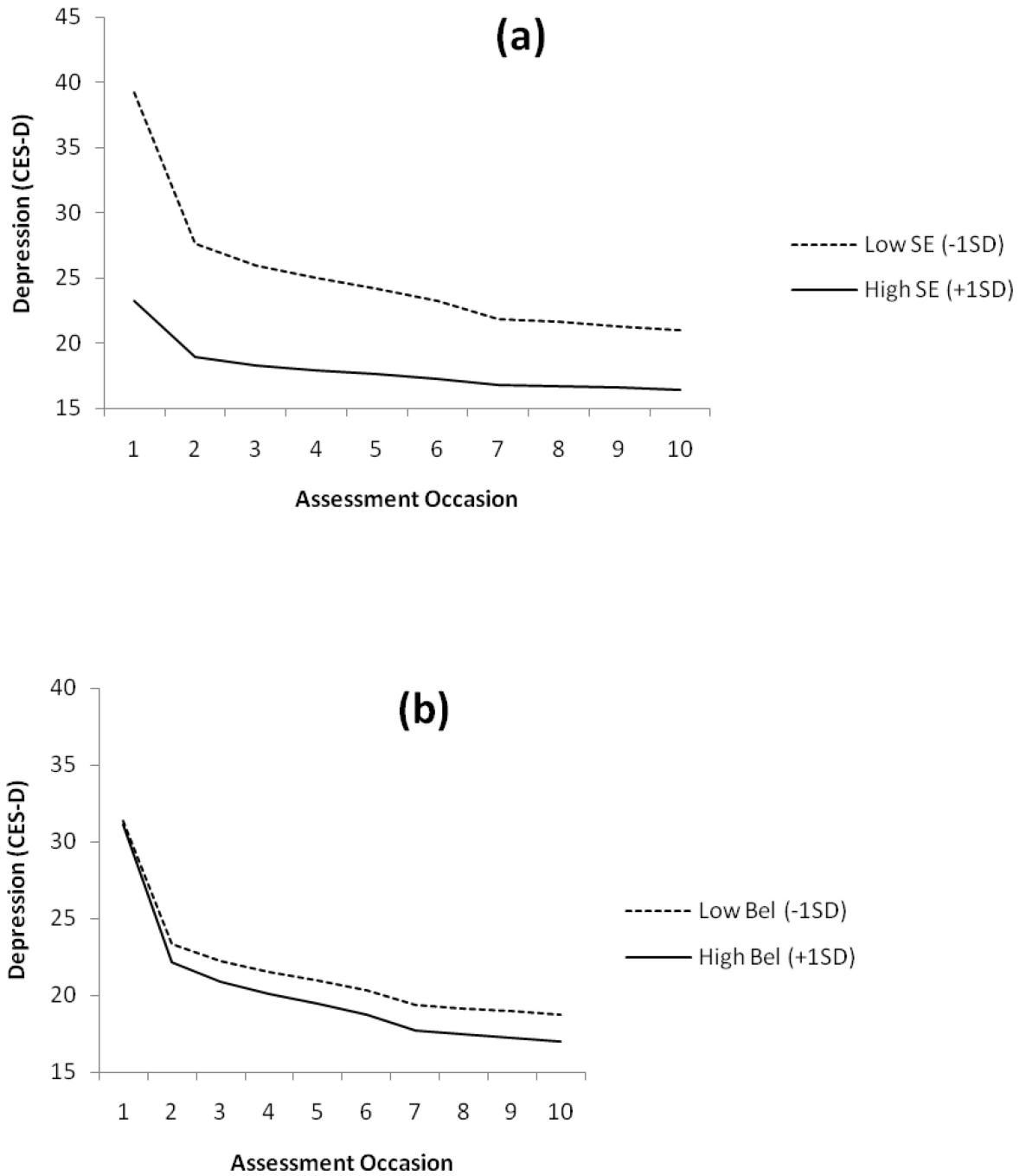. 2b illustrates the effect of social support (ISEL-Belonging; Bel) on change over time in depressive symptoms with Time 1 depressive symptoms included as a covariate. The solid line depicts change over time for

individuals scoring 1 SD above the Time 1 ISEL-belonging mean, while the dashed line depicts change over time in depressive symptoms for individuals scoring 1 SD below the Time 1 ISEL-belonging mean.

Figure 3.
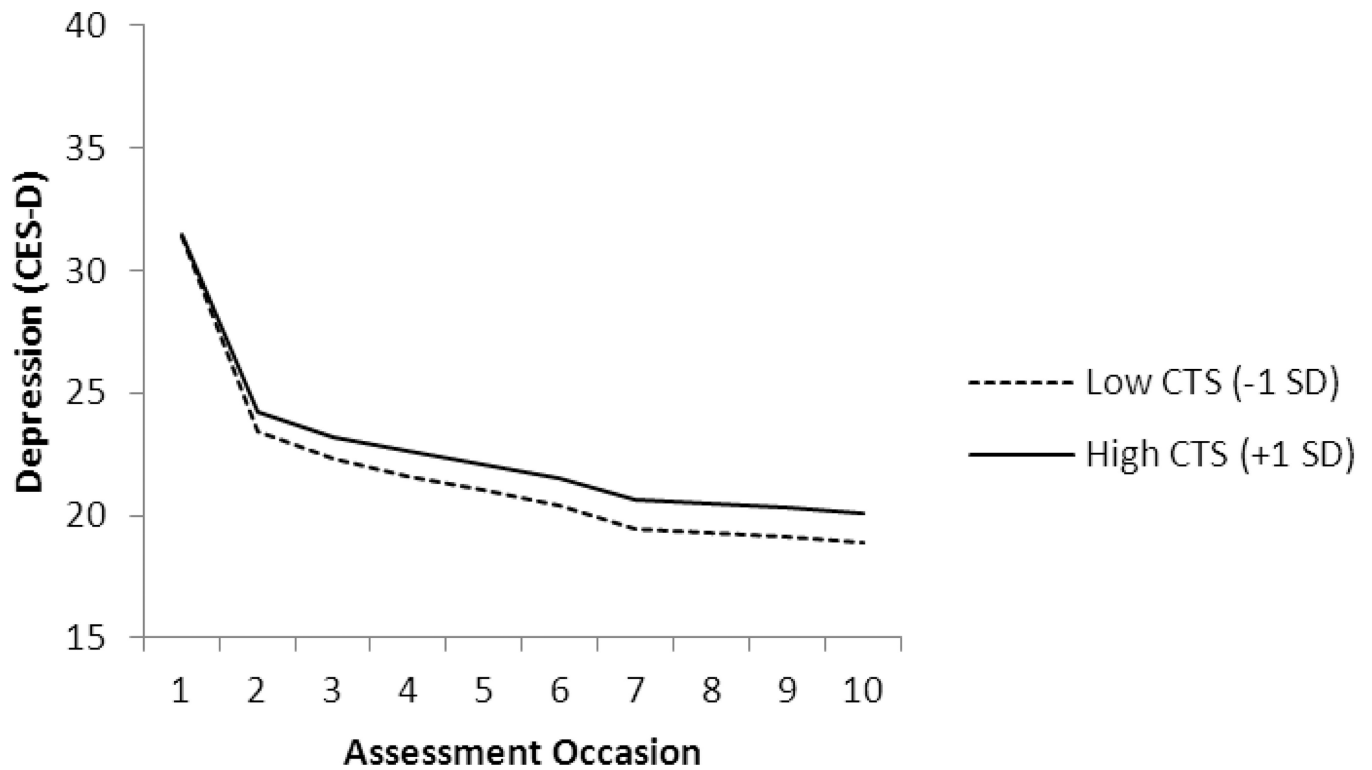Illustrates the effect of IPV victimization on change over time in depressive symptoms with Time 1 depressive symptoms included as a covariate. The solid line depicts change over time for individuals scoring 1 SD above mean level Time 1 IPV victimization, while the dashed line depicts change over time in depressive symptoms for individuals scoring 1 SD below mean level Time 1 IPV victimization.

Table 1

Descriptive Statistics and Intercorrelations among Study Variables at Time 1

Variable	1	2	3	4	5	6	M	SD
1. Depression (CES-D)	---						31.54	12.15
2. ISEL- Appraisal	−.29*	---					6.82	2.70
3. ISEL- Belonging	−.33*	.61*	---				6.54	3.04
4. ISEL-Self Esteem	−.49*	.46*	.61*	---			6.82	2.36
5. ISEL-Tangible	−.32*	.61*	.74*	.60*	---		6.96	2.88
6. IPV Victimization (CTS)	.41*	−.20*	−.22*	−.26*	−.22*	---	5.94	3.18

Note.

*
p < .001;

M = mean; *SD* = Standard deviation; CES-D = Center for Epidemiologic Studies Depression Scale; ISEL = Interpersonal Support Evaluation List; IPV =Intimate Partner Violence; CTS = Conflict Tactics Scale.

Table 2

Descriptive Statistics for CES-D at Each Assessment

Assessment Ocassion	N	% (388)	# of days M	# of days SD	CES-D M	CES-D SD
1	388	100	0.00	0.00	31.54	12.14
2	276	71	95.83	21.24	23.29	11.94
3	271	70	186.10	20.11	21.13	11.87
4	274	71	276.66	23.67	21.04	12.34
5	315	81	378.90	55.74	19.87	12.43
6	239	62	550.23	60.83	19.39	11.97
7	242	62	948.07	105.49	20.94	11.31
8	197	51	1053.21	38.40	18.54	10.52
9	215	55	1186.24	48.14	19.96	11.37
10	241	62	1343.69	72.36	20.08	11.84

Note: M = mean; SD = Standard deviation; CES-D = Center for Epidemiologic Studies Depression Scale; # of days = number of days since baseline assessment.

Table 3

Summary of Regression Analyses Predicting Change Over Time in Depressive Symptoms

Analysis Predictor	Intercept^y			Change Over Time		
	b	t	pr	b	t	pr
Analysis 1: Social Support as a Predictor of Change in Depression						
Intercept	22.22	50.54	.93	−1.74	−18.00	.68
ISEL–Appraisal	−0.17	−0.79	.04	0.04	0.93	.05
ISEL–Belongingness	−0.62	−2.64	.13	−0.10	−1.89	.10
ISEL– Tangible	0.19	0.77	.04	0.04	0.73	.04
ISEL–Self Esteem	−0.83	−3.41	.17	0.29 ***	5.47	.27
Analysis 2: Social Support as a Predictor of Change in Depression Controlling for Initial Depression Levels						
Intercept	22.22 ***	56.23	.94	−1.75	−23.34	.77
T1 Depression Symptoms	0.38 *	9.80	.45	−0.12	−16.11	.64
ISEL–Appraisal	−0.03	−0.14	.01	−0.01	−0.15	.01
ISEL–Belongingness	−0.63 **	−3.14	.16	−0.11 **	−2.91	.15
ISEL– Tangible	0.22	0.97	.05	0.04	1.06	.05
ISEL–Self Esteem	0.04	0.16	.01	0.02	0.37	.02
Analysis 3: Social Support x Initial Depression Level Interaction Predicting Change in Depression						
Intercept	22.18 ***	49.20	.93	−1.73 ***	−20.16	.72
T1 Depression Symptoms	0.37 ***	9.13	.42	−0.12 ***	−15.45	.62
ISEL–Appraisal	−0.02	−0.09	.00	0.00	−0.12	.01
ISEL–Belongingness	−0.64 **	−3.15	.16	−0.11 **	−2.97	.15
ISEL– Tangible	0.21	0.93	.05	0.04	0.95	.05
ISEL–Self Esteem	0.04	0.18	.01	0.02	0.35	.02
ISEL–Appraisal x Depression	−0.02	−1.58	.08	0.00	−1.71	.09
ISEL–Belongingness x Depression	0.01	0.75	.04	0.00	0.49	.03
ISEL– Tangible x Depression	0.01	0.46	.02	0.00	1.13	.06
ISEL–Self Esteem x Depression	0.00	−0.14	.01	0.00	−0.05	.00
Analysis 4: IPV Victimization as a Predictor of Change in Depression Controlling for Initial Depression Levels						
Intercept	22.26 ***	55.16	.94	−1.74 ***	−22.92	.76
T1 Depression Symptoms	0.38 ***	10.59	.48	−0.12 ***	−17.66	.67

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Analysis	Predictor	Intercept[y]			Change Over Time		
		b	t	pr	b	t	pr
	IPV Victimization	0.31 *	2.24	.11	0.05 *	1.98	.10
Analysis 5: IPV Victimization x Initial Depression Level Interaction Predicting Change in Depression							
	Intercept	22.43 *	52.68	.94	−1.70 ***	−21.12	.73
	T1 Depression Symptoms	0.38 ***	10.46	.47	−0.12 ***	−17.58	.67
	IPV Victimization	0.30 *	2.22	.11	0.05 *	1.97	.10
	IPV Victimization x Depression	−0.01	−1.12	.06	0.00	−1.15	.06

Note.

*
indicates $p < .05$,

**
indicates $p < .01$,

***
indicates $p < .001$;

b = unstandardized regression coefficient; t = t-statistc (estimate/standard error of estimate); pr = partial correlation coefficient, .10, .24, and .37 for small, medium, and large effect sizes respectively, Kirk (1996); ISEL = Interpersonal Support Evaluation List; IPV =Intimate Partner Violence.

[y]the time variable was centered at the mean natural-log transformed number of days such that the intercept can be interpreted as depression levels at day 192.[z] Main effects of each predictor variable were included in the interaction analyses. However, for brevity, we only reported the coefficients for the interaction terms.