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Social Support, Negative Social Exchange, and Response to Case Formulation Based Cognitive Behavior Therapy

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Abstract

We investigated associations between pre-treatment social support, negative social exchange, and slope of weekly symptom change for depression, anxiety, and stress over the course of ideographic, case formulation based, cognitive behavior therapy. Participants were 74 adults treated in a private practice setting. We used self-report measures to assess social support and negative social exchange at intake, and to assess symptoms on a weekly basis. At pre-treatment, a higher level of social support was associated with lower levels of depression, and a higher level of negative social exchanges was associated with higher levels of depression and stress. Pre-treatment social support was not significantly associated with slope of symptom change. However, a higher level of pre-treatment negative social exchanges was associated with steeper slope of change in symptoms of depression and stress during treatment. These findings suggest that the association between pre-treatment negative social exchanges and subsequent symptoms may be stronger than that of social support and subsequent symptoms. Additionally, we discuss the possibility that having data on negative social exchanges at the start of treatment may benefit the outcome of ideographic, case formulation based, cognitive behavior therapy.

Keywords

social support; negative social exchange; treatment response; case formulation

Although a variety of empirically supported treatments for anxiety and depression now exist, sustained, favorable response to cognitive behavior therapy (CBT) is estimated at 50–60% on average (Fava et al., 2004; Loerinc et al., 2015). There is a need to enhance the effectiveness of our interventions by developing and honing targeted therapeutic approaches as well as by working to enhance our understanding of extra-therapeutic factors that may impact treatment response. Extra-therapeutic factors, which may be transdiagnostic in their relationship to treatment response, are particularly useful for informing case formulation based, ideographic CBT (Persons et al., 1999; Persons et al., 2006), which allows the

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therapist to flexibly attend to psychosocial factors thought to be implicated in a patient's presenting problems. The quality of the patient's social support system is one such potential factor.

The construct "social support" encompasses emotional and practical support provided by an individual's social network. The patient's perception of available support (i.e., perceived social support) is positively correlated with quality of life (Cohen & Wills, 1985; Uchino, Cacioppo, & Kiecolt-Glaser, 1996) and is a stronger correlate of well-being than objective assessments of support (e.g., number of close friends; Sarason, Sarason, & Pierce, 1990). A longitudinal study and factor analysis of self-reported social support and depression found social support and depressive symptoms to be related but separate constructs (Blazer & Hughes, 1991). Further longitudinal research suggests that a lack of social support may increase vulnerability to psychiatric disorder onset (e.g., Brown & Harris, 1978; Sherbourne & Hays, 1990) or a poorer course of illness for individuals already diagnosed with a depressive disorder (Moos, Cronkite, & Moos, 1998). There is a wealth of research illustrating the positive association between social support and well-being, yet the empirical literature paints a fairly complex picture of the association between support and treatment response. Some investigators have found that a high level of perceived social support enhances an individual's response to treatment (e.g., Brown, Alpert, Lent, Hunt, & Brady, 1988; LaRocca & Scogin, 2015) and have suggested that changes in social support may mediate improvements in depression and anxiety occurring in treatment (Dour et al., 2014). However, others have found a link between only specific sources of support and treatment outcome (e.g., support from a spouse but not from close friends; Ezquiaga, García, Bravo, & Pallarés, 1998), and others have suggested that pre-treatment social support may be differentially related to treatment response depending on the specific treatment a patient receives (e.g., with individuals reporting high levels of pre-treatment support benefitting more from CBT than from an emotion focused therapy; Beckner, Howard, Vella, & Mohr, 2010). Additionally, other investigators have found no association between support and treatment outcome (e.g., Paykel, Cooper, Ramana, & Hayhurst, 1996). Furthermore, as summarized by Kawachi and Berkman (2001), the relationship between social support and treatment outcome may depend on a patient's specific circumstances and difficulties. For instance, while social support may help some individuals feel more resilient, it may increase a sense of helplessness for others (Berkman & Glass, 2000; Lee, 1985). Additionally, supportive individuals may unwittingly reinforce anxious patients' avoidance or safety behaviors, thereby potentially undermining their treatment (Friedman, 1987).

Negative social exchange (also termed "social negativity", "social conflict, and "social strain" among other terms) has received less empirical attention than social support. The construct "negative social exchange" is thought to encompass an individual's perceptions of negative social experiences that may lead to concerns about one's relationships and may, thereby, increase vulnerability to mood shifts and increased psychiatric symptoms (Lakey, Tardiff, & Drew, 1994; Rook, 1990). Notably, these negative social exchanges may involve perceptions of active negative behaviors (e.g., expressing anger or criticizing) or passive negative behaviors (e.g., appearing to be bored) on the part of members of the individual's social network (Finch, Okul, Ruehl, & Kuehlman, 1999). Perceived negative social exchange has been found to be partially independent from social support (Rook, 1984), and is related

to the construct of perceived criticism (perceptions of criticism coming from close others), which is one of the active negative behaviors included under the rubric of negative social exchange. Both social support and negative social exchange have been found to be significantly correlated with measures of affect and with symptoms of depression, after controlling for personality and coping style preference variables (e.g., Finch, Okul, Ruehl, & Kuehlman, 1999). Negative social exchange may be a more powerful predictor of negative affect and next day mood than social support (DeLongis et al., 2004; Newsom, Nishishiba, Morgan, & Rook, 2003; Pagel, Erdy, & Becker, 1987; Rook, 2001), and some investigators have proposed that cognitive bias toward perceiving criticism may increase both, negative social exchange and negative affect (Smith & Peterson, 2008). As with social support, the literature on negative social exchange and related constructs suggests a complex relationship to treatment response. For instance, a higher level of perceived criticism has been found to be associated with poorer anxiety treatment outcomes (Chambless et al., 2017; Renshaw, Chambless, & Steketee, 2003). Yet, there is evidence that increased pressure from family members is associated with increased likelihood of treatment completion (Fogler, Tompson, Steketee, & Hofmann, 2007; Hansen, Hoogduin, Schaap & de Haan, 1992). Thus, although research suggests that perceived social support generally exerts a positive effect on well-being while negative social exchange generally exerts a negative effect, the relationships between support, negative social exchange, and psychiatric symptoms in the context of treatment may be complex and individually variable.

Attending to the relationships between social support and negative social exchange and treatment response may be particularly useful in ideographic, case formulation based CBT, which is an approach to delivering CBT interventions that has been found to have outcomes comparable to those of protocol-based randomized controlled trials (Persons, Bostrom, & Bertagnolli, 1999; Persons, Roberts, Zalecki, & Brechwald, 2006). As summarized by Persons and colleagues (2006; 2008), in ideographic, case formulation based CBT, the therapist integrates various types (e.g., self-report, observational, etc.) of data into a patient's formulation (i.e., a coherent model consisting of hypotheses about the mechanisms driving the patient's presenting problems and the relationships between these problems) and then uses that formulation to select empirically supported interventions that have been shown to be effective in targeting the mechanisms identified by the therapist. Ideographic, case formulation-based CBT differs from a protocol driven approach to CBT in a number of ways, including the following: the therapist's selection of empirically based interventions is driven by an individualized formulation rather than by the structures of a protocol; formulations include information about diagnoses but also psychosocial difficulties and non-clinical concerns the patient may wish to address in treatment; and the therapist monitors the patient's progress in treatment and adjusts the formulation and treatment plan as indicated by progress monitoring and clinical observations (e.g., Persons, 2008). Because this approach is ideographic, it involves attending to each individual patient's context and presenting difficulties, thereby potentially yielding different formulations for the roles of social support and negative social exchange for different patients (e.g., Kawachi and Berkman, 2001). For instance, awareness of the individual patient's cultural and family context may help the therapist hypothesize that a high level of social support is protective for one patient and that it may reinforce the belief "I am incompetent" in another patient.

Differing formulations of the roles played by social support and negative social exchange would, in turn, lead to individually targeted treatment plans based in those formulations.

In sum, there is a need for further research to expand our understanding of the association between social support, negative social exchange, and anxiety and depression symptom change over the course of treatment. Assessing this association in the context of case formulation based, ideographic CBT may be particularly beneficial as this approach to treatment allows for flexibility and the use of carefully selected, empirically supported interventions, based on each patient's unique formulation. Consequently, if we are able to better understand whether pre-treatment social network quality relates to treatment outcome, we may have a better sense for how important it is to integrate this information into formulations of future patients, potentially using such formulations to create more targeted and effective treatment plans. The present study was designed to assess whether pre-treatment social support and negative social exchange are related to weekly symptom change in outpatient, ideographic, case formulation-based CBT (Persons, 2008). We were specifically interested in the relationship between pre-treatment perceived social support and pre-treatment negative social exchange, and the slope of change in depression, anxiety, and stress symptoms measured weekly over the course of treatment.

Methods

Participants

Participants were selected and data gathered via chart review. Study participants were 74 adult patients who started treatment with study author PE or her colleagues (Dr. Jacqueline Persons and Dr. Janie Hong) from 2011 to 2016 at the San Francisco Bay Area Center for Cognitive Therapy, or the Cognitive Behavior Therapy and Science Center (both located in Oakland, California). Participants whose data were included met the following criteria: age 18 or older; provided informed consent for their de-identified clinical data to be used for research purposes; completed the Medical Outcomes Study Social Support Survey (MOS-SSS; Sherborne & Stewart, 1991) and/or the Test of Negative Social Exchange (TENSE; Ruehlman & Karoly, 1991; Finch, Okul, Ruehl & Kuehlman, 1999) at intake; had at least three sessions of Depression Anxiety and Stress Scales (DASS; Lovibond & Lovibond, 1995) data in the medical record.

Table 1 presents demographic information for our sample. Initial diagnoses for each participant were provided by their treating psychologist and were based on baseline self-report measures and clinical judgement. Of our 74 participants, all were diagnosed with at least one DSM-IV disorder at intake, and 46 (62.16%) were given two or more diagnoses. Initial diagnoses reported were: major depressive disorder ($n = 34$), generalized anxiety disorder ($n = 19$), social anxiety disorder ($n = 18$), insomnia disorder ($n = 7$), post-traumatic stress disorder ($n = 6$), obsessive-compulsive disorder ($n = 5$), panic disorder ($n = 5$), agoraphobia ($n = 5$), attention-deficit/hyperactivity disorder ($n = 5$), adjustment disorder ($n = 2$), substance use disorder ($n = 5$), hypochondriasis ($n = 3$), unspecified anxiety disorder ($n = 3$), bipolar I disorder ($n = 3$), bipolar II disorder ($n = 2$), unspecified bipolar disorder ($n = 3$), binge-eating disorder ($n = 1$), and autism spectrum disorder ($n = 1$). Of our participants, 50% were receiving adjunct psychopharmacological treatment.

Measures

Social Support—The Medical Outcomes Study Social Support Survey (MOS-SSS; Sherborne & Stewart, 1991) is a 19-item self-report measure assessing the availability of four types of social support: emotional/informational (e.g. “someone to give you good advice”), tangible (e.g. “someone to help you if you were confined to bed”), affectionate (e.g. “someone who shows you love and affection”), and positive social interaction (e.g. “someone to have a good time with”). Items are rated on a 1 (“none of the time”) to 5 (“all of the time”) scale. Subscale scores for each of the four types of functional support measured were calculated by averaging scores on the items in each subscale. An overall social support score was then calculated by averaging the four subscale total scores. The MOS-SSS has high internal consistency and test-retest reliability (Sherborne & Stewart, 1991), and the present sample also demonstrates high internal consistency (emotional/informational support $\alpha = 0.95$, tangible support $\alpha = 0.97$, affectionate support $\alpha = 0.95$, and positive social interaction $\alpha = 0.94$).

Negative Social Exchange—The revised 24-item Test of Negative Social Exchange (TENSE; Ruehlman & Karoly, 1991; Finch, Okul, Ruehl & Kuehlman, 1999) assesses various types of negative social exchange, with all items ultimately falling under the overarching categories of anger (behaviors the individual perceives as reflecting anger or hostility), interference/hindrances (behaviors the individual perceives to be getting in the way of their pursuing personally important goals), and insensitivity (behaviors the individual perceives to reflect disengagement and detachment) from significant others in the individual’s social network. Participants rate how frequently in the last month they experienced such negative exchanges (e.g., “lost his/her temper with me”; “was rude to me”; “reminded me of my past mistakes”; “was cold towards me”; etc.) from 0 (“Not at all”) to 9 (“Frequently”). Values are summed into a composite indicator of negative social exchange. Internal consistency of the TENSE is adequate (Ruehlman & Karoly, 1991; Finch, Okul, Ruehl & Kuehlman, 1999) and very high in the present sample ($\alpha = 0.95$).

Depression, Anxiety, and Stress—The Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) consists of 21 Likert-scale items assessing indicators of depression (e.g. “felt downhearted and blue”), anxiety (e.g. “felt I was close to panic”), and stress (e.g. “found it hard to wind down”) based on Watson & Clark’s tripartite model (1991). Items are rated from 0 (“did not apply to me at all”) to 3 (“applied to me very much”) and summed into separate depression, anxiety, and stress subscales. The three DASS subscales (depression, anxiety, and stress) demonstrate adequate convergent and discriminant validity with other measures of anxiety and depression, high internal consistency, and high test-retest reliability despite sensitivity to treatment-related changes (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown, Chorpita, Korotitsch & Barlow, 1997). Our sample also showed high internal consistency across subscales (depression $\alpha = 0.90$, anxiety $\alpha = 0.76$, and stress $\alpha = 0.85$).

Procedure

This study was a chart review conducted in the context of a group private practice setting and was approved by the Behavioral Health Research Collective Institutional Review Board.

All patients starting treatment from 2011 to early 2016 were invited to consider giving permission for their de-identified clinical data to be used as part of our research, and all patients were assured that their decision on this point would not impact their clinical care in any way.

All study participants received ideographic case formulation-based CBT, which involves the use of hypotheses about mechanisms involved in the maintenance of each individual patient's presenting problems and a formulation explaining how those mechanisms and problems may be linked (see Persons, 2008). The three therapists whose patient data were included in the present study operated independently, but all three began treatment by collecting data from their patients via self-report measures (including measures assessing symptoms, social support, and negative social exchange) and clinical interview. Based on data collected prior to and during the beginning stages of treatment, each therapist developed a model of each patient's presenting difficulties, anchored in cognitive behavioral mechanisms (e.g., anxiety sensitivity, emotion dysregulation, intolerance of uncertainty, etc.) hypothesized to be driving these difficulties. The therapist and patient then worked together to target hypothesized mechanisms using empirically based CBT strategies. Ideographic case formulation-based CBT typically incorporates regular progress monitoring, allowing therapists to continually assess treatment response and to change their approach when progress is not made, and this was the approach utilized in the present study. Patients whose data were included in this study completed the DASS weekly, allowing therapists and patients to have ongoing, weekly feedback regarding symptom change and treatment progress (or lack of progress). Study data were culled from patient records by their treating therapists and assigned a study ID number prior to being shared with other members of the research team. We utilized weekly DASS data from either the full course of treatment or the first 30 sessions of treatment, whichever came first, based on research indicating that most symptom change tends to occur early in treatment (e.g., Ilardi & Craighead, 1994). Participants completed between 3 and 30 sessions of treatment ($M = 17.32$, $SD = 9.36$).

Data Analysis

In preliminary analyses, we examined the correlation of negative social exchange with social support measures to assess convergent and divergent validity in the present sample. Negative social exchange was moderately correlated with emotional support ($r = -0.42$, $p = 0.01$) but not significantly correlated with tangible support ($r = -0.21$, n.s.), affectionate support ($r = -0.10$, n.s.), and positive interaction ($r = -0.17$, n.s.), suggesting that, as in previous research (e.g., Rook, 1984), the measures of support and negative social exchange in our study appeared to be assessing related but separate constructs.

Considerable extant literature suggests non-linear improvement during psychotherapy (e.g., Hayes et al., 2007), such that most clinical improvement occurs early in the course of treatment (e.g., Ilardi & Craighead, 1994). Mixed effect (i.e., multilevel) regression with full information maximum likelihood estimation was used to evaluate linear and non-linear change in depression, anxiety, and stress symptoms over the course of treatment while adjusting for the hierarchical nature of treatment data where assessments over time are nested within individuals (Raudenbush & Bryk, 2002). A best fit model of change in each

symptom scale was developed by successively adding higher-order polynomials to describe the average trajectory of weekly symptom change over time. In this analytic framework, the association of symptom severity with time and higher-order polynomials describes change in symptom severity over time (see Supplement for further detail). For example, the association of time with depression symptom severity describes linear change in depression symptoms over the course of psychotherapy treatment while the association of depression symptom severity with time squared describes quadratic change over time.

Random effects were subsequently added to evaluate inter-individual heterogeneity in baseline symptom severity and change in symptoms over time. The analytic models included correlations among random effects to adjust for any association of baseline symptom severity with change over time (see Supplemental Table 1). For example, in our sample, the linear slope of change in depression symptoms was negatively correlated with baseline depression severity ($r = -0.73$), suggesting that elevated baseline depression was associated with greater change over time, and this was addressed by including a statistical adjustment in the models used to examine moderation effects of social support and negative social exchange. Following evidence of inter-individual heterogeneity, baseline negative social exchange and social support were added as a main effect and cross-level interaction to evaluate whether baseline negative social exchange or support moderated symptom change during treatment.

Moderation refers to a case in which the association between two variables (e.g., depression symptoms and time) varies as a function of a third variable (e.g., social support) (see Judd, Kenny, & McClelland, 2001 for review). For example, the linear slope of depression symptoms over time describes change in depression symptoms (i.e., the bivariate association of depression symptom severity with time). If the linear slope varies as a function of baseline social support or negative social exchange, social support or negative social exchange would be said to moderate the association of depression symptom severity with time (see Supplement). Moderation by support was evaluated as i) a composite total average of support subscales and ii) each subscale score. Support subscales were assessed independently due to high inter-correlation (r 's = 0.45–0.65). As a between-person, so-called *level 2* variable, baseline negative social exchange or support were grand mean centered. Whereas there is yet no consensus regarding standardized regression weights in mixed effects regression, 95% confidence intervals are provided.

Preliminary analyses examined age, sex, marital status, employment, and student status as possible covariates. T-test and ANOVA analyses were used to examine differences in baseline depression, anxiety, or stress as a function of these covariates. Sex, $t(62.83) = -2.09$, $p = 0.04$, and student status, $F(1, 70) = 3.93$, $p = 0.05$, were marginally associated with depression symptoms. Otherwise, no covariates were associated with baseline depression, anxiety, or stress symptoms (p 's > 0.10). To test for an association with change in depression, anxiety, or stress symptoms, covariates were added to each linear mixed effects model (i.e., for depression, anxiety, and stress symptoms) as moderators of the linear slope, which describes linear change over time. Student status moderated the linear slope for depression and stress symptoms over time such that, as compared to being a full-time student, being a part-time student or not being a student was associated with less change

over time (see Supplemental Table 2). Otherwise, no covariates were associated with change in depression, anxiety, or stress symptoms over time (p 's > 0.07). Based on these preliminary analyses, sex was included as a covariate in the model for depression symptoms; student status and the interaction of student status with the linear slope were included as covariates in the models for depression and stress symptoms. Analyses were conducted with R version 3.3.3 (R Core Team, 2015) with the nlme (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2016) and gglot2 (Wickham, 2009) packages.

Results

Symptom Change During Treatment

As can be seen in Table 1, participant symptom severity improved on average over the course of treatment. Specifically, weekly symptom severity decreased in a monotonically downward fashion with deceleration, suggesting that most treatment gains occurred at the beginning of treatment (see “Change” sections of Table 2 for depression symptoms, Table 3 for anxiety symptoms, and Table 4 for stress symptoms). Additional hierarchical regression terms (e.g., cubic slope) were added to de-trend data for subsequent moderation analyses. Follow up inspection of random effects suggested substantial inter-individual heterogeneity in baseline symptoms and linear change for weekly symptoms of depression, anxiety, and stress (see “Random Effects” column in Tables 2, 3, and 4), which indicates that participants differed regarding both baseline symptom severity and response to treatment.

Social Support

Pre-treatment social support data are presented in Table 1. Examinations of pre-treatment MOS-SSS and initial DASS scores indicated that a higher level of overall social support was associated with a lower initial depression score, $B = -2.63$, $p = 0.01$, 95% CI: $[-4.66, -0.61]$, but not with initial anxiety, $B = 0.50$, $p = 0.61$, or stress, $B = 1.28$, $p = 0.21$. Overall social support was not associated with change in depression, anxiety, or stress symptoms over the course of treatment, B 's = $-0.06 - 0.03$, p 's = $0.25 - 0.92$. Follow-up analyses of the MOS-SSS subscales indicated a negative association of baseline depression symptoms with affectionate, $B = -2.17$, $p = 0.005$, 95% CI $[-3.67, -0.67]$, tangible, $B = -1.90$, $p = 0.03$, 95% CI $[-3.58, -0.21]$, and emotional support, $B = -1.98$, $p = 0.03$, 95% CI $[-3.80, -0.16]$. Additionally, positive interaction was associated with higher baseline stress symptoms, $B = 1.86$, $p = 0.03$, 95% CI $[0.21, 3.50]$. Mirroring the results for overall social support, none of the four social support subscales were associated with change in depression, anxiety, or stress symptoms over the course of treatment, p 's = $0.11 - 1.00$.

Negative Social Exchange

Pre-treatment negative social exchange data are presented in Table 1. Examinations of pre-treatment TENSE and initial DASS scores indicated that a higher level of baseline negative social exchange was associated with a higher level of baseline depression, anxiety, and stress symptoms (see “Moderated Change” section of Tables 2, 3, and 4, respectively). Moreover, baseline negative social exchange moderated the linear slope describing change in depression (see Table 2) and stress symptoms (see Table 4), indicating that a higher level of negative social exchange was associated with greater response to treatment for depression

(see Figure 1A) and stress symptoms (see Figure 1B). In other words, as can be seen in Figure 1, the slope of change for symptoms of depression and stress over the course of treatment was steeper for those patients who endorsed a higher level of baseline negative social exchange, indicating a stronger beneficial effect of treatment for such patients. Baseline negative social exchange was not significantly associated with reduction in anxiety symptoms (see Table 3, and Figure 1C). However, despite differences in statistical significance, inspection of confidence intervals suggested similar effect sizes describing the association of baseline negative social exchange with reduction in depression, anxiety, and stress symptom severity.

Discussion

The present study was designed to assess the relationship between pre-treatment social support and negative social exchange, and the slope of change in symptoms of depression, anxiety, and stress over the course of ideographic, case formulation based CBT. We first examined pre-treatment social support. Although we found a negative correlation between pre-treatment support and initial depressive symptoms, we found no association between support and subsequent change in symptoms of depression, anxiety, or stress, indicating that pre-treatment social support levels were not associated with how much a patient benefitted from treatment. Our findings are consistent with some past research (e.g., Paykel et al., 1996) but are in contrast to other studies (e.g., Brown et al., 1988). One possible explanation for the lack of association between support and symptom change in the present study is that our participants reported a fairly high level of perceived social support (see Table 1). This may have made it difficult to detect associations of a moderate/small effect size. Another potential explanation for our results is that our assessment of social support did not take individual support sources (e.g., spouse versus friend) into account, which could mask the potential effects of particularly important relationships (Ezquiaga et al., 1998). Future research may benefit from including participants with a larger range of perceived social support and from using a measure that assess support received from specific individuals.

We next examined pre-treatment negative social exchange. Pre-treatment negative social exchange was positively correlated with initial depression and stress symptoms. Additionally, a higher level of pre-treatment negative social exchange was associated with a steeper slope of change for depression and stress symptoms over the course of treatment, indicating that patients who perceived more negativity in their social support system prior to treatment had a more robust response to treatment. The fact that we found a significant association between pre-treatment negative social exchange and treatment response, but not between social support and treatment response, suggests that negative social exchanges may be a more potent moderator of treatment response than support. This possibility is consistent with findings that negative social exchange is more strongly associated with mood and well-being than support (e.g., Rook, 2001). The direction of the correlation we found between negative social exchange and treatment response is consistent with findings that aspects of negative social exchange (e.g., expressed dissatisfaction with particular behaviors and non-hostile criticism from close others) may be associated with enhanced treatment adherence (e.g., Fogler, Tompson, Steketee, & Hofmann, 2007). Thus, it is possible that aspects of

experiences falling under the rubric of negative social exchange can help motivate an individual to start treatment and to continue in therapy until significant gains are made.

Another possible interpretation of our results is that having pre-treatment negative social exchange data for their patients may have allowed therapists in the present study to integrate that information into their case formulations (Persons, 2008). Subsequently, they could address mechanisms hypothesized to be driving the negative social exchange and related presenting problems in an individually targeted manner, potentially enhancing treatment progress. For example, the formulation for one individual presenting with a high level of stress symptoms and negative social exchange at pre-treatment might include the hypothesis that a lack of assertiveness skills is contributing to elevated negative social exchange, which is increasing the patient's irritation, frustration and general stress levels. The treatment for this patient might then focus on developing assertiveness skills and carrying out behavioral experiments where the patient would use these new skills and assess for changes in perceived negative social exchange (in addition to ongoing monitoring of symptoms). The formulation for another patient presenting with the same pre-treatment scores might hypothesize the patient's elevated stress and negative social exchange scores as stemming from a cognitive bias that causes the patient to potentially interpret neutral or ambiguous interpersonal exchanges as negative (Smith & Peterson, 2008). The treatment plan for this patient might then include training their awareness of this bias and challenging it via various behavioral experiments and Socratic dialogue. In all of these instances, the therapist may also be providing a relationship free of (or very low in) negative social exchange, which may be beneficial to the patient in a number of ways, including by helping them gather evidence to contrast core beliefs about themselves and relationships. The possibility that targeting mechanisms driving negative social exchange could lead to enhanced treatment response is consistent with ideas that negative social exchange and depressive symptoms are mutually reinforcing, that a cognitive bias may increase vulnerability to perceiving criticism and experiencing depressive symptoms (Smith & Peterson, 2008), and that cognitive guidance can decrease the effect of negative social exchange on subsequent depression (Rhodes & Woods, 1995). Thus, we believe our findings suggest that collecting and attending to data on social support and negative social exchange at the start of treatment could help clinicians develop more comprehensive ideographic case formulations that might, in turn, allow for more effective and efficient targeted intervention.

Our study has a number of limitations. First, we had a modest total sample size of 74 participants, and a smaller subset (46) that completed the TENSE at pre-treatment. The modest sample size may have been particularly problematic in light of the somewhat limited range for social support levels reported by our participants. Given that smaller sample sizes limit statistical power to detect significant interactions, the fact that we were able to detect a significant moderating effect of negative social exchange on change in symptoms of depression and stress in the present study may suggest that the moderation effect of negative social exchange on treatment response is relatively large. However, future research is needed to replicate these findings in larger samples. Second, our sample had a limited level of ethnic/racial diversity. Future study would be needed to clarify the role of social support and negative social exchange on psychotherapy effectiveness among other racial or ethnic groups. Third, we have no direct data on how social support and perceived negative social

exchange were actually integrated into the case formulations of the patients in our study and also do not have social support or negative social exchange data from later in the treatment. In future studies, systematically collecting data on factors included in therapists' formulations of their cases as well as follow-up data collection to assess for changes in social support and negative social exchange would allow for better understanding how therapists utilized the pre-treatment social support and negative social exchange data in their work and whether changes in social support and negative social exchange occurred as a result of treatment.

In spite of the study limitations, our findings suggest that pre-treatment negative social exchange may have a stronger association with treatment response than social support, and that a high level of pre-treatment negative social exchange may be associated with a more robust response to ideographic, case formulation based CBT. Aspects of negative social exchange may decrease the chance of premature treatment drop out. Additionally, awareness at the start of treatment that a patient is reporting high levels of negative social exchange may allow a therapist to develop a more fitting case formulation for the patient, leading to targeted interventions that yield an enhanced treatment response.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Change in Symptom Severity Moderated by Baseline Negative Social Exchange

Note. Negative social exchange is plotted as the mean and ± 1 standard deviation from the mean. Plotting ± 2 standard deviations from the mean would illustrate effects outside the range of the available data.

Table 1.

Demographic, symptom, social support, and negative social exchange data.

	<i>N</i>	<i>M (SD)</i>	<i>Range</i>
Demographic variables			
Age	74	36.81 (13.99)	18-68
Sex			
Male	28		
Female	46		
Marital Status			
Single	34		
Divorced, Separated, or Widowed	7		
Married	33		
Ethnicity			
White	61		
Hispanic/Latino	3		
Asian	5		
Other	5		
Employment status			
Employed full time	35		
Employed part time	14		
Retired	2		
Unemployed	23		
Student status			
Full-time student	12		
Part-time student	6		
DASS subscale scores			
At first session			
Depression	72	20.06 (10.52)	0-42
Anxiety	72	12.47 (9.49)	0-38
Stress	72	18.78 (9.34)	2-38
At last session in dataset *			
Depression	71	8.20 (7.84)	0-34
Anxiety	71	5.58 (6.49)	0-24
Stress	71	10.59 (9.08)	0-34
Pre-treatment social support			
Overall	71	3.80 (0.91)	1.2-5
Emotional/informational subscale	71	3.59 (1.04)	1.13-5
Tangible subscale	71	4.12 (1.10)	1-5
Affectionate subscale	71	3.93 (1.21)	1-5
Positive Interaction subscale	71	3.57 (1.09)	1.33-5
Pre-treatment negative social exchange	46	52.11 (38.16)	1-147.13

Note:

*₌ The last data point collected for this study was termination or session 30, whichever came first.

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Table 2.

Change in Depression Moderated by Baseline Negative Social Exchange

Change		Fixed Effects		Random Effects	
Term	Estimate (B)	95% CI	Estimate (σ)	95% CI	
Intercept	19.88 [^]	(17.54, 22.21)	8.54	(6.99, 10.45)	
Linear Slope	-3.96 [^]	(-5.01, -2.91)	0.69	(0.47, 1.00)	
Quadratic Slope	0.59 [^]	(0.33, 0.85)	0.02	(0.01, 0.03)	
Cubic Slope	-0.04 ^{***}	(-0.07, -0.02)	--	--	
Quartic Slope	0.001 ^{**}	(0.0004, 0.002)	--	--	
Quintic Slope	-0.00002 ^{**}	(-0.00003, -0.000004)	--	--	
Moderated Change					
Term	Estimate (B)	95% CI	Estimate (σ)	95% CI	
Intercept	15.20 [^]	(10.75, 19.64)	6.51	(5.00, 8.49)	
Linear Slope	-2.53 [^]	(-3.45, -1.60)	0.21	(0.11, 0.38)	
Quadratic Slope	0.25 [^]	(0.11, 0.39)	--	--	
Cubic Slope	-0.01 ^{**}	(-0.02, -0.003)	--	--	
Quartic Slope	0.0002 [*]	(0, 0.0003)	--	--	
Quintic Slope	--	--	--	--	
Male ^a	2.22	(-1.67, 6.12)	--	--	
Part-time Student ^a	4.54	(-4.34, 13.43)	--	--	
Full-time Student ^a	-6.49 [*]	(-12.47, -0.51)	--	--	
Negative social exchange	0.10 ^{***}	(0.04, 0.16)	--	--	
Linear Slope × Negative social exchange	-0.004 ^{**}	(-0.007, -0.001)	--	--	
Linear Slope × Part-time Student ^a	0.06	(-0.32, 0.45)	--	--	
Linear Slope × Full-time Student ^a	0.50 ^{**}	(0.17, 0.83)	--	--	

Reference categories are: female (sex) and not a student (student status).

$p < 0.0001$.

$p < 0.0001$.

$p < 0.01$.

$p < 0.05$.

Note.

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Table 3.

Change in Anxiety Moderated by Baseline Negative Social Exchange

Change		Fixed Effects		Random Effects	
Term	Estimate (B)	95% CI	Estimate (σ)	95% CI	
Intercept	12.71 [^]	(10.92, 14.49)	6.70	(5.58, 8.06)	
Linear Slope	-2.83 [^]	(-3.59, -2.07)	0.21	(0.14, 0.31)	
Quadratic Slope	0.45 [^]	(0.26, 0.63)	--	--	
Cubic Slope	-0.03 [^]	(-0.05, -0.01)	--	--	
Quartic Slope	0.001 ^{**}	(0.0003, 0.002)	--	--	
Quintic Slope	-0.00001 ^{**}	(-0.00002, -0.000002)	--	--	

Moderated Change		Fixed Effects		Random Effects	
Term	Estimate (B)	95% CI	Estimate (σ)	95% CI	
Intercept	10.68 [^]	(6.85, 14.50)	7.13	(5.67, 8.97)	
Linear Slope	-2.27 [^]	(-2.91, -1.62)	0.23	(0.14, 0.38)	
Quadratic Slope	0.27 [^]	(0.17, 0.37)	--	--	
Cubic Slope	-0.01 [^]	(-0.02, -0.007)	--	--	
Quartic Slope	0.0002 [^]	(0.0001, 0.0003)	--	--	
Quintic Slope	--	--	--	--	
Negative Social Exchange	0.07 [*]	(0.01, 0.13)	--	--	
Linear Slope × Negative Social Exchange	-0.002	(-0.004, 0.0006)	--	--	

Note.

* $p < 0.05$,** $p < 0.01$,*** $p < 0.001$,[^] $p < 0.0001$

Table 4.

Change in Stress Moderated by Baseline Negative Social Exchange

Change		Fixed Effects		Random Effects	
Term	Estimate (B)	95% CI	Estimate (σ)	95% CI	
Intercept	18.62 [^]	(16.62, 20.61)	7.54	(6.18, 9.18)	
Linear Slope	-1.96 [^]	(-2.55, -1.37)	0.69	(0.49, 0.97)	
Quadratic Slope	0.17 ^{***}	(0.07, 0.26)	0.02	(0.01, 0.03)	
Cubic Slope	-0.007 [*]	(-0.01, -0.001)	--	--	
Quartic Slope	0.0001 [*]	(0.00001, 0.00002)	--	--	

Moderated Change		Fixed Effects		Random Effects	
Term	Estimate (B)	95% CI	Estimate (σ)	95% CI	
Intercept	14.39 [^]	(10.71, 18.08)	6.93	(5.26, 9.13)	
Linear Slope	-1.38 [^]	(-1.87, -0.89)	0.61	(0.36, 1.04)	
Quadratic Slope	0.08 [^]	(0.04, 0.12)	0.02	(0.01, 0.04)	
Cubic Slope	-0.001 [*]	(-0.002, -0.0002)	--	--	
Quartic Slope	--	--	--	--	
Part-time Student ^a	8.71 [*]	(0.98, 16.43)	--	--	
Full-time Student ^a	-1.80	(-7.18, 3.57)	--	--	
Negative Social Exchange	0.11 [^]	(0.06, 0.16)	--	--	
Linear Slope $\times$ Negative Social Exchange	-0.003 ^{**}	(-0.006, -0.0007)	--	--	
Linear Slope $\times$ Part-time Student ^a	0.14	(-0.19, 0.48)	--	--	
Linear Slope $\times$ Full-time Student ^a	0.36 [*]	(0.04, 0.67)	--	--	

Note.

^{*} p 0.05,^{**} p 0.01,

Reference category is not a student (student status)

χ^2 p 0.0001.
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