Interpersonal Predictors of Stress Generation: Is there a super factor?

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Authors:
Josephine H. Shih[a*]
Matthew G. Barstead[b]
Nicole Dianno[a]

[a]Department of Psychology
Saint Joseph's University
Philadelphia, PA 19131

[b]Department of Human Development & Quantitative Methodology
University of Maryland, College Park
College Park, MD 20742

[*]Corresponding Author

Abstract

Hammen's (1991) seminal paper on stress generation highlighted the reciprocal relationship between stress and depression. Not only does stress predict depression, but women with diagnoses of depression also experienced subsequent increased levels of stress. In the ensuing years, depression researchers have moved beyond clinical predictors and examined whether depression vulnerability factors also contribute to stress generation. This interest has led to a growing focus on interpersonal vulnerability factors that contribute to stress generation. To date, the research examining interpersonal predictors of stress generation has tended to examine vulnerability factors singly and thus potential overlap and unique predictions amongst vulnerability factors have not been determined. The present paper examines interpersonal vulnerability factors from various schools of thought (dependency, attachment, and unmitigated communion) as predictors of interpersonal stress generation. Three hundred and sixty-four young adults completed baseline measures of interpersonal vulnerabilities and provided weekly reports of depressive symptoms and stressful life events. Multi-level models were estimated to examine their unique predictions of interpersonal stress generation. Despite converging theories, there does not appear to be a single super-factor. Of the interpersonal vulnerability factors tested, anxious attachment emerged as a consistent predictor of interpersonal stress generation both when examined singly and when in combination with related variables.

Keywords: Stress generation, interpersonal, anxious attachment, neediness, dependency

Interpersonal Predictors of Stress Generation: Is there a super factor?

Brown and Harris (1978) demonstrated that stressful life events often precede the onset of a major depressive episode. Brown and Harris' use of a contextual threat-based assessment of stressful life events set the gold standard for studying stressful life events in depression because it took into consideration the context of an event and disaggregated individuals' emotional reactions to the events in assessing the negative impact of the stress. The disaggregation is noteworthy because depressed individuals tend to have a negative worldview and may perceive stressful life events to be more severe than an objective observer might. Because not everyone who experiences a stressful life event develops depression, much of the subsequent research has focused on searching for vulnerability factors for depression from a diathesis-stress framework. In recent decades, research on stress and depression has shifted to include considerations for a transactional relationship between stress and depression such that depressive symptoms as well as individuals' characteristics and behaviors may also contribute to further exposure to stressful life events and exacerbate and/or maintain depressive symptoms (Hammen, 1991; Hammen, 2006; Hammen & Shih, 2008; Liu & Alloy, 2010). This process of contributing to greater exposure to stress is termed stress generation (Hammen, 1991).

Hammen (1991) showed that women with a diagnosis of major depression differed from women with other diagnoses and a control group of women in the amount of stressful life events experienced over a 6 month period of time. Specifically, Hammen contrasted between two types of stressful life events, those events that are fateful or independent of an individual's diagnosis or behaviors or characteristics (e.g., experiencing natural disaster) and those events that are dependent in nature (e.g.,

interpersonal conflict). She found that women with a diagnosis of unipolar major depression experienced more dependent life events but not independent life events compared to the other groups. The stress generation finding essentially shifted the view of depressed individuals being passive recipients of stressors and reacting to them to active participants in their environment in which they may react to stressors but may also contribute to their occurrence through their behaviors or selection into stressful contexts (Hammen, 1991, 2006). Hammen argued that to fully test the stress generation hypothesis, researchers need to demonstrate that the predictor of stress generation predicts higher levels of dependent stressors but also show that the predictor does not predict higher levels of independent stressors (Hammen, 2005). Furthermore, while Hammen (1991) observed that a significant subset of dependent stressors were interpersonal in nature, subsequent studies have tested this question explicitly by contrasting prediction of dependent interpersonal events and dependent non-interpersonal events and demonstrated an "interpersonal stress generation" effect such that predictors of stress generation associated with depressive symptoms (Conway, Hammen, & Brennan, 2012; Rudolph, 2008) or depression-related vulnerability have tended to predict dependent interpersonal stress but not dependent non-interpersonal stress (Feurer, Burkhouse, Siegle & Gibb, 2017; Shih, 2006).

Initial interest in stress generation focused on clinical predictors such as the impact of comorbid diagnoses (Harkness & Luther, 2001), depressive symptoms and specific clinical features (Harkness, Monroe, Simons, & Thase, 1999). However, it was noted that individuals with a history of depression, tended to contribute to stressors even when they were not in a depressive episode (Daley et al., 1997; Hammen & Brennan,

2002). This pattern of results suggests that in addition to depression or residual depressive symptoms, other factors may be at work in producing stress generation. Researchers focused on examining vulnerability factors to depression as predictors of stress generation. There was support for neuroticism (Poulton & Andrews, 1992; Uliaszek et al., 2012), rumination (Flynn, Kecmanovic, & Alloy, 2010; Stroud, Sosoo & Wilson, 2016), negative cognitive style (Safford, Alloy, Abramson, & Crossfield, 2007), co-rumination (Hankin, Stone, & Wright, 2010; Bouchard & Shih, 2013), sociotropy (Shih, 2006), dependency (Starrs et al., 2010), excessive reassurance-seeking (Eberhart & Hammen, 2009, Stroud et al., 2016), and anxious attachment (Eberhart & Hammen, 2010) as predictors of stress generation. Moreover, these vulnerability factor's effects on stress generation are demonstrated while controlling for the effect of depressive symptom's impact on stress generation. Hence, while depressive symptomatology is associated with increased stress generation, vulnerability factors for depression exert additional impact on stress generation. These findings have significant implications in that they suggest a double-bind: not only are individuals vulnerable to depression more likely to develop depression when they encounter stressful life events, some of these traits contribute to the very stressors for which individuals are reactive (e.g., Shih, 2006).

In addition, research has further demonstrated that increases in dependent stressors predicted later depressive symptoms (Liu, Kraines, Massing-Schaffer, & Alloy, 2014). In perhaps the most convincing demonstration of its potential effects, Holahan, Moos, Holahan, Brennan and Schuttee (2005) examined avoidance coping as a predictor of dependent stressors to predict depressive symptoms 10 years later. Of note, Rudolph, Flynn, Abaied, Groot and Thompson (2009) found that depression predicted both

dependent interpersonal stress and dependent non-interpersonal stress in girls but only dependent interpersonal stress predicted later depression. These findings support stress generation as an important process that mediates the relationship between depression along with its vulnerability factors and subsequent depression. To date, the findings on stress generation tend to point to interpersonal stress generation and there is some evidence (e.g., Rudolph et al., 2009) that dependent interpersonal stress may be unique in predicting depression continuity over time, at least in girls.

Overall, there has been significant support for stress generation and its role in depression. Moreover, the interpersonal domain seems particularly relevant for further study. First, as reviewed earlier, it appears that much of the stress generation effect occurs in the interpersonal domain. Second, Vrshek-Schallhorn et al. (2015) demonstrated that the severity of stress and the interpersonal nature of stress were the two aspects of stressful life events most strongly associated with depression onset. In terms of stress generation, research to date has largely focused on predictors of stress generation as a mechanism of depression onset, exacerbation, and maintenance and less so on the mechanism of stress generation (for an exception, see Stroud et al., 2016). Moreover, research has also often examined predictors of stress generation on their own without considering other predictors in the same model. Liu (2013) argued in his review for more simultaneous assessment and test of multiple risk factors. Given the proliferation of predictors of stress generation in various domains including neuroticism, negative cognitive style, rumination, rejection sensitivity, sociotropy, dependency, corumination, excessive reassurance seeking and so on, there is an increasing need to identify the unique and more potent predictors of stress generation to aid the development

of models that examine mechanisms of stress generation. These questions about potent vulnerability factors are particularly important as researchers develop targeted prevention or intervention programs both in terms of identifying individuals likely to benefit from such programs as well as possible interpersonal domains to target in interventions.

The present study aims begin the process of identifying unique and potent interpersonal vulnerability factors in predicting interpersonal stress generation. Prominent interpersonal vulnerability factors for depression include dependency (Blatt & Zuroff, 1992), sociotropy (Beck, 1983), and insecure attachment (Bowlby, 1979). Theorists have argued that dependency, sociotropy, and anxious attachment may be "virtually identical" though they developed from different schools of thought (Alden & Bieling, 1996, p.71). Individuals who are high on sociotropy are proposed to base their self-worth excessively on having close relationships with others, which in turn confers risk for depression when interpersonal loss or stressors occur (Beck, 1983). Dependency is also proposed to be a personality characteristic associated with the need to be loved and cared for by others but in ways where there is a fear of abandonment and feelings of helplessness and general dependence upon others (Blatt, D'Afflitti, & Quinlan, 1976). Relatedly, anxious attachment is defined as a form of insecure attachment characterized by fear of being abandoned or rejected by others (Brennan, Clark, & Shaver, 1998). As such, constructs such as dependency, sociotropy and anxious attachment may have significant conceptual overlap, but their overlap and unique effects in predicting stress generation have not been empirically tested. We propose that they be examined within the same study to consider the overlap among potentially similar constructs as well as unique contributions of particular vulnerability factors.

Specifically, we propose to examine neediness rather than dependency as a predictor of stress generation because Rude and Burnham (1995) found a two-factor model for dependency such that dependency had both an adaptive (connectedness) and a maladaptive (neediness) component. Several subsequent studies have demonstrated neediness to be a risk factor for depression but not connectedness (e.g., Besser & Priel, 2005; Little & Garber, 2000). Compared to sociotropy, findings have been more consistent for dependency (Shahar & Priel 2003; Shih, Abela & Starrs, 2009) and most recently, neediness (Bouchard & Shih, 2013) for their demonstrated association with higher levels of interpersonal dependent stressors.

Similar to dependency, attachment is another construct that appears to have adaptive (secure attachment) and maladaptive facets (anxious, avoidant attachment). Compared to dependency and sociotropy, there has been relatively more consistent findings with insecure forms of attachment predicting interpersonal stress generation but not generation of non-interpersonal stressors (Bottonari et al., 2007; Cohen et al., 2013; Hankin, Kassel, & Abela, 2005). More specifically, of studies that compared and contrasted the impact of avoidant vs. anxious attachment, anxious attachment emerged to be more predictive of stress generation over the 6-month study follow-up period (e.g., Hankin et al., 2005). In sum, it appears that in the depression literature, both neediness and anxious attachment may represent the maladaptive type of interpersonal orientation, and there is some evidence to support these traits predicting stress generation in the interpersonal domain.

Beyond sociotropy, dependency, and anxious attachment, Bakan (1966) proposed communion and agency as fundamental modalities of human existence. Specifically, a

distinction has been made in the health psychology literature between communion and unmitigated communion, with unmitigated communion being the maladaptive form of communion, conceptualized as an over-involvement in others to the exclusion of oneself (Helgeson, 1994; Helgeson & Fritz, 1998). Similar to the findings on dependency, the maladaptive form of communion is associated with greater psychological distress and poorer health outcomes. In recent years, work in the area of unmitigated communion has begun to consider it as a moderator of how stress is associated with well-being and negative affect (Helgeson, Swanson, Ra, Randall, & Zhao, 2015; Nagurney, 2007). Behaviorally, Helgeson et al. (2015) found that individuals high on unmitigated communion provided more support to others and reported being overly nurturant on a daily basis. To date, researchers have not examined whether unmitigated communion or behaviors associated with unmitigated communion predict stress generation. However, self-reported problematic behaviors of being too caring have been associated with interpersonal stress generation in females, and such a finding hints at the possibility that unmitigated communion may be a distal predictor of interpersonal stress generation (Shih & Eberhart, 2008). The work on unmitigated communion is interesting and relevant to the present study in that it identifies a maladaptive form of interpersonal orientation, yet it may be theoretically distinct from neediness and anxious attachment. Unmitigated communion is associated more with over-involvement in others and being overly-nurturant which may or may not have conceptual overlap with neediness and anxious attachment, both of which draw from a fear of abandonment and needing others for approval and self-worth. Hence, in addition to examining the potential overlap between

neediness and anxious attachment, the present study included an examination of a closely related but likely distinct construct to provide a test of discriminant validity.

In sum, the present study first sought to examine the overlapping variance among measures of neediness, anxious attachment to determine whether they loaded onto the same latent factor while including a closely related construct of unmitigated communion. In considering predictors of interpersonal stress generation, we next tested original scores of each measure of interpersonal orientation both separately as well as simultaneously in the same model to consider their unique contributions. Finally, we also examined whether factor scores for each interpersonal orientation would harvest the strengths and overlap of the constructs and better predict stress generation. We chose to assess stress and depressive symptoms weekly stress assessment over a two-month period similar to some previous studies (Shih, 2006; Eberhart & Hammen, 2008) in order to capture stressors rather than daily hassles and depressive symptoms rather than daily mood fluctuations. Furthermore, we tested the interpersonal vulnerabilities' contribution to stress generation above and beyond the effect gender and depressive symptoms have on stress generation.

Method

Participants

Four hundred and seven participants (177 males, 230 females) from a mid-Atlantic university initially volunteered to participate in this study. By the completion of the study 89.4% (N = 364: 156 males, 208 females) of the original sample had provided at least four weeks of consecutive stress data, which we defined as the minimum threshold for inclusion in the analyses.

There were no significant differences between participants who did not provide minimum data necessary for Multi-Level Modeling (MLM) analyses and the final sample on the following demographic variables: gender, $\chi^2(1) = 0.56$, $p = .454$ age, $t(405) = 0.76$, $p = .447$, and year in college, $\chi^2(4) = 5.44$, $p = .254$. The two groups did differ in terms of racial minority status, $\chi^2(1) = 4.14$, $p = .042$. Nine of the 43 participants with insufficient data (20.9%) were non-White, whereas 38 of the 364 participants included in the analyses (10.4%) were non-White. Additionally, the two groups did not differ significantly on their average baseline BDI scores, $t(60.16) = 1.93$, $p = .058$. Given the marginal significance of this difference, it is worth noting descriptively that, individuals who provided sufficient data reported higher levels of depression ($M = 8.44$, $SD = 6.74$) than those who did not ($M = 6.78$, $SD = 5.19$).

The final sample used in the study analyses consisted of 26.1% freshmen, 32.4% sophomores, 20.3% juniors, 20.3% seniors, and 0.8% in their fifth year. Ages ranged from 18 to 25 ($M = 19.66$, SD 1.25) with an ethnic breakdown of 89.6% Caucasian, 4.4% Hispanic/Latino, 3.0% Black/African American, 2.2% Asian/Asian-American, and 0.8% other race/ethnicity.

Procedure

The study procedures were approved by the university's Institutional Review Board. Participants were recruited from an undergraduate psychology participant pool and participation was rewarded with course credit. Participants were recruited and participated online. Following their online consent, participants were directed to a preliminary survey, which assessed baseline levels of depressed mood, attachment, dependency, and unmitigated communion. On the first Sunday following completion of

the preliminary survey, participants were sent the first of eight-weekly stress and mood assessments. A link to each weekly survey was sent every Sunday evening at 5 PM. Each survey assessed mood and stressful life events that had occurred over the previous week. Participants had until 10 AM each Monday to complete that week's assessment.

Measures

Depressed Mood. The Beck Depression Inventory – Second Edition (BDI-II; Beck, Steer, & Brown, 1996) consists of 21 groups of statements reflecting mood and cognitive symptoms of depression such as sadness, loss of pleasure, and sense of worthlessness. Each group of statements are scaled from 0-3 with 0 indicating no endorsement of depressive symptom and 3 indicating a strong endorsement. Higher scores indicate greater depressive symptomatology with 16 or higher usually indicating depression in the clinical range. The Cronbach's alpha for the present sample was .84.

Anxious Attachment. The Revised Adult Attachment Scale (RAAS; Collins, 1996) for close relationships was used to assess how participants generally feel in important, close relationships. This measure consists of three subscales (close, depend, and anxiety), which are each composed of six items rated on a 5-point Likert scale (1 = *not at all characteristic of me*, 5 = *very characteristic of me*). We were primarily interested in the anxiety subscale as a marker of an individual's tendency to worry about being rejected or unloved in their close relationships (e.g. "I often worry that other people don't really love me"). The items measuring anxious attachment were averaged to create a variable representing anxious attachment. Cronbach's alpha for the present sample was .88

Neediness. The Depressive Experiences Questionnaire (DEQ; Blatt et. al., 1995) was designed to assess dependency and self-criticism. The interpersonal facet of the DEQ is captured by the dependency subscale, which has been shown to tap both an adaptive form of dependency "connectedness" and a maladaptive form of dependency, "neediness" (Rude & Burnham, 1995). Neediness and connectedness were originally identified as subfactors of the DEQ's dependency subscale by Rude and Burnham (1995), and this finding has been substantiated by subsequent work (e.g., Blatt, Zohar, Quinlan, Zuroff, & Mongrain, 1995). Our focus in the present study were items that loaded onto neediness, though in order to calculate neediness scores using the traditional scoring methods, participants were required to respond to all items on the dependency subscale of the DEQ. Neediness items tap levels of social helplessness, intense worry and fear about interpersonal relationships, preoccupation about separation and rejection, and excessive concern about loss of support, with no link to a particular person/relationship (e.g., "Without support from those who are close to me, I would be helpless"). Each item is rated on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). Rude and Burnham's (1995) analysis detected eleven items that loaded onto the DEQ-Neediness subfactor. Due to researcher error, items 31 ("If someone makes me angry, I let him (her) know how I feel") and 32 ("I constantly try, and very often go out of my way, to please or help people I am close to") were not included. Importantly, neither item loaded particularly highly on Neediness in Rude and Burnham's factor analysis. Cronbach's alpha for the present sample was .68

Unmitigated Communion. The Revised Unmitigated Communion Scale (Frtiz & Helgeson, 1998) was used to assess the extent to which one places others needs before

one's own (e.g.; "Even when exhausted, I will still help other people"). This scale includes 9 items rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) with higher values indicating higher levels of unmitigated communion. Cronbach's alpha in the present sample was .70.

Stressful Life Events. The Stressful Life Event Checklist (SLEC; [Blinded for review], 20xx) used in this study consisted of 39 items, which assessed the number of stressful life events experienced over the past week in a broad range of areas including school, work, family, friends, and romantic relationships. Items on the SLEC were coded by two independent raters on two categories: whether the item was independent/dependent in nature, and whether the item was interpersonal/non-interpersonal in nature. Initial Kappa statistics for both categories was .78. The independent raters consulted with an expert coder (XX-blinded for review) to discuss disputed items until all raters agreed upon classification. Participants were asked to report the number of times each of the 39 events occurred within the past week. Prior to creating summary scores, we recoded these raw frequency counts to fit a scale ranging from 0 to 5 with 5 indicating that the stressor occurred 5 or more times. Frequencies of items classified as dependent and interpersonal in nature were summed to create the dependent interpersonal stress variable. Frequencies of items classified as independent in nature were summed to create the independent stress variable. Sample items of dependent interpersonal events include: "significant fight or argument with close family member that led to serious consequences such as self or family member crying, temporary loss of privileges, emotional distance, etc." and "Someone rejected your attempt to please them". Sample independent stressors include "Witnessed an accident or act of violence" and

"immediate family member got in serious trouble (with law, in school, at work, with parents, etc.)"

Results

Overview of Analytic Plan

We addressed our research aims in two stages. First, we performed a principal components analysis (PCA) with oblique rotation to explore the possibility that the interpersonal vulnerabilities assessed in the present study might draw from a common latent factor. We used Horn's Parallel Analysis to determine the appropriate number of components to extract in the analysis (Horn, 1965). Horn's Parallel Analysis simulates distributions of eigenvalues from samples of uncorrelated data, which can then be compared against observed eigenvalues for each component extracted. This approach provides an empirical basis for identifying component extraction cutoffs when performing exploratory factor analyses and has been shown to outperform visual identification methods (i.e., elbows in a scree plot) as well as arbitrarily defined cutoffs (e.g., eigenvalues > 1) in terms recovering factors from simulated data (e.g., Zwick, & Velicer, 1986). In the present study, we compared the observed eigenvalues from our PCA with those at the 95th percentile of the distributions generated by the parallel analysis to determine the number of components to retain. Component scores were saved using the Regression method available in SPSS v23 (IBM, 2015) for use in subsequent analyses.

Second, because stress measures were collected weekly over an 8-week period and therefore nested within individuals, we used the lme4 package in R (Bates, Maechler, Bolker, & Walker, 2015; R Core Team, 2016) to test the association between

interpersonal vulnerability factors and stress generation. Moreover, the dependent variable consisted of a frequency count of stressors that occurred in the previous week, and therefore a Poisson distribution was used to estimate our models. Central to testing the stress generation hypothesis is contrasting models estimating interpersonal vulnerabilities' association with *dependent interpersonal* stress versus *independent* stress. In addition to testing models with dependent interpersonal stress and independent stress as the criterion variable, several different types of models were tested alternating how the interpersonal vulnerabilities were entered into the models: 1) single models in which original scores for each interpersonal vulnerability were included in the model, absent scores for the other two interpersonal vulnerabilities, 2) simultaneous models in which the original scores for all three interpersonal vulnerabilities were included in the same model, and 3) simultaneous models in which PCA-derived scores for each interpersonal vulnerability were included in the same model. Gender and previous week depression scores were included as covariates in all models, including those with a single interpersonal vulnerability predictor. Given the number of models tested, we set a more conservative $\alpha = .01$ threshold for statistical significance. An example of the simultaneous MLM model tested is outlined below.

Level 1 Equation:

$$\ln(\lambda_{ti}) = \pi_{0i} + \pi_{1i}(\text{Time}_{ti}) + \pi_{2i}(BDI_{(t-1)i}) + e_{ti}$$

Level 2 Equations:

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{Gender}) + \beta_{02}(\text{Anxious Attachment}) + \beta_{03}(\text{Neediness}) + \beta_{04}(\text{Unmitigated Communion}) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

All predictors at Level 2 were grand-mean centered, and time was centered at the study midpoint (i.e., week 4). If an individual's number of reported weekly stressors was greater than 3 SD above the grand mean for the stress variable of interest, their stress score for that week was recoded to be equal to the first integer above the +3 SD cutoff (Tabachnik & Fiddell, 2013).

Factor Structure of Interpersonal Vulnerabilities for Stress Generation

Using Horn's Parallel analysis, we simulated distributions of eigenvalues from 1000 uncorrelated datasets with 41 variables and 364 cases. Comparing observed component eigenvalues with eigenvalues at the 95th percentile of these distributions resulted in the extraction of five components that explained a combined 38.06% of the variance in observed item scores. Based on the magnitude of loadings, the first three components appeared to reflect anxious attachment, unmitigated communion, and (reversed) neediness, respectively (see Table 1). Items designed to measure anxious attachment and unmitigated communion tended to load highly on their respective components. The third component representing (reversed) neediness contained items that reflected both the connectedness and neediness subfactors of dependency described by Rude and Burnham (1995) in their factor analysis. However, the two highest-loading items as well as 8 out of 10 of the highest-loading items on this component (magnitude > .30) were more strongly related to the neediness than the connectedness subfactor in Rude and Burnham's analysis. Moreover, the highest loading items on this third component reflect fear, worry, and concern over disruptions in social relationships, which

are more indicative of dependency's maladaptive form (neediness) than its adaptive manifestation (connectedness).

Ultimately, this PCA yielded three factor scores of interest to our hypotheses regarding stress generation. Considering the fact that items indicating more maladaptive attitudes (e.g., "after an argument I feel very lonely") loaded negatively on the neediness component in our analysis, the factor score for the third component was reversed so that higher scores on each PCA-derived summary variables represented more maladaptive attitudes. Bivariate correlations and descriptive statistics for these component scores and the original summary scores of each measure are presented in Table 2. As can be seen, component-based scores were highly and positively correlated with the variable scores of the same constructs derived from the original scoring methods.

Independent and Dependent Interpersonal Stressors

Over the course of the 8-week study, we successfully recorded 2,667 reports of weekly stress. In the entire final sample of 363 participants, that total represents an average of 7.35 completed stress reports per person. The overall average number of dependent interpersonal stressors experienced each week was 3.01 (SD = 5.09), and the average number of weekly independent stressors was 0.31 (SD = 1.75).

Single Models with Original Scores

Our first set of models tested the stress generation hypothesis for each interpersonal vulnerability in separate models. A complete set of estimates for these models is displayed in Table 3. We began by examining whether there were gender differences in reports of stress over the 8 weeks. Controlling for previous week depression scores, women reported approximately 63% more dependent interpersonal

stressors than men, and there were no gender differences in frequency of reported independent stressors. This gender difference in dependent interpersonal stress supported the inclusion of gender as a covariate in subsequent models that independently examined the association between each interpersonal vulnerability and each type of stress.

In this first set of single-vulnerability models, we found full support for anxious attachment and neediness in predicting stress generation. To begin, in separate models, both anxious attachment and neediness significantly predicted dependent interpersonal stress, after controlling for gender and previous week depression scores. A one standard deviation unit increase in anxious attachment scores was related to a 34% increase in reports of average dependent interpersonal stress. A similar increase in neediness scores was related to a 30% jump in reports of dependent interpersonal stress. Unmitigated communion failed to predict dependent interpersonal stress, and none of the interpersonal vulnerability scores significantly predicted independent stress.

Simultaneous Models with Original Scores

Our second set of models tested the same stress generation hypothesis for each of three interpersonal vulnerabilities in a simultaneous model as opposed to separate models, with gender and previous week depression scores again included as covariates. When all three interpersonal vulnerability scores were included in the same model, the pattern of associations changed somewhat (see Table 3). In this simultaneous model, individual variation in anxious attachment scores continued to predict stress generation. Though slightly attenuated, the association between anxious attachment and number of dependent interpersonal stressors was still positive and significant. A one standard deviation increase in anxious attachment scores was related to a 25% increase in reports

of dependent interpersonal stress. Additionally, as in the single vulnerability models, anxious attachment was not related to reports of independent stress. Unmitigated communion remained unrelated to either dependent interpersonal or independent stress in this pair of simultaneous models.

Where the findings diverge in comparison with the single vulnerability models is in regards to neediness. Neediness exhibited a pattern of relations consistent with stress generation in the single vulnerability models; however, this was no longer the case when it was included in a model with both anxious attachment and unmitigated communion. Taken together these results suggest that anxious attachment is a relatively robust predictor of stress generation, unmitigated communion is unlikely to be a predictor of stress generation, and neediness may be somewhat of an inconsistent predictor of stress generation.

Simultaneous Models with Factor Scores

Our third set of models tested the stress generation hypothesis using PCA-derived scores for each interpersonal vulnerability. This approach allowed some of the shared variance that had been previously partialed out by the simultaneous model to remain in the model and contribute to each PCA score, depending on each item's association with each component. The models demonstrated support for anxious attachment as a vulnerability factor for stress generation but not neediness nor unmitigated communion (see Table 3). Anxious attachment was positively related to dependent interpersonal stress, but not independent stress. A one standard deviation increase in PCA-derived anxious attachment was associated with a 39% increase in reports of dependent

interpersonal stressors. Neither neediness nor unmitigated communion were significant predictors of reports for either type of stressor.[1]

Discussion

The present study utilized an 8-week prospective design to assess neediness, anxious attachment, and unmitigated communion as predictors of interpersonal stress generation. The primary goal of the study was to examine individual and unique effects of these vulnerability factors in predicting stress generation within the same sample. A principal components analysis was conducted to examine the possible existence of an interpersonal vulnerability super-factor that encompasses both the maladaptive form of dependency (i.e., neediness) and anxious attachment while remaining distinct from less theoretically related interpersonal vulnerabilities such as unmitigated communion. Original scores for each of these three vulnerabilities as well as scores derived from the PCA were then used to examine each construct's relation to stress generation.

The current study controlled for gender and previous-week depressive symptoms. As expected depressive symptoms predicted interpersonal stress generation. Women reported significantly higher levels of dependent interpersonal stress but not independent stress compared to men. This gender effect also corroborates with earlier work that adolescent girls are more likely to experience interpersonal stress generation than adolescent boys (e.g., Rudolph & Hammen, 1999; Shih, Eberhart, Hammen, & Brennan, 2006).

[1] In addition to testing the stress generation hypotheses, we also tested a set of linear mixed effects models to verify that dependent interpersonal stress predicted changes in weekly depression scores. The models controlled for previous week depression and gender. The models were largely consistent with existing literature in that weekly reports of dependent interpersonal stress were significantly related to elevated depression symptoms, $b = 0.56$, $CI_{99} = [0.42, 0.69]$, above and beyond the significant association between previous week and current week depression scores, $b = 0.44$, $CI_{99} = [0.38, 0.51]$.

With regard to the presence of a super interpersonal vulnerability factor, one did not emerge. Despite the seeming similarities between neediness and anxious attachment, items from these two constructs loaded onto two separate factors with some neediness items loading onto the anxious attachment factor (please see Table 4). A third interpersonal vulnerability factor emerged with items primarily drawn from the unmitigated communion scale. While items from measures of the three constructs (neediness, anxious attachment, and unmitigated communion) were entered and three interpersonal factors emerged, two patterns are worth noting. First, there appears to be some overlap between anxious attachment and neediness and these items loaded onto the first factor. This factor that we termed anxious attachment is composed of largely anxious attachment items and some neediness items. Remaining neediness items loaded onto the second factor, and notably, unmitigated communion appeared to form its own unique factor. Second, the latent factor consisting of anxious attachment items with some neediness items was the single most potent predictor of interpersonal stress generation. As such, while we did not find an overarching super latent factor across the three constructs, it is also clear from the analysis that the single factor of anxious attachment was the interpersonal vulnerability that is most relevant to interpersonal stress generation.

The potency and uniqueness of anxious attachment as a predictor of interpersonal stress generation is seen in the analyses using original scale scores as well. When regression models were conducted with each interpersonal vulnerability entered by itself (i.e., single vulnerability models), both anxious attachment and neediness demonstrated the expected pattern of predictions for stress generation in predicting dependent interpersonal stressors but not independent stressors. That both anxious attachment and

neediness singly predict interpersonal stress generation mirrors findings from the earlier literature when they were not studied in conjunction with each other or when studied in conjunction with cognitive vulnerability factors (Bouchard & Shih, 2013; Eberhart & Hammen, 2006; Hankin et al., 2005). However, when they were entered into the same regression model, anxious attachment appears to have unique prediction to interpersonal stress generation with neediness no longer predicting interpersonal stress generation. The current study and pattern of results support the stated need for the vast literature on interpersonal theories of depression to consider relative potency and uniqueness of the vulnerability factors to aid in the development of integrative theories on mechanisms of stress generation as well as identifying vulnerability factors most relevant to target in prevention and intervention (Hammen & Shih, 2014). Moreover, the pattern of results further underscores the idea of a double-bind such that depression vulnerability factors may indicate not only a vulnerability in the diathesis-stress sense but also increase a person's likelihood for depression onset through the contribution of stressful life events.

Despite neediness not being a unique predictor of interpersonal stress generation when anxious attachment was entered into the model, it is noteworthy that the two vulnerability factors more traditionally associated with depression in single-vulnerability regression models were associated with interpersonal stress generation. In contrast, unmitigated communion was its own unique factor but not one that predicted interpersonal stress generation. This contrasting finding suggests that while unmitigated communion may appear to be a closely related interpersonal vulnerability, it is a distinct construct that functions differently than anxious attachment and neediness in predicting stressful events. Whereas anxious attachment and neediness draw from a fear of

abandonment and needing approval of others which may elicit behaviors that contribute to interpersonal stressors, unmitigated communion draws from being over-involved in caring for others to the exclusion of oneself. Whereas anxious attachment and neediness draw are vulnerability factors, unmitigated communion is predictive of poor health outcomes (Helgeson & Fritz, 1998; Helgeson & Palladino, 2011). While Helgeson et al. (2015) demonstrated that unmitigated communion was related to increased support-giving and interpersonal problems such as being overly nurturant, intrusive, and exploitable, unmitigated communion was not associated with dependent interpersonal stress or independent stress in the present study. The present study is the first to directly test unmitigated communion as a predictor of stress generation. It is interesting that while unmitigated communion is associated with a number of interpersonal problematic behaviors, it is not associated with interpersonal stress generation. It is possible that unmitigated communion may contribute to a sense of greater perceived stress and lower well-being (Helgeson et al., 2015) that is felt within-person but its effect is not evident in terms of negative interactions with others.

These findings need to be interpreted in the context of the strengths and limitations of the study. One strength of the study was the weekly assessment of stressful life events. This approach reduced recall errors and the use of frequency count rather than self-reported impact scores also reduced the likelihood that significant relationships found between interpersonal vulnerability factors and stress generation were an artifact of interpersonally-oriented participants being more reactive to interpersonal stressors. A second strength of the study was in creating a-priori distinctions between dependent interpersonal stress and independent stress and contrasting the two outcome variables to

test the stress generation hypothesis more stringently (Hammen, 2005). That is, not only was an association between the vulnerability factor and interpersonal stress expected but for stress generation to be supported, the vulnerability factor needed to also not predict independent stress that are outside of the individual's control.

On the other hand, one limitation of the study was the use of self-report measures to assess stressful life events. Despite some safeguards in place (e.g., use of frequency rather than impact scores), one cannot say with certainty that the reported gender difference in stress generation is not purely due to a reporting bias with men tending to report less stressful life events in general. Though it is noteworthy that men and women did not differ in their reports of weekly independent stress, providing some evidence to refute the argument that the gender difference in dependent weekly interpersonal stressors among men and women was solely due to a reporting bias. In the future, the use of a more objective assessment of stress such as those used by Brown & Harris (1978) or Hammen (1991) would further validate the study conclusions.

A second limitation of the present study was the 8-week duration of assessment. It is possible that the stress generation captured over the 8 weeks was of everyday hassle-type stressors. Use of a more long-term assessment period and follow-up would allow researchers to capture more highly significant events (i.e., deaths, ending of long-term relationships). Finally, the present study used a college sample. Experiences and stressors of college students may not be comparable to community or clinical samples, and it cannot be assumed that the results of this study generalize to such samples. Nonetheless, the present study provides results important to understanding the transition to and experience of college in terms of interpersonal variables and stress. And the

current pattern of findings on stress generation mirrors those found in adolescent community samples (e.g., Hankin et al., 2005).

In the last decade, the list of predictors of stress generation has expanded rapidly. Researchers have begun to study this phenomenon beyond depression. For example, researchers are considering anxiety disorders (Allen & Rapee, 2009; Connolly, Eberhart, Hammen, & Brennan, 2010), anxiety sensitivity (Riskind, Black, & Shahar, 2010) and eating disorder symptoms (Dodd, Smith & Bodell, 2012) as predictors of stress generation. It is noteworthy that it is not always the case that vulnerabilities predict higher levels or of interpersonal stressors. Interpersonal stress generation may be a phenomenon unique to internalizing disorders or depression in particular (Conway et al., 2012). Conway and colleagues found that internalizing diagnoses predicted dependent interpersonal stress and externalizing diagnoses predicted dependent non-interpersonal stress. Unipolar major depression predicted interpersonal stress generation. However, panic disorder predicted a reduced exposure to dependent interpersonal stress that they termed a "stress inhibition" effect. Thus, an examination of the literature beyond major depression further underscores some of the uniqueness of stress generation to understanding major depression, that vulnerability factors for depression tend to predict higher levels of dependent stress and that it may be unique to depression that much of the effect of depression onset and maintenance is through the generation of *interpersonal* stressors (Conway et al., 2012; Rudolph et al., 2009).

The present findings demonstrate that late adolescents and young adults who exhibit interpersonal vulnerability factors for depression such as anxious attachment and neediness report more controllable interpersonal stressors on a weekly basis but not

independent events. While unmitigated communion may be associated with interpersonal problematic behaviors, it does not predict interpersonal stress generation beyond the effect of its shared variance with depressive symptoms. Given the growing list of predictors of stress generation, it is important for the field to move beyond simply identifying predictors of stress generation and to examine mechanisms of stress generation. The present study extends the current literature on stress generation by attempting to find and underscore the overarching, most potent or most unique interpersonal vulnerability from a theoretical perspective. While no overarching interpersonal vulnerability factor emerged, anxious attachment emerged as a potent and unique predictor of interpersonal stress generation and is an important target for future research on mechanism of action. Researchers have begun to consider more distal or personality-based vulnerability factors as predictors of stress generation and interpersonal behaviors such as excessive reassurance seeking as more proximal predictors of interpersonal stress generation (Stroud et al., 2016). There is also a need to examine beyond the micro process of stress generation and consider the broader interpersonal context and how individuals may self-select into more stressful environments (Hammen, 2005, 2006; Hammen & Shih, 2010). Anxious attachment provides a rich interpersonal vulnerability theory and body of work from which to develop integrative models that shed light on how anxious attachment contribute to interpersonal stress generation and the maintenance of depression.

References

Alden, L. E., & Bieling, P. J. (1996). Interpersonal convergence of personality constructs in dynamic and cognitive models of depression. *Journal of Research In Personality*, *30*(1), 60-75. doi:10.1006/jrpe.1996.0004

Allen, J.L., & Rapee, R.M. (2009). Are reported differences in life events for anxious children and controls due to comorbid disorders? *Journal of Anxiety Disorders, 23,* 511-518. doi: 10.1016/j.janxdis.2008.10.005.

Bakan, D. (1966). The duality of human existence: An essay on psychology and religion. Oxford, England: Rand Mcnally.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed effects models using lme4. *Journal of Statistical Software, 67,* 1-48. doi: 10.18637/jss.v067.i01

Beck, A.T. (1983). *Cognitive therapy of depression: new perspectives*: New York: Raven press.

Beck, A., Steer, R., & Brown, G.K. (1996). *Manual for the Beck Depression Inventory-II.* San Antonio, TX: Psychological Corporation.

Besser, A., & Priel, B. (2005). Interpersonal relatedness and self-definition in late adulthood depression: Personality predispositions, and protective factors. *Social Behavior and Personality*, *33*(4), 351-382. doi:10.2224/sbp.2005.33.4.351

Blatt, S. J., D'Afflitti, J. P., & Quinlan, D. M. (1976). Experiences of depression in normal young adults. *Journal of Abnormal Psychology*, *85*(4), 383-389. doi:10.1037/0021-843X.85.4.383

Blatt, S. J., Zohar, A. H., Quinlan, D. M., Zuroff, D. C., & Mongrain, M. (1995). Subscales within the dependency factor of the Depressive Experiences Questionnaire. *Journal of Personality Assessment*, *64*(2), 319-339. doi:10.1207/s15327752jpa6402_11

Blatt, S. J., & Zuroff, D. C. (1992). Interpersonal relatedness and self-definition: Two prototypes for depression. *Clinical Psychology Review*, *12*(5), 527-562. doi:10.1016/0272-7358(92)90070-O

Bottonari, K. A., Roberts, J. E., Kelly, M. R., Kashdan, T. B., & Ciesla, J. A. (2007). A prospective investigation of the impact of attachment style on stress generation among clinically depressed individuals. *Behaviour Research and Therapy*, *45*(1), 179-188. doi:10.1016/j.brat.2006.01.003

Bouchard, L. C., & Shih, J. H. (2013). Gender differences in stress generation: Examination of interpersonal predictors. *Journal of Social and Clinical Psychology*, *32*(4), 424-445. doi:10.1521/jscp.2013.32.4.424

Bowlby, J. (1979). On knowing what you are not supposed to know and feeling what you are not supposed to feel. *The Canadian Journal of Psychiatry/ La Revue Canadienne De Psychiatrie*, *24*(5), 403-408.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, W. S. Rholes, J. A. Simpson, W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46-76). New York, NY, US: Guilford Press.

Brown, G.W., & Harris, T.O. (1978). *Social origins of depression: A study of psychiatric disorder in women.* London: Tavistock.

Collins, N. L. (1996). Working models of attachment: Implications for explanation, emotion, and behavior. *Journal of Personality and Social Psychology*, *71*(4), 810-832. doi:10.1037/0022-3514.71.4.810

Cohen, J. R., Hankin, B. L., Gibb, B. E., Hammen, C., Hazel, N. A., Ma, D., Yao, S., Zhu, X. Z., Abela, J. Z. (2013). Negative attachment cognitions and emotional distress in mainland Chinese adolescents: A prospective multiwave test of vulnerability-stress and stress generation models. *Journal of Clinical Child and Adolescent Psychology*, *42*(4), 531-544. doi:10.1080/15374416.2012.749787

Conway, C.C., Hammen, C., & Brennan (2012). Expanding Stress Generation Theory: Test of a transdiagnostic model. *Journal of Abnormal Psychology, 121*(3), 754-766. Doi: 10.1037/a0027457.

Connolly, N.P., Eberhart, N.K., Hammen, C.L., & Brennan, P.A. (2010). Specificity of stress generation: A comparison of adolescents with depressive, anxiety, and comorbid diagnoses. *International Journal of Cognitive Therapy, 3*, 368-379. doi: 10.1521/ijct.2010.3.4.368.

Daley, S.E., Hammen, C., Burge, D., Davila, J., Paley, B., Lindberg, N. et al. (1997). Preditors of the generation of episodic stress: A longitudinal study of late adolescent women. *Journal of Abnormal Psychology*, 106(2), 251-259. doi: 10.1037/0021-843X.106.2.251.

Dodd, D., Smith, A., & Bodell, L. (2014). Restraint feeds stress: The relationship between eating disorder symptoms, stress generation, and the interpersonal theory of suicide. *Eating Behaviors, 15*(4), 567-573. doi: 10.1016/j.eatbeh.2014.08.004.

Eberhart, N. K., & Hammen, C. L. (2009). Interpersonal predictors of stress generation. *Personality and Social Psychology Bulletin, 35*(5), 544-556. doi:10.1177/0146167208329857

Eberhart, N. K., & Hammen, C. L. (2010). Interpersonal style, stress, and depression: An examination of transactional and diathesis-stress models. *Journal of Social And Clinical Psychology, 29*(1), 23-38. doi:10.1521/jscp.2010.29.1.23

Feurer, C., Burkhouse, K.L., Siegle, G., & Gibb, B.E. (2017). Increased pupil dilation to angry faces predicts interpersonal stress generation in offspring of depressed mothers. *The Journal of Child Psychology and Psychiatry, 58*(8), 950-957. Doi: 10.1111/jepp.12739.

Flynn, M., Kecmanovic, J., & Alloy, L. B. (2010). An examination of integrated cognitive-interpersonal vulnerability to depression: The role of rumination, perceived social support, and interpersonal stress generation. *Cognitive Therapy and Research, 34*(5), 456-466. doi:10.1007/s10608-010-9300-8

Fritz, H. L., & Helgeson, V. S. (1998). Distinctions of unmitigated communion from communion: Self-neglect and overinvolvement with others. *Journal of Personality and Social Psychology*, *75*(1), 121-140. doi:10.1037/0022-3514.75.1.121

Hammen, C. (1991). Generation of stress in the course of unipolar depression. *Journal of Abnormal Psychology*, *100*(4), 555-561. doi:10.1037/0021-843X.100.4.555

Hammen, C. (2005). Stress and depression. *Annual Review of Clinical Psychology*, *1*(1), 293-319. Doi: 10.1146/annurev.clinpsy.1.102803.143938.

Hammen, C. (2006). Stress generation in depression: Reflections on origins, research, and future directions. *Journal of Clinical Psychology*, *62*(9), 1065-1082. doi:10.1002/jclp.20293

Hammen, C., & Brennan, P.A. (2002). Interpersonal dysfunction in depressed women: Impairments independent of depressive symptoms. *Journal of Affective Disorders*, *72*(2), 145-156. doi: 10.1016/S0165-0327(01)00455-4.

Hammen, C., & Shih, J. H. (2008). Stress generation and depression. In K. S. Dobson, D. A. Dozois, K. S. Dobson, D. A. Dozois (Eds.), *Risk factors in depression* (pp. 409-428). San Diego, CA, US: Elsevier Academic Press. doi:10.1016/B978-0-08-045078-0.00018-6

Hammen, C., & Shih, J.H. (2010). Stress Generation: A Special Section. *International Journal of Cognitive Therapy*, *4*, 313-317. doi: 10.1521/ijct.2010.3.4.313.

Hammen, C., & Shih, J.H. (2014). Depression and interpersonal processes. In I. Gotlib, & C. Hammen (Eds). *Handbook of Depression*, 3rd edition (p.277-295). New York: Guilford.

Hankin, B. L., Kassel, J. D., & Abela, J. Z. (2005). Adult attachment dimensions and specificity of emotional distress symptoms: Prospective investigations of cognitive risk and interpersonal stress generation as mediating mechanisms. *Personality and Social Psychology Bulletin*, *31*(1), 136-151. doi:10.1177/0146167204271324

Hankin, B. L., Stone, L., & Wright, P. A. (2010). Corumination, interpersonal stress generation, and internalizing symptoms: Accumulating effects and transactional influences in a

multiwave study of adolescents. *Development and Psychopathology*, *22*(1), 217-235. doi:10.1017/S0954579409990368

Harkness, K. L., & Luther, J. (2001). Clinical risk factors for the generation of life events in major depression. *Journal of Abnormal Psychology, 110*(4), 564-572. doi:10.1037/0021-843X.110.4.564

Harkness, K. L., Monroe, S. M., Simons, A. D., & Thase, M. (1999). The generation of life events in recurrent and non-recurrent depression. *Psychological Medicine, 29*(1), 135-144. doi:10.1017/S0033291798007752

Helgeson, V. S. (1994). Relation of agency and communion to well-being: Evidence and potential explanations. *Psychological Bulletin, 116*(3), 412-428. doi:10.1037/0033-2909.116.3.412

Helgeson, V. S., & Fritz, H. L. (1998). A theory of unmitigated communion. *Personality and Social Psychology Review*, *2*(3), 173-183. doi: 10.1207/s15327957pspr0203_2.

Helgeson, V.S., & Palladino, D.K. (2011). Implications of psychosocial factors for diabetes outcomes among children with type 1 diabetes: A review. *Social and personality Psychology Compass, 6,* 228-242. doi: 10.1111/j.1751-9004.2011.00421.x.

Helgeson, V. S., Swanson, J., Ra, O., Randall, H., & Zhao, Y. (2015). Links between unmitigated communion, interpersonal behaviors and well-being: A daily diary approach. *Journal of Research in Personality*, *57*53-5760. doi:10.1016/j.jrp.2014.12.007

Holahan, C.J., Moos, R.H., Holahan, C.K., Brennan, P.L., & Schutte, K. K. (2005). Stress generation, avoidance coping, and depressive symptoms: A 10-Year Model. *Journal of Consulting and Clinical Psychology, 73*(4), 658-666. doi: 10.1037/0022-006X.73.4.658.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30,* 179-185. doi: 10.1007/bf02289447

Little, S. A., & Garber, J. (2000). Interpersonal and achievement orientations and specific stressors predicting depressive and aggressive symptoms in children. *Cognitive Therapy and Research, 24*(6), 651-670. doi: 10.1023/A:1005535327428

Liu, R. T., & Alloy, L. B. (2010). Stress generation in depression: A systematic review of the empirical literature and recommendations for future study. *Clinical Psychology Review, 30*(5), 582-593. doi:10.1016/j.cpr.2010.04.010

Liu, R.T. (2013). Stress generation: Future directions and clinical implications. *Clinical Psychology Review 33*, 406-416. Doi: 10.1016/j.cpr.2013.01.005.

Liu, R.T., Kraines, M.A., Massing-Schaffer, M., & Alloy, L.B. (2014). Rejection sensitivity and depression: mediation by stress generation. *Psychiatry, 77*(1), 86-97. doi: 10.1521/psyc.2014.77.1.86.

Nagurney, A. J. (2007). The effects of relationship stress and unmitigated communion on physical and mental health outcomes. *Stress and Health: Journal of The International Society for the Investigation of Stress, 23*(4), 267-273. doi:10.1002/smi.1146

Poulton, R. G., & Andrews, G. (1992). Personality as a cause of adverse life events. *Acta Psychiatrica Scandinavica, 85*(1), 35-38. doi:10.1111/j.1600-0447.1992.tb01439.x

R Core Team. (2016). R: A language and environment for statistical computing. Vienna Austria: R Foundation for Statistical Computing. https://www.R-project.org/

Riskind, J.H., Black, D., & Shahar, G. (2010). Cognitive vulnerability to anxiety in the stress generation process: interaction between the looming cognitive style and anxiety sensitivity. *Journal of Anxiety Disorders, 24*(1), 124-128. doi: 10.1016/j.janxdis.2009.09.007.

Rude, S. S., & Burnham, B. L. (1995). Connectedness and neediness: Factors of the DEQ and SAS dependency scales. *Cognitive Therapy & Research, 19,* 323-340. doi: 10.1007/bf02230403

Rudolph, K.D. (2008). Developmental influences of interpersonal stress generation in depressed youth. *Journal of Abnormal Psychology, 117*(3), 673-679. doi: 10.1037/0021-843X.117.3.673.

Rudolph, K.D., Flynn, M., Abaied, J.L., Groot, A., & Thompson, R. (2009). Why is past depression the best predictor of future depression? Stress generation as a mechanism of depression continuity in girls. *Journal of Clinical Child and Adolescent Psychology, 38*(4), 473-485. doi: 10.1080/15374410902976296.

Rudolph, K.D., & Hammen, C. (1999). Age and gender as determinants of stress exposure, generation, and reactions in youngsters: a transactional perspective. *Child Development*, 70, 660-677. doi: 10.1111/1467-8624.00048.

Safford, S. M., Alloy, L. B., Abramson, L. Y., & Crossfield, A. G. (2007). Negative cognitive style as a predictor of negative life events in depression-prone individuals: A test of the stress generation hypothesis. *Journal of Affective Disorders*, *99*(1-3), 147-154. doi:10.1016/j.jad.2006.09.003

Shahar, G., & Priel, B. (2003). Active vulnerability, adolescent distress, and the mediating/suppressing role of life events. *Personality and Individual Differences*, *35*(1), 199-218. doi:10.1016/S0191-8869(02)00185-X

Shih, J. H. (2006). Sex differences in stress generation: An examination of sociotropy/autonomy, stress, and depressive symptoms. *Personality and Social Psychology Bulletin*, *32*(4), 434-446. doi:10.1177/0146167205282739

Shih, J. H., Abela, J. Z., & Starrs, C. (2009). Cognitive and interpersonal predictors of stress generation in children of affectively ill parents. *Journal of Abnormal Child Psychology*, *37*(2), 195-208. doi:10.1007/s10802-008-9267-z

Shih, J. H., & Eberhart, N. K. (2008). Understanding the impact of prior depression on stress generations: Examining the roles of current depressive symptoms and interpersonal behaviours. *British Journal of Psychology*, *99*(3), 413-426. doi:10.1348/000712607X243341

Shih, J.H., Eberhart, N.K., Hammen, C.L., & Brennan, P.A. (2006). Differential exposure and reactivity to interpersonal stress predict sex differences in adolescent depression. *Journal*

of Clinical Child and Adolescent Psychology, 35, 103-115. doi: 10.1207/s15374424jccp3501_9

Starrs, C.J., Abela, J.R.Z., Shih, J.H., Cohen, J.R., Yao, S., Zhu, X.Z., & Hammen, C.L. (2010). Stress generation and vulnerability in adolescents in mainland China. *International Journal of Cognitive Therapy, 3*(4), 345-357. doi: 10.1521/ijct.2010.3.4.345.

Stroud, C.B., Sosoo, E. E., & Wilson, S. (2016). Rumination, excessive reassurance seeking, and stress generation among early adolescent girls. *Journal of Early Adolescence, 1,* 1-25. doi: 10.1177/0272431616659559.

Tabachnick, B. G., & Fiddell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson.

Uliaszek, A. A., Zinbarg, R. E., Mineka, S., Craske, M. G., Griffith, J. W., Sutton, J. M., Epstein, A., Hammen, C. (2012). A longitudinal examination of stress generation in depressive and anxiety disorders. *Journal of Abnormal Psychology, 121*(1), 4-15. doi:10.1037/a0025835

Vrshek-Schallhorn, S., Stroud, C.B., Mineka, S., Hammen, C., Zinbarg, R.E., Wolitzky-Taylor, K., & Craske, M.G. (2015). *Journal of Abnormal Psychology, 124*(4), 918-932.

Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99,* 432-442. doi: 10.1037//0033-2909.99.3.432

Table 1. Five-component Solution from Principal Components Analysis with Oblique

Item	Item Wording	Anxious Attachment	Unmitigated Communion	(Reversed) Neediness	Low Self-Reliance	Socially Unconcerned
AAS9	I often worry that other people won't want to stay with me	**.82**	-.01	-.04	.04	-.13
AAS10	When I show my feelings for others, I'm afraid they will not feel the same about me	**.82**	.01	.09	.00	-.15
AAS3	I often worry that other people really don't love me	**.81**	.03	.02	-.01	-.08
AAS11	I often wonder whether other people really care about me	**.81**	-.01	.08	.01	-.10
AAS4	I find that others are reluctant to get as close as I would like	**.67**	.03	.04	-.02	.01
AAS15	I want to get close to people, but I worry about being hurt	**.58**	-.12	-.22	-.20	-.08
DEQ28	I am very sensitive to others for signs of rejection	**.56**	.09	-.19	-.02	-.06
DEQ25	When I am with others, I tend to devalue or "undersell" myself	**.53**	.12	-.08	.08	-.04
DEQ27	No matter how close a relationship between two people is, there is always a large amount of uncertainty and conflict	**.52**	.02	.02	.00	**.34**
DEQ6	I urgently need things that only other people can provide	.28	-.03	-.17	.27	.18
UC8	Even when exhausted, I will always help other people	-.06	**.82**	.17	-.05	.00
UC7	I can't say no when someone asks me for help	-.05	**.82**	.15	.07	.01
UC1	I always place the needs of others above my own	-.07	**.71**	.08	-.12	-.02
UC9	I often worry about others' problems	.06	**.59**	-.13	-.05	-.07
UC6	It is impossible for me to satisfy my own needs when they interfere with the needs of others	.15	**.58**	.10	.13	.07
DEQ34	I find it very difficult to say "no" to the requests of friends	.02	**.57**	-.09	.03	.06
UC3	For me to be happy, I need others to be happy	.04	**.42**	-.26	.00	.04
DEQ40	I am very sensitive to the effects my words or actions have on the feelings of other people	.10	**.40**	-.24	**-.30**	-.18
UC4	I worry about how other people get along without me when I am not there	.26	.27	-.11	.12	.11
DEQ55	After an argument I feel very lonely	.20	-.08	**-.70**	.00	.23
DEQ19	I become frightened when I feel alone	.18	-.06	**-.61**	.16	.00
DEQ23	I often think about the danger of losing someone who is close to me	.12	-.01	**-.52**	.05	-.09
DEQ52	After a fight with a friend, I must make amends as soon as possible	-.21	**.30**	**-.51**	-.06	.04
DEQ2	Without support from others who are close to me, I would be helpless	.01	.01	**-.47**	.14	-.11
DEQ22	I have difficulty breaking off a relationship that is making me unhappy	.15	.10	**-.45**	-.05	.22
DEQ50	If someone I cared about became angry with me, I would feel threatened that he(she) might leave me	**.35**	.17	**-.45**	.02	.10
DEQ65	Being alone doesn't bother me at all	.04	-.01	**.45**	**-.41**	.23
DEQ20	I would feel like I'd be losing an important part of myself if I lost a very close friend	-.16	.01	**-.43**	-.12	-.17
DEQ46	Anger frightens me	.16	.18	**-.41**	.01	.19
DEQ45	I worry a lot about offending or hurting someone who is close to me	.15	**.33**	**-.38**	-.17	-.15

UC2	I never find myself getting overly involved in others' problems	-.06	.02	-.11	.08	-.11
DEQ42	I am a very independent person	.06	.02	.19	**-.78**	.00
DEQ51	I feel comfortable when given important responsibilities	-.02	.08	-.04	**-.62**	.02
DEQ38	Even if the person who is closest to me were to leave, I could still "go it alone."	.06	-.12	.11	**-.57**	.29
DEQ29	It's important for my family that I succeed	-.05	.01	-.24	**-.44**	-.23
DEQ18	I do not care whether or not I live up to what other people expect of me	-.10	.11	-.05	.07	**.65**
DEQ12	I seldom worry about being criticized for things I have said or done	-.23	.04	-.25	-.11	**.61**
DEQ26	I am not very concerned with how other people respond to me	-.17	.02	.03	-.06	**.59**
DEQ57	I rarely think about my family	.29	-.06	.12	.10	**.48**
DEQ9	The lack of permanence in human relationships doesn't bother me	-.13	.05	**.30**	.10	**.42**
UC5	I have no trouble getting to sleep at night when other people are upset	-.13	.11	-.26	.15	.26

Note. Loadings greater in magnitude than .30 are highlighted in bold. Horn's parallel analysis identified an eigenvalue of 1.473 at the 95th percentile for a sixth component. The observed eigenvalue for our sixth component, 1.438, did not exceed this value. AAS = Adult Attachment Scale, DEQ = Depressive Experiences Questionnaire, UC = Unmitigated Communion Scale.

Table 2. Bivariate Correlations and Descriptive Statistics for Level 2 Variables

	AA	UC	NE	PCA-AA	PCA-UC	PCA-NE
AA	-	.21	.49	.94	.15	.23
UC		-	.31	.20	.90	.38
NE			-	.57	.27	.69
PCA-AA				-	.17	.21
PCA-UC					-	.31
PCA-NE						-
M	2.74	3.32	0.20	0.00	0.00	0.00
SD	0.92	0.55	0.66	1.00	1.00	1.00

Note. All correlations significant at $p < .005$. AA = Anxious Attachment. UC = Unmitigated Communion. NE = Neediness. PCA = Principal Components Factor Scores.

Table 3. Interpersonal Vulnerabilities Predicting Stress Generation Controlling for Previous Week Depression Scores

	Dependent Interpersonal Stress		Independent Stress	
	b	IRR [CI_{99}]	*b*	IRR [CI_{99}]
	Single Predictor Models – Original Scores			
Level 1 Intercept, π_0				
Intercept, β_{00}	0.13	1.14 [0.94, 1.40]	-2.51**	0.08 [0.06, 0.11]
Gender, β_{01}	0.49**	1.63 [1.12, 2.38]	0.03	1.03 [0.64, 1.67]
Anxious Attachment, β_{01}[a]	0.32**	1.38 [1.13, 1.69]	0.08	1.08 [0.83, 1.41]
Neediness, β_{01}[a]	0.40**	1.49 [1.12, 1.99]	0.25	1.29 [0.88, 1.87]
Unmitigated Communion, β_{01}[a]	0.28	1.33 [0.94, 1.87]	0.39	1.48 [0.94, 2.33]
Time slope, π_1				
Intercept, β_{10}	-0.19**	0.83 [0.78, 0.87]	-0.20**	0.82 [0.71, 0.94]
Previous week BDI, π_2				
Intercept, β_{20}	0.03*	1.03 [1.00, 1.05]	0.04*	1.04 [1.00, 1.07]
	Simultaneous Model – Original Scores			
Level 1 Intercept, π_0				
Intercept, β_{00}	-0.13	0.88 [0.65, 1.19]	-2.45**	0.09 [0.06, 0.13]
Gender, β_{01}	0.42*	1.52 [1.04, 2.22]	-0.10	0.90 [0.55, 1.48]
Anxious Attachment, β_{02}	0.24*	1.27 [1.01, 1.60]	-0.03	0.97 [0.72, 1.31]
Neediness, β_{03}	0.20	1.22 [0.88, 1.71]	0.20	1.22 [0.80, 1.88]
Unmitigated Communion, β_{04}	0.14	1.15 [0.81, 1.64]	0.34	1.41 [0.88, 2.25]
Time slope, π_1				
Intercept, β_{10}	-0.19**	0.82 [0.78, 0.87]	-0.21**	0.81 [0.70, 0.94]
Previous week BDI, π_2				
Intercept, β_{20}	0.02	1.02 [0.99, 1.04]	0.03	1.03 [0.99, 1.07]
	Simultaneous Model – PCA Scores			
Level 1 Intercept, π_0				
Intercept, β_{00}	-0.15	0.86 [0.63, 1.16]	-2.44*	0.09 [0.06, 0.14]
Gender, β_{01}	0.47*	1.60 [1.08, 2.38]	-0.12	0.89 [0.53, 1.48]
Anxious Attachment, β_{02}	0.33**	1.39 [1.14, 1.68]	0.06	1.06 [0.82, 1.37]
Neediness, β_{03}	0.07	1.07 [0.87, 1.32]	0.16	1.17 [0.89, 1.54]

Unmitigated Communion, β_{04}	0.02	1.02 [0.84, 1.23]	0.13	1.14 [0.88, 1.48]
Time slope, π_1				
Intercept, β_{10}	-0.19**	0.82 [0.78, 0.87]	-0.21*	0.81 [0.70, 0.94]
Previous week BDI, π_2				
Intercept, β_{20}	0.02	1.02 [0.99, 1.04]	0.03	1.03 [0.99, 1.07]

Note. IRR = Incident Rate Ratio. CI_{99} = 99% Confidence Interval. Gender: Males = 0, Females = 1. BDI = Beck Depression Inventory

[a]Based on unconditional growth model estimates

[b]Gender included as a covariate in each single predictor model

*$p < .01$

**$p < .001$

Table 4. Items and Item Wording for Potential Anxious Attachment Composite

AAS9	I often worry that other people won't want to stay with me
AAS10	When I show my feelings for others, I'm afraid they will not feel the same about me
AAS3	I often worry that other people really don't love me
AAS11	I often wonder whether other people really care about me
AAS4	I find that others are reluctant to get as close as I would like
AAS15	I want to get close to people, but I worry about being hurt
DEQ28	I am very sensitive to others for signs of rejection
DEQ25	When I am with others, I tend to devalue or "undersell" myself
DEQ27	No matter how close a relationship between two people is, there is always a large amount of uncertainty and conflict
DEQ50	If someone I cared about became angry with me, I would feel threatened that he(she) might leave me