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WASHINGTON UNIVERSITY IN ST. LOUIS

Department of Psychological and Brain Sciences

The Effect of Social Anxiety on Social Support Behavior in Close Friendships

by

Marilyn L. Piccirillo

A thesis presented to  
The Graduate School  
of Washington University in  
partial fulfillment of the  
requirements for the degree  
of Master of Arts

December 2016  
St. Louis, Missouri

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Marilyn Piccirillo

*Washington University in St. Louis*

*December, 2016*

## ABSTRACT OF THE THESIS

The Effect of Social Anxiety on Social Support Behavior in Close Friendships

by

Marilyn L. Piccirillo

Masters of Arts in Psychology

Washington University in St. Louis, 2016

Associate Professor Thomas Rodebaugh, Chair

Quality of interpersonal relationships is a strong predictor of mental and physical health outcomes (Cacioppo, & Hawkley, 2003) and individuals with social anxiety disorder (SAD) report increased relationship impairment (Schneier et al., 1994). Evidence from the interpersonal literature suggests that individuals with SAD exhibit interpersonal constraint, in that they rate themselves as colder and more restricted in the amount of warmth they display with close others (Rodebaugh, Bielak, Vidovic, & Moscovitch, 2016). This study aimed to determine behavioral differences in the provision and receipt of support behaviors as a function of generalized SAD (GSAD). Participants ( $n = 92$ ) and their friends ( $n = 92$ ) completed two support tasks alternating between providing and receiving support on a chosen topic. These interactions were recorded and reviewed by coders, using the Social Support Interaction Coding System (Pasch & Bradbury, 1998; Pasch, Bradbury, & Davila, 1997). Structural equation modeling was used to determine that individuals with GSAD and their friends engaged in fewer positive and fewer neutral helper,  $b = 1.31, p = .049$ , and helpee,  $b = 1.70, p = .012$ , behaviors, as compared to individuals with no SAD (NOSAD) and their friends. However, there were no significant differences in the number of participant,  $b = 0.12, p = .224, d = .25$ , and friend,  $b = 0.10, p = .329, d = .20$ , total support behaviors as a function of GSAD status. Results suggest there may be significant differences in

how GSAD dyads provide and receive support. Clinical implications of this research suggest that helping individuals with SAD develop and practice adaptive support behaviors may be beneficial, as their engagement in fewer positive or neutral behaviors within close friendships may contribute to their reports of interpersonal impairment.

## Introduction

Successful interpersonal relationships are an important cornerstone of the human experience, and the impact of interpersonal relationships on mental and physical health is well-documented in the scientific literature (Cacioppo, & Hawkley, 2003; Hawkley & Cacioppo, 2003; Heinrich & Gullone, 2006; Qualter et al., 2013). Indeed, satisfying friendships are associated with a stronger sense of well-being (Hartup & Stevens, 1997), greater emotional adjustment, and higher levels of self-worth, social competence, and self-esteem (Bagwell, 2005; Buote et al., 2007; Cohen, 2004; Hussong, 2000; Rubin, 2004; Schradle, & Dougher, 1985). Likewise, individuals who maintain successful friendships are also more likely to utilize adaptive coping strategies and exhibit greater self-control, suggestive of a higher quality of life (Berkman, 1984; Schradle, & Dougher, 1985). In contrast, numerous studies provide evidence for the link between poor friendship quality and earlier mortality, along with other negative outcomes (Giles, Glonek, Luszcz, & Andrews, 2005; Korenke, Kubzansky, Schernhammer, Holmes, & Kawachi, 2006; Steptoe, Shankar, Demakakos, & Wardle, 2013).

Researchers have long believed that psychological disorders, such as social anxiety disorder (SAD), cause interpersonal impairment. Individuals with SAD report fewer friendships (Greca & Lopez, 1998; Schneier et al., 1994; Vernberg, Abwender, Ewell, & Beery, 1992), fewer dating partners (Dodge, Heimberg, Nyman, & O'Brian, 1987; Leary & Dobbins, 1983; Schneier et al., 1994), and fewer sexual relationships (Dodge, Heimberg, Nyman, & O'Brian, 1987; Leary & Dobbins, 1983). They are also less likely to be married over their lifetime (Hart, Turk, Heimberg, & Liebowitz, 1999; Sanderson, DiNardo, Rapee, & Barlow, 1990; Schneier et al., 1994; Turner, Beidel, Dancu, & Keys, 1986). Importantly, many of the relationships that

individuals with SAD do maintain are often associated with decreased satisfaction (Alden & Taylor, 2004; Heinrichs, 2003; Rodebaugh, 2009; Rodebaugh, Fernandez, & Levinson, 2012).

However, recent longitudinal studies have provided important evidence to counter the belief that social anxiety causes interpersonal impairment. These studies suggest that poor friendship quality and decreased levels of perceived social support lead to increased social anxiety over time. In contrast, levels of social anxiety do not predict decreased friendship quality or perceived social support over time (Rapee, Peters, Carpenter, & Gaston, 2015; Rodebaugh, Lim, Shumaker, Levinson, & Thompson, 2015). These findings suggest that interpersonal impairment may play an important role in determining the trajectory and severity of SAD. Close relationships are known to confer significant mental and physical health benefits (Hawkley & Cacioppo, 2003), and recent studies have suggested that poor relationship quality is associated with worsening outcomes; thus, there is much utility in examining the interpersonal processes that individuals with SAD may use to navigate close relationships, including friendships.

Currently, interpersonal impairment is not directly addressed in cognitive-behavioral treatments for SAD (Heimberg et al., 1990). With a greater understanding of the interpersonal strategies that individuals with SAD employ within the context of close friendships, such as the provision and receipt of social support, we may be able to develop interventions to help individuals with SAD utilize more adaptive relationships behaviors.

An important area of focus within interpersonal processes is the provision and receipt of social support. Social support has been extensively studied within the context of interpersonal relationships (for review, see Uchino, 2004); however, little is understood about how individuals with SAD may provide and receive support from a partner, especially a close friend. Examining how individuals with SAD employ social support processes may reveal maladaptive processes

that may advance interpersonal theories of SAD and may also represent a fruitful ground to direct adaptive interpersonal change. Interventions targeting interpersonal impairment could have a more direct impact on reducing social anxiety symptomatology, as compared to addressing social anxiety symptoms exclusively (Rodebaugh et al., 2015). Although individuals with SAD have fewer relationships overall, close friendships may be more common than romantic relationships among individuals with SAD. Thus, this warrants research examining close friendships, as this focus may allow us to look at a larger, potentially wider, range of individuals with SAD and the behaviors they use to provide and receive social support.

### **Interpersonal constraint among individuals with SAD**

A growing body of research from the interpersonal literature suggests that individuals with higher levels of social anxiety report that they are restricted in the amount of interpersonal warmth they deliver to others (Alden & Taylor, 2004; Fernandez & Rodebaugh, 2011). Similarly, they have a greater tolerance for those who present as interpersonally cold, perhaps because they view these individuals as similar to themselves and thus, safer to interact with (Kachin, Newman, & Pincus, 2001; Rodebaugh et al., 2016). These studies suggest that individuals with SAD may be constrained in their interpersonal style, which may translate to more restricted patterns of social support within close relationships. A key study by Meleshko & Alden (1993) provides further evidence of interpersonal constraint among individuals with higher levels of social anxiety. Social presentation style and reciprocal self-disclosure within a small-talk conversation was manipulated and examined in conversations between individuals with higher and lower levels of social anxiety and a stranger. The stranger (i.e., confederate) was instructed to either reveal more intimate versus less intimate details within the conversation. Results demonstrated that individuals with higher levels of social anxiety maintained a moderate

level of self-disclosure, regardless of the stranger's level of self-disclosure, whereas individuals with lower levels of social anxiety better matched the strangers' level of self-disclosure (Meleshko & Alden, 1993). This study suggests that individuals with higher levels of social anxiety adopt a restricted and protective stance when interacting with others that may translate to restricted patterns of supportive behavior. These findings are also supported by a small number of studies that have directly tested these hypotheses. Primarily, an examination of self-reports from individuals who endorse higher levels of introversion and neuroticism and women who have higher levels of social anxiety demonstrated that these individuals also endorsed providing less support to their spouse or romantic partner (Cutrona, Hessling, & Suhr, 1997; Pasch, Bradbury, & Davila, 1997; Porter & Chambless, 2014). Similarly, studies have demonstrated that individuals with SAD and those with higher levels of social anxiety exhibit avoidant patterns of behavior in close relationships, including avoidance of conflict and emotional expression, which may translate into maladaptive styles of receiving support from their partner (Alden & Taylor, 2004; Darcy, Davila, & Beck, 2005; Davila, & Beck, 2002).

Overall, previous research suggests that individuals with SAD and higher levels of social anxiety engage in maladaptive interpersonal patterns that may impair relationship quality and restrict adaptive supportive behavior. However, many of these studies rely on retrospective self-report, and results are likely subject to the well-studied negative self-referential biases that individuals with higher levels of social anxiety exhibit (Morrison & Heimberg, 2013; Moscovitch, Orr, Rowa, Reimer, & Antony, 2009). Thus, studies utilizing behavioral coding procedures, which eliminate the potential for self-report biases, are needed to further clarify and extend these findings.

### **Patterns of support among close friends of individuals with SAD**

Previous literature has suggested that individuals with SAD and higher levels of social anxiety report receiving less social support from close friends and romantic partners (Cuming & Rapee, 2010; Porter & Chambless, 2014; Torgrud et al., 2004), despite evidence suggesting that romantic partners of individuals with higher levels of social anxiety report providing similar levels of social support, as compared to romantic partners of individuals with lower levels of social anxiety (Dunkel-Schetter, & Bennett, 1990; Beck, Davila, Farrow, & Grant, 2006; Porter & Chambless, 2014). This evidence suggests that individuals with higher levels of social anxiety may perceive less support to be available and may be more likely to interpret positive, supportive interactions through a negative lens, even when adequate support exists and is provided (Fernandez & Rodebaugh, 2011; Porter & Chambless, 2014).

In accordance with interpersonal theory, friends of individuals with SAD may engage in similar restricted patterns of support behavior, due to similarities in interpersonal style. However, previous studies demonstrated that friends of individuals with SAD are not more likely to have SAD themselves (Rodebaugh et al., 2014, 2015). That is, although individuals with higher levels of SAD may tolerate others who are interpersonally cold, their friends are not more likely to have SAD and may exhibit greater interpersonal warmth. Similarly, it is important to note that it may be considerably harder to maintain a long-term friendship between two individuals who are interpersonally cold, as compared to friendships where one partner is higher in warmth. These findings suggest that friends of individuals with SAD, particularly those involved in longer friendships, may not demonstrate the same support patterns as their partners.

### **Present Study**

I aimed to test the relationship between generalized SAD (GSAD) and social support behaviors within the context of close friendships. Individuals with GSAD and those without

(NOSAD) were invited to bring a close friend to an in-lab experiment where they were asked to engage in two brief conversations designed to assess social support behavior. In each conversation, the individual either served as the helper (providing help to their friend) or the helpee (requesting help from their friend) on a chosen topic. These conversations were coded using the Social Support Interaction Coding System (Pasch & Bradbury, 1998), a behavioral coding system that measured the amount of positive, negative, neutral, and off-topic behavior that the helper and helpee (i.e., the participant and his or her friend), engaged in.

A model was assessed that allowed GSAD status and condition to predict support behaviors. Demographic variables, including gender and length of friendship, were tested as additional predictors of the relationship between GSAD status and social support behaviors. Two and three-way interactions were also included between GSAD status and select variables, described below. As depressive symptoms are also associated with significant interpersonal impairment (Hammen, 2003; Hammen & Brennan, 2002; Mead, 2002) and social anxiety and depression are highly comorbid (Mineka, Watson, & Clark, 1998), level of depressive symptoms were tested as an additional predictor of the relationship between GSAD status and social support behaviors.

In keeping with interpersonal theories, we hypothesized that these participants would engage in less positive and more neutral support behaviors. We also hypothesized that individuals with higher levels of depression would engage in less positive and more negative support behaviors. We predicted that demographics, including gender and length of friendship would significantly predict support behaviors, but that these variables would not significantly moderate the relationship between GSAD status and support behaviors.

## **Methods**

## **Participants**

Individuals ( $N = 184$ ) were recruited in three groups: those diagnosed with generalized SAD (GSAD,  $n = 43$ ) those who did not endorse any SAD symptoms (NOSAD,  $n = 49$ ), and non-romantic close friends of participants in both groups ( $n = 92$ ). Participants in the GSAD group were recruited from the St. Louis community using flyers posted in public settings and clinics in the area, as well as television, newspaper, and the Internet. Participants in the NOSAD group were recruited from a volunteer registry and were matched to GSAD participants on age and race. Both groups of participants were invited to bring a current, non-romantic, close friend to a second session. Participants (but not close friends) first went through a screening process via phone to rule out exclusion diagnoses, including active mania, psychosis, substance abuse (including impairment from substance use in the past 60 days), and imminent suicidality. Participants were invited to participate in the clinical sample if they endorsed symptoms of SAD, suggestive of a diagnosis. Participants who did not endorse symptoms of SAD were invited to participate as part of the control sample. There was no specific screening process for close friends. However, any participants that demonstrated any acute symptoms of intoxication, psychosis, mania, imminent suicidality, or other psychological issues requiring immediate attention were excluded from the study. Both participants and their friends were compensated with \$15 per hour. Demographic characteristics of both participants and friends, divided by GSAD status, are presented in Table 1. The study sample was primarily female (66.67%) and white (50.27%), although 40.98% of the sample identified as black. The average age was 39.48 years and the average duration of friendship was 9.89 years.

## **Diagnostic Measures**

A licensed clinical psychologist, post-doctoral fellow, and four graduate students in a clinical psychology doctoral program conducted diagnostic interviews. Training was conducted and supervised by the licensed clinical psychologist and randomly selected diagnostic interviews were reviewed in a systematic way to assess reliability. These procedures will be briefly elaborated on below and are described in greater depth in a previous paper (Rodebaugh et al., 2014).

**Structured Clinical Interview for DSM-IV (SCID-IV-TR).** The SCID-IV-TR (First, Spitzer, Gibbon, & Williams, 2002) is a semi-structured interview that was used to assess both current and selected lifetime psychiatric diagnoses including internalizing disorders. The SCID-IV-TR maps on to psychopathology as defined in the DSM-IV and is considered to be a gold-standard in diagnostic assessment. The SCID-IV-TR was used primarily to assess current internalizing symptomatology, including GSAD. Past symptomatology was assessed in order to better define current diagnoses.

**Liebowitz Social Anxiety Scale (LSAS).** The LSAS (Liebowitz, 1987) is a 48-item clinician-administered scale measuring anxiety and avoidance of 24 social performance and interaction situations. For each situation, the clinician rates levels of anxiety using a 4-point Likert scale ranging from 0 - *None* to 3 - *Severe*, based on the participant's report. The clinician also rates the participant's report of avoidance of this situation on a 4-point Likert scale ranging from 0 - *Never* to 3 - *Usually*. The LSAS has been widely used as a measure of social anxiety – scores that are 60 and above suggest a probable clinical diagnosis of generalized SAD and scores below 30 suggest no diagnosis of SAD (Mennin, Fresco, Heimberg, Schneier, Davies, & Liebowitz, 2002). The LSAS was used to confirm GSAD diagnosis.

**Diagnostic algorithm.** The LSAS was used in combination with the SCID-IV-TR to determine diagnosis status. Individuals with a diagnosis of SAD from the SCID-IV-TR, as well as a score that was 60 and above on the LSAS were determined to have GSAD and were enrolled in the GSAD group. Those individuals who did not meet diagnostic criteria for SAD on the SCID-IV-TR and had scores below 30 on the LSAS were enrolled in the NOSAD group. Individuals who did not meet these criteria were excluded.

### **Self-Report Measures**

**Demographic Information.** Demographic information, including gender, was collected from participants and their close friends. Participants and their friends were also asked to provide the number of years and months that they had been friends.

**Beck Depression Inventory – II (BDI-II).** The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item frequently used measure of depressive symptoms. Items use a four-point scale to assess cognitive-behavioral symptoms of depression. The BDI-II has been previously shown to have good psychometric properties and was used in this study to assess the moderating effect of depressive symptoms on the relationship between GSAD and social support styles. Internal consistency was good for this measure ( $\alpha = .92$ ).

### **Coding System**

**Social Support Interaction Coding System (SSICS).** The SSICS (Pasch & Bradbury, 1998; Pasch et al., 1997) was used to code social support behaviors during the social support tasks (see Procedure). This coding system has been used in several other psychological studies exploring primarily romantic relationships (Beck et al., 2006; Lawrence et al., 2008; Trombello, Schoebi, & Bradbury, 2011; Verhofstadt, Lemmens, & Buysse, 2013). Helper behavior is divided into six styles: Positive Instrumental (e.g., problem-solving), Positive Emotional (e.g.,

validation), Positive Other (i.e., positive behavior not otherwise accounted for), Negative (e.g., minimizing or criticizing the helpee), Neutral (i.e., other behaviors related to the task, not otherwise accounted for), and Off-Task (i.e., behaviors that do not relate to the task). Helpee behavior is categorized into four styles: Positive (e.g., asking for help in a clear and effective manner), Negative (e.g., demanding help, expressing negative affect), Neutral (i.e., behaviors related to the task, not otherwise accounted for), and Off-Task (i.e., behaviors that do not relate to the task). As each participant took turns being the helper and helpee, both primary participants and their close friends were rated on their helper and helpee behavior over the two social support interactions.

**Coding Procedure.** Coders (undergraduate laboratory research assistants) attended a two-day training led by the principal investigator and a post-doctoral fellow. Coders were trained using materials, including video examples, supplied by one of the SSICS developers, Dr. Lauri Pasch. After the initial training, coders then rated video examples of social support interactions between romantic partners. These videos were not used in this study. The primary investigator reviewed ratings from the example videos and feedback was given on potential problems concerning fidelity of the codes; however, initial codes were not changed during the feedback process. After training, the coders then moved to rating non-example videos.

Video clips were randomized without reference to interaction or diagnostic status. Randomly selected videos ( $n = 16$ ) from each condition were reviewed and rated by all four coders and the remaining videos ( $n = 54-67$ ) from each condition were systematically and randomly assigned. Coders each rated the first four videos assigned independently. The principal investigator then reviewed reliability for the social support codes regularly to ensure adequate adherence to the coding protocol. Reliability was reviewed periodically and feedback was given

as necessary. Each month, coders rated a previously-coded clip together to reduce coder drift. Coding of all study videos was completed in nine months.

For each video, the coder reviewed the interaction between a helper and helpee (e.g., participants and their close friends). They rated the helper on six different styles of providing social support (Positive Instrumental, Positive Emotional, Positive Other, Negative, Neutral, Off-task) by recording the number of times that the helper engaged in each type of behavior. They also rated the helpee on four styles of receiving social support (Positive, Negative, Neutral, and Off-task) by recording the number of times the helpee engaged in specific helpee support behaviors.

Coders were blind, in that they did not receive information on the individual's diagnostic status or other information regarding the study. Importantly, coders were asked to describe their impressions of the study and to guess the main focus of the study, after they completed coding the interactions. The coders were not aware that the focus of the study was to compare interpersonal processes between individuals with GSAD versus NOSAD. However, some coders reported that they believed the participants might have been recruited based on level of (social) anxiety or depression.

**Coding Reliability.** To account for the low counts of Positive Instrumental and Positive Emotional helper codes, all positive helper code values were summed to create a total positive helper code (Positive) (Trombello et al., 2011). Inter-rater reliability for this sample was initially measured for each interaction using data from the original dataset to measure reliability for each code in each interaction across the four coders. Reliability was measured for each interaction, rather than across interactions, as the same participants appeared in both interactions. Two-way

random intra-class correlations (ICC), measuring absolute agreement across average measures varied widely across the codes and coders for each interaction (Table 1).

A small, random subset of videos in each condition was rated by all four coders. Random subsets of the remaining videos were systematically assigned and rated by each pair of coders. Random forest imputation (described below) was used to impute values for codes rated by fewer than four coders, resulting in five imputed datasets. Reliability for each code was measured for each interaction across the four coders and in each of the five imputed datasets. Again, ICC values varied widely across codes (Table 1) and differed based on clip order (e.g., Negative codes were more reliable in the second clip, as compared to the first clip, suggesting the presence of order effects).

Overall, reliability was inconsistent for individual codes within each interaction, thus codes were rearranged to sort codes by the role (helper versus helpee) for primary participant and their friends. Reliability was examined for primary participants and friends for helper and helpee for each code across the four coders. Reliability varied widely, and Negative and Off-Task codes still demonstrated fair to poor ICC values, compared to previous studies using the SSCIS (Trombello et al., 2011) (Table 2).

To account for the low reliability in the Negative codes, Negative helper codes were subtracted from Positive helper codes to create a Positivity valence helper code. This process was repeated for the helpee codes to create a Positivity valence helpee code. This Positivity valence code reflected the overall level of positive support behavior accounting for the individual's level of negative support behavior. Reliability was examined for the Positivity valence codes across the four coders and in the five imputed datasets and the average ICC was adequate (Table 3). Reliability for Off-Task codes was examined among participants and

friends, helper and helpee roles, as well as on the dyad level. All methods of examining reliability for Off-Task codes suggested that these codes were not reliable. Thus, the Off-Task codes were not used in the study analyses.

## **Procedure**

Data presented here were obtained as part of a larger study (see Rodebaugh et al., 2014). After participants were initially screened and recruited, as previously described, they came to the lab for their first session. Participants completed a diagnostic interview, including the SCID-IV-TR and LSAS, as well as a battery of self-report measures. Participants were then invited to a second session and were asked to bring a close friend to this session. Friends were assessed using the M.I.N.I. International Neuropsychiatric Interview, version 6.0 (Lecrubier et al., 1997) and both participant and friend completed self-report measures. The social support tasks were then explained and both participant and friend were asked to select a topic or issue that they needed help managing or changing. Participants were randomly selected to serve either as the helper (providing help) or helpee (receiving help) in the first support conversation. Participants and friends discussed the helpee's topic during a 10-minute conversation. They then had 10-minute break, before completing a 10-minute conflict task, discussing a topic that was a problem in their relationship (data from this task was not analyzed in this study). Finally, after a second 10-minute break, they then alternated support roles and completed a second 10-minute conversation. Participants were then invited to bring their romantic partner to a third session. If participants did not plan on attending the third session, they were debriefed on the nature of the experiment.

## **Data Analytic Method**

**Random forest imputation.** To accommodate the planned missing values for social support interaction codes rated by fewer than four coders, random forest imputation was used,

via the missForest package in R (Stekhoven, 2013). Random forest is a non-parametric iterative imputation method that uses machine learning to understand underlying patterns in data by building decision trees based on predictive variables to build a predictive model. This predictive model can then be used to estimate and impute missing values. A decision tree consists of a list of all variables, ranked in order of variables that are most useful for determining the missing values in a selection of the data. However, due to the complexity of patterns in data, one decision tree cannot accommodate the entire dataset, thus multiple decision trees (i.e., a forest) are created to build a predictive model that can account for patterns within the entire dataset. Random forest imputation first trains a forest by developing a predictive model based on a selection of data that is not missing any values. Error is computed for this model and the model is adjusted until error is sufficiently low. Once error has been minimized, this model is then applied to the portions of data that are missing values. The R package, missForest, was used to impute missing values, primarily to impute values for the social support interactions that were not coded by all four coders. Five imputed datasets were created as part of the multiple imputation process. Imputed values were reviewed to ensure that they did not exceed the minimum/maximum for that variable in the original dataset.

**Structural Equation Modeling.** Structural equation modeling (SEM), using MPlus, Version 7.0 (Múthen, & Múthen, 1998-2012) was used to test models. The MLR estimator was used, as it is appropriate for multivariate nonnormal variables, such as those included in this study. Analyses were conducted using Mplus 7.1 (Múthen, & Múthen, 1998-2012). Standard fit indices were examined to determine fit of the models (Hu, & Bentler, 1999), including the root mean square error of approximation (RMSEA; Steiger, & Lind, 1980), comparative fit index (CFI; Bentler, 1990), and Tucker-Lewis incremental fit index (TFI; Tucker, & Lewis, 1973). To

reduce the risk of biased fit indices associated with small sample sizes, the Swain correction was used to adjust fit indices (Boomsma, & Herzog, 2013; Herzog, & Boomsma, 2009). The Swain corrections were calculated using a Swain correction function in R (Boomsma, & Herzog, 2013).

A model was constructed testing the effects of GSAD status, clip order, relationship length, participant gender, and friend gender on participant and friend support behaviors, including positivity valence, neutral, and positive helper and helpee codes. Interaction terms were created to account for the interactions between condition and GSAD status, GSAD status and friendship length, and the primary participant and friend gender (i.e., presence of a same-sex dyad). The model was further assessed by constraining paths between predictor terms and support behaviors, beginning with the highest order interaction term.

This process was done to reduce the number of tests and parameters included in the final model. As the original model had 120 pathways, we wanted to reduce the number of pathways, given the probability of Type I error. By first determining which terms exhibited a significant omnibus effect on the group of support behaviors, before analyzing paths between terms and individual support behaviors, we were able to remove terms that did not significantly contribute to the model, increasing model parsimony and preserving statistical power. For example, if the path between a participant's GSAD diagnosis and their positive helper support behavior was significant in the original model, it would be difficult to know whether this pathway was significant due to a true effect or due to a Type I error (i.e., given the large number of pathways included, the likelihood of this pathway reflecting a false positive is considerable). Thus, we would first want to ensure that GSAD diagnosis exerts a significant omnibus effect on support behaviors, before interpreting effects between GSAD diagnosis and positive helper support behaviors. If the term does not have a significant omnibus effect, this suggests that it does not

contribute to the model and can be removed, increasing statistical power. If the term is significant at the omnibus level, we are more confident that this term represents a substantive addition to the model.

A two-step process was used to determine comparative fit of the constrained models, examining the Wald test statistic (Wald, 1943). All paths involving a specific term were constrained and set equal to each other. If the Wald test was non-significant,  $p > .05$ , this suggested that the paths were equivalent and could be set equal to each other, increasing model parsimony. If the Wald test was significant,  $p < .05$ , this suggested that the paths were not equivalent. In this event, other constraints were examined, e.g., constraining paths by participant versus friend support behaviors. Once paths were constrained as equivalent, each set of equivalent parameters were set equal to 0, to determine if the paths involving the specific term significantly contributed to the model. If the Wald test was non-significant, this suggested that the set of equivalent parameters did not contribute significantly to the model and that the term could be removed, increasing model parsimony. If the Wald test was significant, this suggested that the term contributed significantly to the model and the term and its set of equivalent parameters were retained in the model.

Depression was also examined in a second set of models by adding the main effect of depression, as well as testing interactions with the terms included in the final model. A similar process was used to constrain individual terms in the depression model to determine if paths including depression contributed significantly to the model. An alpha of .05 was used to determine statistical significance between study predictors and support codes.

## **Results**

### **Correlation Analyses**

Bivariate correlations were examined between the predictor variables, demographic variables, and participant and friend support variables. Correlations ranged in size from moderate to high (Tables 5 - 6). Helper and helpee codes, among participant or friend, were significantly associated with each other, as were level of depressive symptoms and GSAD status, and participant and friend gender. However, GSAD status was not significantly associated with support behavior. Interestingly, friend gender was significantly associated with friend support behaviors, but this pattern was not replicated among participant gender and participant support behaviors. Correlations between participant and friend support codes from alternating roles (helper vs. helpee) were statistically significant and ranged in size from moderate to high (Table 7).

### **Creation of the Structural Equation Model**

A preliminary model was tested to examine the effects of GSAD diagnosis, condition, participant and friend gender, length of friendship on participant and friend support behaviors. Two-way interactions between participant and friend gender, GSAD diagnosis and condition, GSAD diagnosis and length of friendship were tested, along with a three-way interaction between GSAD diagnosis, condition, and length of friendship. As our study sample was small, we were limited in the statistical power necessary to analyze multiple interactions, as the interactions of multiple categorical predictors often resulted in low cell counts. Thus, as interpersonal constraint may manifest differently in friendships as a function of length of friendship, we decided to examine the three-way interaction between GSAD diagnosis, condition, and length of friendship. This model was saturated and had perfect fit. A series of models was tested, constraining each term, beginning with the highest order interaction term, to determine presence of omnibus effects and increase model parsimony. Results of this process are

demonstrated in Table 8. This procedure suggested that all interaction terms, as well as participant gender and length of relationship, did not significantly contribute to the model. Thus, these terms were removed from the model.

A model developed by constraining paths and retaining those with significant omnibus effects, using the process described above, was assessed. This model constrained GSAD diagnosis paths by helper and helpee behaviors, constrained friend gender paths as equivalent, and left the condition (clip order) variable unconstrained. This model had excellent Swain-adjusted fit indices: RMSEA = 0.05, CFI = 0.99, TLI = 0.99 (Figure 1). Level of depressive symptoms was added to this model to determine whether depression predicted support behaviors. Two-way interactions were also tested between depression and condition, depression and friend gender, and depression and GSAD status. A similar process as described above was used to constrain depression terms. Results of this process are demonstrated in Table 8. This procedure suggested that depression, as well as the interaction terms including depression, did not significantly contribute to the model. Thus, these terms were removed from the model.

**The effect of GSAD diagnosis on support behaviors.** There was a significant omnibus effect of GSAD diagnosis on helper,  $b = -1.30$ ,  $p = 0.049$ , and helpee,  $b = -1.70$ ,  $p = 0.012$ , behaviors, suggesting that individuals with GSAD and their friends exhibited fewer helper and helpee behaviors.<sup>1</sup> Additionally, friend's gender had an omnibus effect on support behaviors collectively,  $b = -1.89$ ,  $p < 0.05$ , such that dyads in which the close friend was female engaged in more positive and neutral support behaviors. Finally, condition (clip order) significantly predicted participant neutral helpee behaviors, such that participants who were provided help in

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<sup>1</sup> We present the unstandardized estimates for GSAD diagnosis in the text here and present y-standardized estimates in Table 9. Although we constrained the GSAD and helper, helpee path estimates, this does not constrain the standard error. As the standard error for each path is different, there are slightly different standardized estimates for each path.

the first conversation exhibited more neutral helpee behaviors in the second conversation,  $b = 3.67, p < 0.05$ . Model estimates are displayed in Table 9 and the final constrained model is displayed in Figure 1.

### **Post-hoc models**

A post-hoc model was assessed, in which an average support behaviors score was calculated for participant and friend, helper and helpee support behaviors, respectively. This model was conducted to determine whether GSAD status significantly predicted differences in how much individuals talked during interactions. GSAD status, friend gender, and condition were allowed to predict both participant and friend total behavior scores. Paths between GSAD status and total helper behaviors were constrained, as well as paths between GSAD status and total helpee behaviors. All paths between friend gender and total behavior scores were constrained as equivalent. This model had excellent Swain-adjusted fit indices, RMSEA = 0.00, CFI = 1.00, TLI = 1.00. Results suggested that GSAD status did not significantly predict the participants' average number of helper,  $d = 0.11, p = .528$ , or helpee,  $d = 0.27, p = .130$ , support behaviors, nor did it predict the friends' average number of helper,  $d = 0.11, p = .518$ , or helpee,  $d = 0.26, p = .138$ , support behaviors.<sup>2</sup> Results are demonstrated in Table 10.

A separate post-hoc model was assessed, to determine whether GSAD status predicted differences in negative behavior. Participant and friend helper and helpee negative behaviors were included in a model that used the same paths and parameters as the final model. As positivity valence codes were calculated using negative behavior codes, the positivity valence codes were removed from this post-hoc model to reduce multicollinearity. Due to the substantially low numbers of negative behaviors that resulted in negative behaviors falling on a

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<sup>2</sup> The  $y$ -standardized estimates (i.e., partially standardized coefficients) are presented, as the predictors are dichotomous. Thus, the estimates represent the increase in standard deviations of the outcome as a result of every one-unit increase in the predictor. These values are also equivalent to Cohen's  $d$ .

different metric as compared to positive and neutral behaviors, all behaviors were standardized. This allowed for all behaviors to be examined using a similar metric. The post-hoc model including negative behaviors had excellent Swain-adjusted fit, RMSEA = 0.05, CFI = 1.00, TLI = 0.98. Participant and friend helper negative behaviors were constrained as equivalent, as were helpee negative behaviors. In this model, GSAD did not significantly predict participant negative helper,  $d = 0.20$ ,  $p = .147$ , or helpee,  $d = 0.25$ ,  $p = .064$ , behaviors. Similarly, GSAD also did not predict friend negative helper,  $d = 0.21$ ,  $p = .136$ , or helpee,  $d = 0.24$ ,  $p = .082$ , behaviors. Constraining paths between predictors and negative behaviors, using the process described previously and examining Wald test statistics revealed that paths between predictors and negative behaviors did not significantly contribute to the model. Thus, paths between predictors and negative behaviors were removed from the model.

### **Discussion**

Recent literature suggests that interpersonal impairment may drive future social anxiety symptomatology and highlights the importance of examining interpersonal processes that individuals with SAD may use within the context of close relationships (Rapee et al., 2015; Rodebaugh et al., 2015). This study utilized behavioral coding to analyze support behaviors between individuals with GSAD and their close friends during two social support tasks. Results from this study suggest that GSAD status had significant omnibus effects on helper and helpee behaviors, such that dyads in which the participant had GSAD engaged in fewer positive and fewer neutral behaviors. Friends' gender, but not participants' gender, also had a significant omnibus effect on support behaviors, in that participants and friends in dyads in which the chosen friend was female exhibited more positive and neutral behaviors. Finally, condition (clip order) significantly predicted participant neutral helpee behavior. That is, participants who had

provided help in the first conversation, as compared to participants who received help in the first conversation, were significantly more likely to engage in neutral helpee behaviors as they received help in the second conversation, after the conflict task. Importantly, depressive symptoms did not significantly predict support behaviors, nor did they moderate any of the relationships between GSAD status, friends' gender, condition, and support behaviors.

These findings provide partial support for study hypotheses. Primarily, dyads with GSAD engaged in fewer positive support behaviors, although they also engaged in fewer neutral behaviors. In essence, in this context, GSAD status may dampen any non-negative behaviors. These findings are in keeping with interpersonal theories and provide nuance to the related research that suggests that individuals with SAD exhibit interpersonal constraint within close relationships. Namely, a constrained interpersonal style would suggest that the individual engages in less positive and more neutral behaviors, in line with study hypotheses. However, our results suggest that both participants with GSAD and their friends engaged in fewer positive, as well as fewer neutral behaviors when helping and receiving help from their friends. In contrast, participants with NOSAD and their friends engaged in more positive, as well as more neutral behaviors during the support conversations. However, there were no significant differences in number of total behaviors as a function of GSAD status. In short, the percentage of positive and neutral behaviors was smaller in GSAD dyads. This is inconsistent with the original hypotheses, which suggested that interpersonal constraint would be reflected in greater neutrality within the dyad. However, the decrease of positive and neutral (i.e., non-negative) behavior may be an even clearer hallmark of interpersonal constraint, and, thus, these findings provide important evidence supporting differences in support behavior among individuals with GSAD and their friends.

This study also further clarifies the literature describing how close friends of individuals with SAD behave within interpersonal relationships. The literature suggests that that partners (typically romantic partners) report that they provide similar levels of support, regardless of their partner's social anxiety symptoms. Results from this study provide contrary evidence in this regard and suggest that GSAD diagnosis has a similar effect on both participants and friends within this context. Additionally, given the moderate to large correlations between participant and friend helper and helpee codes, it is possible that friends of individuals with GSAD match their partner in levels of support behavior. That is, friends of individuals with GSAD also exhibited less positive and less neutral behavior, both when giving and receiving help, compared to friends of individuals with NOSAD. This suggests that friends may react to their friend (the primary participant) with a constrained interpersonal presentation style when engaging in support conversations. These findings provide behavioral evidence to counter the existing self-report findings, suggesting that close others provide similar levels of support within relationships, irrespective of diagnostic status. However, much of the previous literature has focused on romantic relationships, and, thus, behavioral patterns that are seen in friendships may differ. Likewise, these findings may reveal the presence of self-report biases in close others – in that they are more likely to view themselves in a positive light, and report providing more support to their partner. Although friends of individuals with higher levels of social anxiety may report that they provide similar levels of support to their partner, as compared to friends of individuals with lower levels of social anxiety, it may be that in specific support-focused contexts, they react to their partner by matching their level of supportive behavior. That is, when interacting with their partner who has higher levels of social anxiety, they may be more likely to match this partner and both provide and receive lower levels of positive and neutral behavior within the interaction.

Furthermore, we predicted that depressive symptoms would predict fewer support behaviors and more negative support behaviors. Depressive symptoms did not predict participant or friend support behaviors; nor did they significantly moderate any relationships between GSAD-variables and support behaviors. These effects are surprising, given the extensive literature noting interpersonal impairment due to depression. It may be that comorbid depression symptoms are less likely to impact support behaviors within friendships, when GSAD is the primary concern. Future studies should aim to examine the effects of depression on support behaviors in a sample specifically recruited for depression, to better understand how comorbid depressive symptoms impact support behaviors within close friendships.

Results from this study should be interpreted within the limitations of our study design. A potential limitation was that reliability for negative and off-task codes were low. This may be due to the fact that there were limited instances of negative support behaviors between participants and their close friends. It is possible that negative behavior is not as readily seen in friendships as compared to romantic relationships. To account for low reliability in negative behavior codes, we created a positivity valence code. This valence code represented the difference of positive and negative behaviors, which allowed us to account for negative behaviors while still addressing the limitations of low reliability for this code.

Another limitation may be the structure of the study design that involved a conflict task between participant and friend in between the two support conversations. This is evidenced by the fact that clip order was a significant predictor of participant neutral helpee behaviors, although clip order did not significantly predict any other support behaviors. Additionally, review of the reliability for negative codes (Table 1) demonstrates that reliability was higher in the second conversation. It is possible that the conflict task induced negative affect that resulted

in the presence of more frequent negative support behaviors that remained in the second support conversation. If this were the case, then a higher frequency of negative support behaviors would have increased reliability. Notably clip order did not significantly predict most support behaviors nor did it moderate relationships with any support behaviors. This suggests that the conflict task does not pose a significant limitation to our study design.

Finally, our small study sample of approximately 46 dyads reflected a primarily white and female demographic that limits our ability to generalize study results to the wider population of individuals with SAD. Notably, friend gender was a stronger predictor of support styles, in that dyads in which the chosen friend was female engaged in more positive and more neutral support behaviors compared to dyads in which the chosen friend was male. This gender effect may be due to differences in interpersonal style – in that women may be more likely than men to verbalize their support within close friendships and when they are specifically asked to provide support. Future studies should aim to recruit a larger sample from a wider demographic to better generalize to the population of individuals with SAD and their friends.

Despite limitations, our study design also exhibits key strengths. Namely, we recruited a clinical population of individuals with SAD and collected behavioral data from both participants and their close friends. Much of the previous literature has focused on romantic partners and has largely ignored close friendships. However, given that individuals with SAD are likely to experience fewer romantic, dating, and sexual relationships, including marriage, close friendships represent an accessible and potentially important type of relationship for individuals with SAD. Thus, this study provides useful evidence regarding interpersonal behaviors that individuals with SAD may use within close friendships.

Furthermore, we present behavioral data from two social interactions. The use of behavioral coding to supplement self-report data represents a critical advancement to a field that has predominantly relied on self-report, which is likely susceptible to cognitive biases. Notably, this behavioral data conflicts with existing self-report literature that suggest that friends provide similar levels of support to their partner irrespective of GSAD status. These data suggest that there could be important differences in support behaviors in dyads in which one partner has been diagnosed with GSAD. Data presented here are somewhat congruent with how individuals with SAD describe themselves interpersonally. Individuals with SAD are more likely to describe themselves negatively, and, indeed, our data suggests that they are less likely to utilize positive support behaviors; however, we did not find substantial evidence to suggest that they are more likely to utilize negative behaviors. Although conclusions from this data regarding negative behavior are limited, overall, these behavioral data provide important evidence to clarify and extend previously literature describing interpersonal style, as measured via self-report.

The behavioral evidence presented in this study suggests that there are significant differences in the friendship dynamic between individuals with GSAD and their friends, compared to individuals with NOSAD and their friends. These differences may have important clinical implications and extend previous literature that has focused on self-reported interpersonal impairment among individuals with SAD. Given that interpersonal impairment leads to greater social anxiety over time, our findings suggest that there are behavioral indicators that can be addressed regarding support processes in close friendships. Targeting interpersonal relationships and increasing effective support behavior may better address social anxiety symptomology, as compared to focusing specifically on anxiety symptoms. These findings suggest that the decrease of supportive behaviors within a support-focused context may provide

useful evidence to inform how GSAD effects support processes within close friendships. Importantly, both participants with GSAD and their friends engaged in fewer support behaviors, suggesting that there is something unique about the dyad dynamic that differentiates their friendship from friendships in which the partner does not have SAD. Clinical interventions should address support behaviors and focus on how to help individuals with SAD both effectively provide and elicit support, building positive support styles within close relationships. It is possible that targeting an individual's interpersonal behavior may improve friendship quality and could have important implications on social anxiety symptomatology later on. Overall, this study provides novel evidence of behavioral manifestations of interpersonal constraint, providing insight into how individuals with GSAD may interact with their friends and setting the stage for future studies to determine how these behaviors may translate to friendship quality.

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# Figures and Tables

*Table 1.* Demographics, depressive symptoms, and support behaviors for primary participants and friends.

	Primary Participants ( <i>n</i> = 92)		Friends ( <i>n</i> = 91)	
	GSAD ( <i>n</i> = 51)	NOSAD ( <i>n</i> = 41)	GSAD ( <i>n</i> = 51)	NOSAD ( <i>n</i> = 40)
Mean age (SD)	40.57 (13.98)	37.93 (14.08)	38.60 (15.14)	40.80 (15.25)
Number of women (%)	35 (68.6)	29 (70.7)	34 (66.7)	24 (60.0)
Race (%)				
White	25 (49.0)	23 (56.1)	24 (47.1)	20 (50.0)
Asian	2 (3.9)	0 (0.0)	2 (3.9)	1 (2.5)
Black	19 (37.3)	17 (41.5)	22 (43.1)	17 (42.5)
Hispanic	1 (2.0)	2 (4.9)	2 (3.9)	1 (2.5)
Multiracial	25 (49.0)	1 (2.4)	1 (2.0)	2 (5.0)
Friendship Duration (yrs)	11.26 (10.36)	8.52 (7.57)	--	--
Mean BDI score (SD)	20.02 (10.94)	4.71 (4.79)	--	--
Positivity Helper	13.79 (5.13)	14.61 (4.54)	14.51 (4.57)	14.59 (5.89)
Positive Helper	14.83 (5.09)	15.72 (4.06)	15.67 (4.55)	15.35 (5.81)
Neutral Helper	15.01 (8.60)	14.50 (6.71)	15.15 (7.99)	16.03 (6.30)
Positivity Helpee	12.61 (4.30)	14.08 (4.84)	12.39 (4.58)	13.62 (4.56)
Positive Helpee	13.73 (3.85)	14.86 (4.69)	13.47 (4.52)	14.65 (3.94)
Neutral Helpee	16.63 (7.83)	17.12 (6.38)	15.82 (7.89)	16.06 (6.54)

*Note.* GSAD = Generalized social anxiety disorder; NOSAD = No social anxiety disorder; Yrs = Years; BDI = Beck Depression Inventory. ‘Positivity’ refers to the positive valence behavioral code.

Table 2. Intraclass correlations (ICC) for each code in each interaction from the original dataset and averaged across the five imputed datasets.

Social Support Code	Description	ICC, Original Dataset	Average ICC over Imputed Datasets
First Interaction			
Helper			
Positive	Constructive problem solving or emotional reassurance and validation.	0.95	0.81
Negative	Criticizing, blaming the helpee	0.62	0.11
Neutral	Supportive behavior related to the task, not otherwise accounted for	0.88	0.71
Off-Task	Behavior that is not related to the task	0.86	0.34
Helpee			
Positive	Clearly and effectively stating the problem and requesting help	0.95	0.71
Negative	Demanding help, criticizing, blaming the helper	0.31	0.07
Neutral	Behavior related to the task, not otherwise accounted for	0.83	0.62
Off-Task	Behavior that is not related to the task	0.93	0.33
Second Interaction			
Helper			
Positive	Constructive problem solving or emotional reassurance and validation.	0.82	0.51
Negative	Criticizing, blaming the helpee	0.78	0.59
Neutral	Supportive behavior related to the task, not otherwise accounted for	0.71	0.61
Off-Task	Behavior that is not related to the task	0.24	0.50
Helpee			
Positive	Clearly and effectively stating the problem and requesting help	0.82	0.66
Negative	Demanding help, criticizing, blaming the helper	0.96	0.57
Neutral	Behavior related to the task, not otherwise accounted for	0.57	0.54
Off-Task	Behavior that is not related to the task	0.004	0.48

Table 3. Intra-class correlations (ICC) by role for primary participants and friends.

Social Support Code	Description	Average ICC over Imputed Datasets
Primary Participants		
Helper		
Positive	Constructive problem solving or emotional reassurance and validation.	0.62
Negative	Criticizing, blaming the helpee	0.56
Neutral	Supportive behavior related to the task, not otherwise accounted for	0.69
Off-Task	Behavior that is not related to the task	0.39
Helpee		
Positive	Clearly and effectively stating the problem and requesting help	0.69
Negative	Demanding help, criticizing, blaming the helper	0.42
Neutral	Behavior related to the task, not otherwise accounted for	0.57
Off-Task	Behavior that is not related to the task	0.44
Friends		
Helper		
Positive	Constructive problem solving or emotional reassurance and validation.	0.76
Negative	Criticizing, blaming the helpee	0.47
Neutral	Supportive behavior related to the task, not otherwise accounted for	0.61
Off-Task	Behavior that is not related to the task	0.44
Helpee		
Positive	Clearly and effectively stating the problem and requesting help	0.67
Negative	Demanding help, criticizing, blaming the helper	0.52
Neutral	Behavior related to the task, not otherwise accounted for	0.58
Off-Task	Behavior that is not related to the task	0.36

Table 4. Intra-class correlations for Positivity valence codes.

Social Support Code	Intraclass Correlation, Average over Imputed Datasets
Primary Participants	
Positivity, Helper	0.62
Positivity, Helpee	0.69
Friends	
Positivity, Helper	0.73
Positivity, Helpee	0.66

Note. 'Positivity' refers to the positive valence behavioral code.

Table 5. Correlations between predictor variables and participant support behaviors.

	1	2	3	4	5	6	7	8	9	10	11	12
1. GSAD status												
2. Condition	.03											
3. Participant gender	.02	.11										
4. Friend gender	-.06	-.05	.49**									
5. Friendship length	.15	-.05	-.14	.013								
6. Depression	.66**	-.05	-.11	-.09	.15							
7. Positivity Helper	-.08	-.09	-.08	-.19	.08	.05						
8. Positivity Helpee	-.16	-.17	-.19	-.17	-.07	-.04	.30**					
9. Positive Helper	-.10	-.13	-.09	-.16	.09	.06	.98**	.32**				
10. Positive Helpee	-.13	-.09	-.19	-.18	-.09	-.03	.31**	.98**	.32**			
11. Neutral Helper	.03	-.01	.04	-.03	.12	-.10	.04	.03	.09	.06		
12. Neutral Helpee	-.03	.20	.04	-.08	-.05	-.23*	-.10	.02	-.05	.10	.72**	

Note. \* represents  $p < 0.05$ . \*\* represents  $p < 0.001$ . GSAD = Generalized social anxiety disorder. 'Positivity' refers to the positive valence behavioral code.

Table 6. Correlations between predictor variables and friend support behaviors.

	1	2	3	4	5	6	7	8	9	10	11	12
1. GSAD status												
2. Condition	.03											
3. Participant gender	.02	.11										
4. Friend gender	-.06	-.05	.49**									
5. Friendship length	.15	-.05	-.14	.01								
6. Depression	.66**	-.05	-.11	-.09	.15							
7. Positivity Helper	-.01	.04	-.19	-.22*	-.17	.01						
8. Positivity Helpee	-.15	.05	-.14	-.31**	-.03	-.13	.33**					
9. Positive Helper	.03	.09	-.19	-.22*	-.18	.04	.99**	.33**				
10. Positive Helpee	-.15	-.02	-.17	-.29**	.01	-.09	.33**	.98**	.34**			
11. Neutral Helper	-.05	.13	.04	-.07	-.01	-.25*	-.06	.01	.01	.05		
12. Neutral Helpee	-.02	-.02	.07	.01	.11	-.11	-.03	.09	.04	.18	.69**	

Note. \* represents  $p < 0.05$ . \*\* represents  $p < 0.001$ . GSAD = Generalized social anxiety disorder. 'Positivity' refers to the positive valence behavioral code.

Table 7. Correlations between participant and friend support behaviors.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Participant Positivity Helper												
2. Participant Positivity Helpee	.30**											
3. Participant Positive Helper	.98*	.32**										
4. Participant Positive Helpee	.31**	.98**	.32**									
5. Participant Neutral Helper	.04	.03	.09	.06								
6. Participant Neutral Helpee	-.10	.02	-.05	.10	.72**							
7. Friend Positivity Helper	.26*	.81**	.28**	.84**	-.03	.09						
8. Friend Positivity Helpee	.78**	.34**	.75**	.35**	.17	.05	.33**					
9. Friend Positive Helper	.28**	.80**	.30**	.85**	.03	.15	.99**	.33**				
10. Friend Positive Helpee	.80**	.36**	.81**	.37**	.23*	.09	.33**	.98**	.34**			
11. Friend Neutral Helper	-.13	-.01	-.09	.07	.72*	.95**	-.06	.01	.01	.05		
12. Friend Neutral Helpee	.09	.04	.16	.08	.95**	.70**	-.03	.09	.04	.18	.69**	

Note. \* represents  $p < 0.05$ . \*\* represents  $p < 0.001$ . 'Positivity' refers to the positive valence behavioral code.

Table 8. Results of constrained paths in the creation of the structural equation model.

Constrained term	Constraining all paths as equivalent		Constraining participant and friend paths as equivalent		Constraining helper and helpee paths as equivalent		Constraining participant, friend, helper, and helpee paths as equivalent		Setting constrained paths to 0	
	Wald test statistic	df	Wald test statistic	df	Wald test statistic	df	Wald test statistic	df	Wald test statistic	df
GSAD diagnosis* condition* friendship length	7.146	11							0.071	1
Participant * friend gender	6.460	11							0.153	1
GSAD diagnosis* condition	11.493	11							1.301	1
GSAD diagnosis* friendship length	17.380	11							0.000	1
Friendship length* condition	24.225*	11	15.289**	10					0.432, 2.749	1, 1
Friend gender	4.814	11							5.576*	1
Participant gender	14.053	11							0.060	1
Condition	72.544*	11	65.838*	10	72.763*	10	54.004*	8		
Friendship length	19.728*	11			20.754*	10	11.962	8	1.153, 1.325, 0.613, 0.535	1, 1, 1, 1
GSAD diagnosis	26.733*	11	25.288*	10	17.193	10			3.88*, 6.365*	1, 1
Depression* Friend gender	7.043	11							0.012	1
Depression* Condition	23.441	11	23.288*	10	16.679	10			0.168, 0.512	1, 1
Depression* GSAD diagnosis	21.131*	11	17.150	10					3.335, 3.735	1, 1
Depression	26.490*	11	25.911*	10	20.747*	10	10.541	8	0.298, 1.314, 1.324, 0.194	1, 1, 1, 1

Note. \*  $p < 0.05$ . \*\* Paths were constrained by neutral helper and helpee behaviors versus positivity valence, positive helper and helpee behaviors, due to a clear pattern in direction of the estimates. GSAD = Generalized social anxiety disorder.

Table 9. GSAD status predicting participant and friend support behaviors.

Participant	Positivity Helper		Positivity Helpee		Neutral Helper		Neutral Helpee		Positive Helper		Positive Helpee	
	Est. ( $b^*$ )	SE	Est. ( $b^*$ )	SE	Est. ( $b^*$ )	SE	Est. ( $b^*$ )	SE	Est. ( $b^*$ )	SE	Est. ( $b^*$ )	SE
Condition	-0.215	0.218	-0.239	0.232	-0.125	0.242	0.514*	0.217	-0.304	0.216	-0.091	0.232
Friend gender	-0.399*	0.146	-0.424*	0.145	-0.243*	0.090	-0.265*	0.096	-0.417*	0.150	-0.447*	0.154
GSAD status	-0.275*	0.137	-0.379*	0.138	-0.169	0.089	-0.238*	0.097	-0.288*	0.143	-0.399*	0.142
<hr/>												
Friend	<hr/>											
Condition	0.138	0.220	0.020	0.221	0.349	0.234	-0.244	0.254	0.259	0.222	-0.068	0.211
Friend gender	-0.368*	0.129	-0.442*	0.164	-0.264*	0.094	-0.262*	0.095	-0.368*	0.129	-0.461*	0.169
GSAD status	-0.254*	0.118	-0.394*	0.152	-0.184	0.096	-0.235*	0.096	-0.254*	0.118	-0.412*	0.157

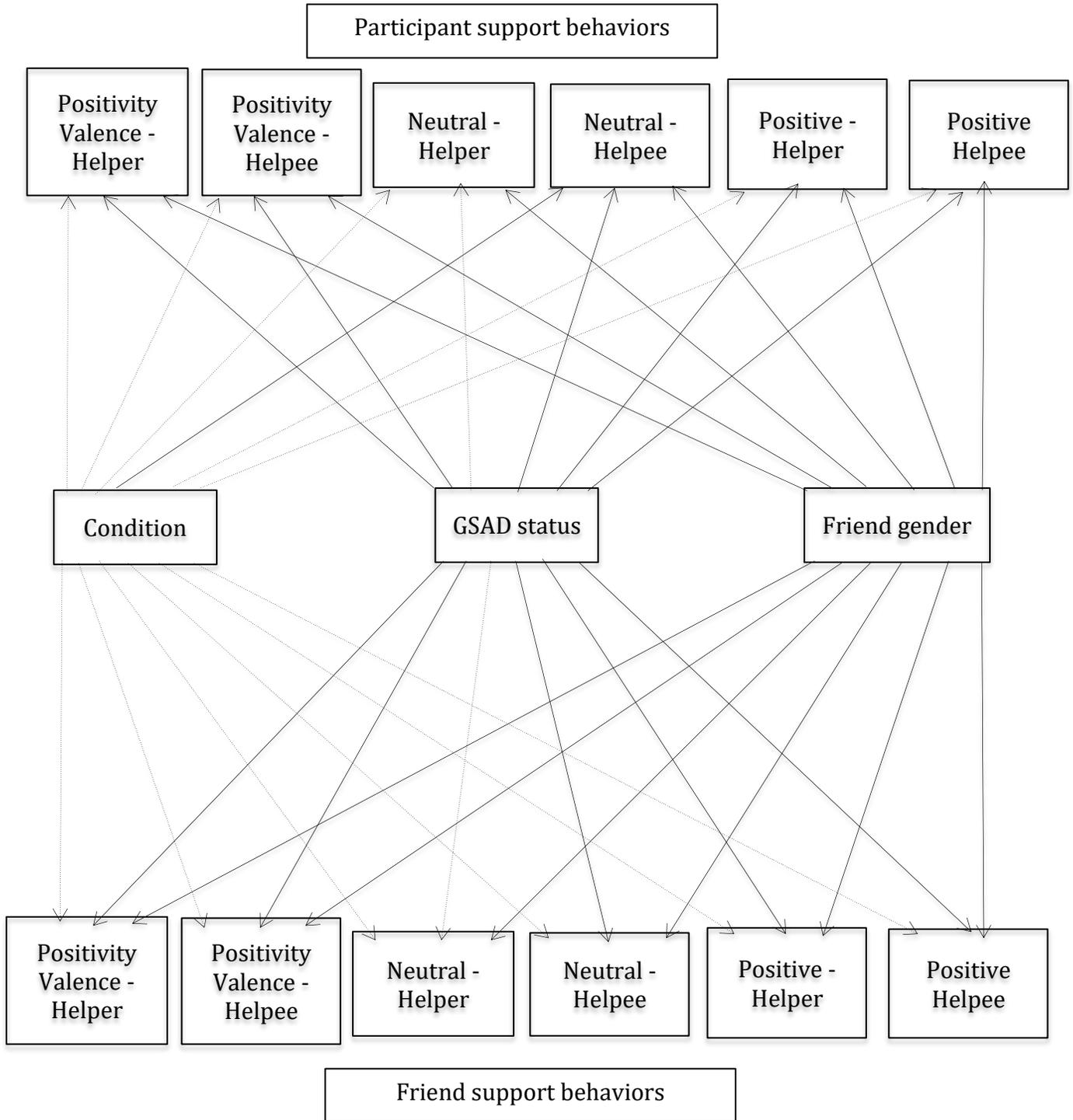
Note. \* represents  $p < 0.05$ . Estimates presented here are y-standardized (i.e., a partially-standardized coefficient). Thus, the estimate represents the increase in standard deviation of the outcome for every one-unit increase in the predictor. GSAD = Generalized social anxiety disorder. 'Positivity' refers to the positive valence behavioral code.

Table 10. Post-hoc model: GSAD status predicting average number of support behaviors.

	Participant Average Helper		Participant Average Helpee		Friend Average Helper		Friend Average Helpee	
	Est. ( <i>b</i> *)	SE	Est. ( <i>b</i> *)	SE	Est. ( <i>b</i> *)	SE	Est. ( <i>b</i> *)	SE
Condition	-0.270	0.235	0.191	0.232	0.368	0.227	-0.165	0.232
Friend gender	-0.378*	0.189	-0.409*	0.199	-0.385*	0.188	-0.402*	0.204
GSAD status	-0.106	0.168	-0.268	0.177	-0.109	0.168	-0.264	0.178

*Note.* Estimates presented here are y-standardized (i.e., a partially-standardized coefficient). Thus, the estimate represents the increase in standard deviation of the outcome for every one-unit increase in the predictor. GSAD = Generalized social anxiety disorder. ‘Positivity’ refers to the positive valence behavioral code.

Figure 1. Final constrained structural equation model



Note. Correlations were permitted between all support behaviors. Estimates are presented in Tables 9. Solid lines refer to paths that are significant at,  $p < 0.05$ . Dashed lines refer to paths that are non-significant,  $p \geq 0.05$ .