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A Multidimensional Approach to the Study of Social Anxiety and Friendships

by

Katya Christine Fernandez

A dissertation presented to the
Graduate School of Arts and Sciences
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requirements for the degree
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ABSTRACT OF THE DISSERTATION

A Multidimensional Approach to the Study of Social Anxiety and Friendships

by

Katya Christine Fernandez

Doctor of Philosophy in Psychology

Washington Unversity in St. Louis, 2014

Professor Thomas Rodebaugh, Chair

Despite its inherently interpersonal nature, the specific ways in which social anxiety symptoms interact with and impact friendships has not been well-studied. Research suggests that social anxiety, when compared with other psychological disorders, has a specific relationship with friendship impairment; however, the mechanisms that explain how this impairment functions over time are not well-understood. The current study sought to test whether interpersonal styles—dependence, avoidance, warmth, dominance, and emotional expressivity— mediate the relationship between social anxiety and both self- and friend-report friendship functioning over time. Participants consisted of undergraduate students who nominated a friend to participate in the study; both the participants and their friends filled out questionnaires assessing friendship functioning. The friend dyads were again asked to fill out questionnaires assessing friendship functioning 2 to 3 months later. Using longitudinal mediation analyses, models testing each interpersonal style as a mediator between social anxiety at Time 1 and both self- and friend-report friendship functioning independently at Time 2 were tested. None of the interpersonal styles significantly longitudinally mediated the relationship between social anxiety at Time 1 and friendship functioning at Time 2. Potential reasons for the lack of significant findings are discussed and suggestions for future research are explored.

A Multidimensional Approach to the Study of Social Anxiety and Friendships

Social anxiety is broadly defined as the experience of anxiety about social situations and is conceptualized as a continuous, rather than a categorical, construct. When maladaptive, social anxiety may involve persistent and excessive fear of negative evaluation in social situations that causes the individual distress; this maladaptive social anxiety is known as social anxiety disorder (SAD). Despite its inherently interpersonal nature, the specific ways in which social anxiety symptoms interact with and impact close relationships has not been well-studied. The presence and quality of friendships in particular have been shown to serve as protective factors for a variety of negative outcomes (e.g., depression; McLeod, Kessler, & Landis, 1992). If individuals with SAD engage in interpersonal behavioral patterns that inhibit or interfere with their ability to initiate and maintain friendships, then a thorough delineation of these patterns is necessary to address these relationship issues in the treatment of SAD.

Due to the multi-perspective nature inherent to interpersonal interactions, friendships and social anxiety should be studied using multiple dimensions of assessment (i.e., multiple sources of information, multiple time points of assessment, etc.). This *multidimensional* approach is necessary to (a) confirm and validate any findings obtained from one method of assessment, and (b) to assess whether and how constructs change over time. The ultimate goal of such a systematic exploration is the development of a complete model of interpersonal functioning in friendships that would provide more information about how individuals with maladaptive social anxiety perceive and interact with their friends; more specifically, such a model would provide more information about how these individuals view their friends, how their friends view them, and how relationships between these individuals change over time. This information in turn

would allow treatment providers to better understand the interpersonal dynamics that may be affecting the trajectory of social anxiety and SAD.

Social Anxiety

The current study assessed social anxiety, broadly speaking, with the goal of better understanding SAD. In the recent National Comorbidity Survey Replication (Kessler, 2005), SAD was found to be a relatively common mental disorder, affecting about 12% of the population across the lifetime; this prevalence partially accounts for the increase in research activity in recent years on the assessment, understanding, and treatment of the disorder (see Magee, Erwin, & Heimberg, 2009 for a recent review). SAD is highly comorbid with other forms of psychopathology, such as other anxiety, mood, and substance abuse disorders, and is associated with impairments in a variety of domains, as well as overall quality of life (Schneier et al., 1994; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992). Despite its status as an inherently interpersonal disorder, very little research has focused specifically on the role of social anxiety in intimate contexts such as friendships. If individuals higher in social anxiety report difficulties interacting with strangers or non-intimate individuals, it is reasonable to hypothesize that they would also experience difficulties in friendships. A variety of factors should be considered when conceptualizing how individuals higher in social anxiety initiate, maintain, and end friendships; for example personality traits, communication styles, attachment styles, etc. One way to organize these constructs is by considering them in light of general interpersonal styles (Alden & Taylor, 2004).

Interpersonal Styles and Social Anxiety

Interpersonal styles, broadly speaking, can be defined as behavior patterns or tendencies that individuals exhibit in social situations; interpersonal styles can reflect an individual's

behavior in group interactions as well as in one-on-one interactions. To understand how individuals higher in social anxiety function in friendships, it is useful to draw upon the literature depicting how these individuals behave interpersonally in general. For example, if individuals higher in social anxiety tend to display interpersonal styles characterized by submission, then it would be reasonable to hypothesize that excessive submission may be one pathway by which individuals higher in social anxiety fail to make friends as successfully as their less anxious counterparts.

Alden and Taylor (2010) highlight self-concealment and lack of reciprocity as key features of interpersonal processes in individuals with SAD. In other words, individuals with SAD feel the need to hide aspects of themselves (e.g., emotions and thoughts), primarily to avoid negative evaluation from others; they also do not reciprocate openness on the part of others. These tendencies may lead to an individual having a generally *avoidant* interpersonal style, whereby the primary goal in interacting with others consists of avoiding self-expression or self-disclosure. Such a style may result in others perceiving the individual with SAD as being cold, distant, and disinterested (Creed & Funder, 1998). As Grant, Beck, Farrow, and Davila (2007) highlight, this avoidant approach is consistent with the silencing the self theory (Jack & Dill, 1992), which highlights the negative effects (such as depression, decreased self-esteem, and a decreased sense of self) that may arise when an individual does not share his or her experiences with close others. This link may be one way in which social anxiety and interpersonal dysfunction correlate with depression.

In addition to avoidant interpersonal styles, however, there is also evidence that individuals higher in social anxiety display *overdependence* on others in close relationships (Davila & Beck, 2002). Such an overdependent interpersonal style is consistent with previous

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findings reporting an association between SAD and dependent personality disorder (Bornstein, 1995). Though at first an overdependent interpersonal style may appear to contradict an avoidant interpersonal style, it is possible that whether an individual adopts one style or the other depends on the context. Consistent with this context-dependent view, Alden (2001) suggests that if the individual's primary goal is to avoid negative evaluation, then he or she will tend toward avoidance; if the individual's primary goal is to achieve or maintain intimacy or closeness, then he or she will tend toward overdependence. If an individual higher in social anxiety wishes to both avoid negative evaluation and maintain closeness, then it is possible that he or she may engage in a strategic combination of these styles, alternating between self-concealment and needy behaviors. Similarly, it is possible that social fears underlie both interpersonal styles: In most interpersonal situations, individuals higher in social anxiety display an avoidant interpersonal style (due to an underlying fear of negative evaluation), but when in the context of an already-established close relationship, the individual may adopt a dependent interpersonal style (due to an underlying fear of either being alone or being abandoned/rejected by that close other). In the case of a close other, the individual no longer focuses on fears of negative evaluation, but rather a fear of abandonment or isolation: More research is needed to test the validity of this conceptualization.

Davila and Beck (2002) conducted a seminal study in which the interpersonal styles of individuals higher in social anxiety were analyzed within the context of close relationships, defined more specifically as friendships, family relationships, and romantic relationships. Davila and Beck decided to test five specific interpersonal styles in the context of close relationships: passivity (i.e., behaviors reflecting less assertion), conflict avoidance, avoidance of emotion expression, fear of rejection, and interpersonal dependency. Their main hypothesis was that

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individuals higher in social anxiety would show a greater tendency to engage in these behaviors, even after controlling for depressive symptoms, and that the five styles would be associated with interpersonal stress. Using an undergraduate sample, they conducted a face-to-face interview whereby participants discussed their specific interpersonal styles and their levels of interpersonal chronic stress. Participants were asked to discuss their interpersonal styles and chronic stress in their friendships, family relationships, and romantic relationships. The results indicated that, after controlling for depressive symptoms, social anxiety symptoms were positively associated with all hypothesized interpersonal styles. Additionally, these styles were positively associated with interpersonal chronic stress, which provides evidence for their maladaptive nature. Overall, Davila and Beck's study successfully demonstrated the relationship between social anxiety and interpersonal styles associated with avoidance (i.e., passivity, conflict avoidance, avoidance of emotion expression, and fear of rejection) and dependency.

Grant, Beck, Farrow, & Davila (2007) took the research on social anxiety and close relationships one step further, and investigated whether interpersonal styles associated with individuals higher in social anxiety would predict depression over time. As with Davila and Beck's (2002) study, Grant et al. focused on interpersonal styles involving friends, family, and romantic partners. More specifically, they hypothesized that social anxiety would be associated with avoidance of expressing emotion, lack of assertion, and interpersonal dependency, and that these three styles would in turn predict depressive symptoms longitudinally. Their results indicated that although social anxiety was associated with all three interpersonal styles, only avoidance of expressing emotion predicted depressive symptoms one year after initial measurement.

A recent study looked at whether the interpersonal styles of dominance and warmth would predict an individual's willingness to engage in blatant benevolence and costly consumption, two types of mating strategies. This study also tested whether the relationship between social anxiety and an individual's willingness to engage in these mating strategies would be mediated by these interpersonal styles (Fernandez & Rodebaugh, 2014). The authors found that dominance (and not warmth), was a significant mediator between social anxiety and willingness to engage in costly consumption specifically. The results suggested that individuals higher in social anxiety, who also reported problematic low dominance, were more likely to display inflexibility in their self-reported mating strategies. This study is one of few to directly test the link between social anxiety and interpersonal styles to romantic relationship functioning, more specifically mating strategies hypothesized to be linked to romantic relationship formation. Although dominance and warmth were tested in the context of romantic relationships, it is possible and likely that such interpersonal styles impact friendships as well.

Social Anxiety and Friendships

There are various types of close relationships, notably friendships, romantic relationships, and family relationships; the current study focuses solely on friendships. The focus on friendships is due to the nature of these relationships. Friendships are typically entered into voluntarily by both individuals; the characteristics of friendships may therefore differ from that of family relationships, which are largely involuntary and fixed at birth. The current study focuses on voluntary relationships to ascertain the effects of social anxiety on the initiation and outcome of these relationships (e.g., to better understand what factors may cause one of these voluntary relationships to terminate). Furthermore, research suggests that within an adolescent population, social anxiety specifically related to peer relationships above and beyond the effects

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of depression (e.g., friendships), whereas the relationship between social anxiety and family relationships did not hold once depressive symptoms were included in analyses (Starr & Davila, 2008). These findings suggest that social anxiety may have more of an impact on peer relationships than family relationships, particularly when considering the role of depression; however, future research should focus on relationship functioning in the family relationships of individuals higher in social anxiety as well.

Research has highlighted the importance of friendships in personal and interpersonal development and functioning throughout the lifespan. Several studies have found that individuals who report having friends also report greater psychological health throughout adulthood (Ginsberg, 1986; Hartup & Stevens, 1997). For example, some studies have shown a significant correlation between having friends and reporting fewer depressive symptoms (Bagwell, Newcomb, & Bukowski, 1998). Research has also found that having friends is associated with greater physical health, including longevity (Giles, Glonek, Luszcz, & Andrews, 2005). Despite these advantages, friendships also carry the potential for negative outcomes depending on how they function within an individual's life. For example, individuals whose self-esteem depends on the quality of their friendships have been found to be more susceptible to unstable self-esteem, which in turn predicted depressive symptoms (Cambron, Acitelli, & Steinberg, 2010). In other words, it is important not only to consider the presence or quality of friendships, but also how the individual utilizes and perceives friendships, particularly in terms of his or her own self-concept.

The existing literature on friendships and social anxiety specifically is limited, with the majority of studies focusing on adolescents (Erath, Flanagan, Bierman, & Tu, 2010; La Greca & Lopez, 1998; Van Zalk, Van Zalk, Kerr, & Stattin, 2011). Within these studies, both friendship quantity and quality have been linked with a variety of outcomes in individuals higher in social

anxiety. For example, Erath, Flanagan, Bierman, and Tu (2010) found that the associations between social anxiety and both loneliness and self-reported victimization were attenuated in individuals with more close friendships; this study supports the role of friendships as protective factors against a variety of negative outcomes. Similar studies have also shown that adolescents who report higher levels of negative qualities in their friendships (e.g., pressure) reported higher levels of depression and social anxiety; although the causal directions of these relationships are unclear, these results highlight the importance of friendships in social functioning (La Greca & Harrison, 2005). In adults, conflicts within friendships were associated with less rapid recovery from depressive episodes (McLeod, Kessler, & Landis, 1992).

Despite the seemingly positive and protective effects of friendships for individuals higher in social anxiety, it is also possible that these friendships may enable avoidance of discomfort, and over time come to function as safety behaviors. In line with this theory, Pontari (2009) found that individuals higher in social anxiety expressed fewer negative self-focused thoughts when a friend was present than when they were alone, despite the friend's presence having no effect on the individual's self-reported anxiety. However, the friend's level of social anxiety was not assessed in this study. Given Van Zalk, Van Zalk, Kerr, and Stattin's (2011) finding that adolescents higher in social anxiety tended to choose friends who are also higher in social anxiety, it is important to assess for both primary participant and friends' level of social anxiety. Van Zalk et al. suggest that over time, these individuals serve as a maintaining factor for each other's anxiety; if this is the case, then even though the individual higher in social anxiety experiences temporary relief from threatening social situations, he or she may engage in a self-perpetuating anxiety cycle in the long run.

More recently, Rodebaugh et al. (2014) conducted a study in which they assessed friendship functioning globally and friendship functioning pertaining to a specific friendship. Results indicated that social anxiety has a negative impact on self-perception of friendship for a specific friendship, but not on the quality of the same friendship as reported by friends (i.e., friend-report of the same friendship). More generally, the results of this study suggest that individuals higher in social anxiety may be reporting greater impairment in their overall friendships, but more subtle impairments when considering a specific relationship; such a finding may be due to biases in reporting (e.g., a tendency to exaggerate negative characteristics about the self; Moscovitch, Orr, Rowa, Reimer, & Antony, 2009; Rapee & Lim, 1992).

Much of the literature on friendships and social anxiety can be conceptualized within the framework of interpersonal styles. For example, if an individual higher in social anxiety adopts a generally avoidant interpersonal style, then this individual may be (a) more drawn toward developing friendships with other individuals who also adopt an avoidant interpersonal style, as such a relationship would involve relatively passive interpersonal processes (Van Zalk, Van Zalk, Kerr, & Stattin, 2011) and (b) more likely to experience short-term relief from anxiety when in the presence of friends, which may in turn exacerbate anxiety in the long run (Pontari, 2009). Further research is needed to identify the interpersonal styles (and their constituent behaviors, cognitions, and emotions) that most strongly predict friendship functioning in individuals higher in social anxiety.

Considering the Role of Depression

Given the high comorbidity between social anxiety and depressive symptoms (Ohayon & Schatzberg, 2010; Stein, Fuetsch, Muller, Hofler, Lieb, & Wittchen, 2001), it is important to consider the role of depression when conceptualizing friendship functioning in individuals higher

in social anxiety. One example of how social anxiety and depression may overlap in terms of friendships is interpersonal dependency. Interpersonal theories of depression highlight the important role of close relationships in the development and maintenance of depression, particularly in terms of dependency on close others (Coyne & Whiffen, 1995). If individuals with maladaptive social anxiety are more likely to display dependent interpersonal styles, then it is important to elucidate the function of depression. For example, it is possible that social anxiety interacts with interpersonal dependency to predict depression, which in turn leads to worse relationship functioning. More research is needed to test the causal relationships among these constructs.

Despite the comorbidity between social anxiety and depression, there is evidence that SAD is associated with impairment in friendships above and beyond depression; for example, Rodebaugh (2009) found a specific link between SAD and perceived friendship quality, above and beyond a variety of demographic variables and other mental disorders, including depression. To better understand what constructs are unique to social anxiety, it is necessary to assess both social anxiety and depression when assessing friendships.

Social Anxiety, Friendships, and Assessment

The vast majority of the studies thus far on social anxiety and friendships involve (a) assessment that occurs at a single point in time and (b) only self-report data. These methodological choices result in inherently interpersonal constructs being determined by a single person, who in turn reports on these constructs once. Because close relationships are dynamic in nature, relationship-relevant constructs (e.g., relationship closeness) may change over time. It is nearly impossible to be certain that a single time point measurement of a given construct is representative of that construct's nature over time; as a result, relationship constructs should be

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measured more than once whenever possible. Relatedly, a central part of the study of relationship dynamics is determining causal relationships; for example, determining which constructs best predict relationship functioning over time. Such questions cannot be answered with cross-sectional data; in fact, several researchers have highlighted the dangers of estimating longitudinal relationships cross-sectionally (Cole & Maxwell, 2003; Maxwell & Cole, 2007), emphasizing that such estimations result in substantially biased estimates of longitudinal relationships, among other issues.

Second, when attempting to capture an inherently interpersonal construct (e.g., relationship quality), it is by definition necessary to include the report of both relationship partners to obtain a more objective measure of that construct. It is possible that one partner may be satisfied with the relationship, but the other partner may be dissatisfied and his or her dissatisfaction may in turn strongly predict relationship functioning. Additionally, research has shown that individuals higher in social anxiety may underestimate their performance in social situations (Christensen, Stein, & Means-Christensen, 2003); it is possible that these individuals' perceptions of their friendships are similarly distorted. Consideration of both self- and informant-report is necessary to (a) obtain a more objective understanding of relationship processes, and to (b) minimize potential biases associated with the inclusion of a single perspective.

Finally, the measurement of both social anxiety and depression on a continuum (rather than as categorical diagnoses) allows for a more nuanced understanding of how these two constructs affect friendship functioning. The social anxiety and depression continuua include clinically significant levels of these symptoms; as a result, the results obtained in the current study may also provide insight into potential factors that may be contributing to the interpersonal

distress and impairment associated with both disorders (i.e., SAD and major depressive disorder).

The Current Study

The primary rationale for the current study is the development of a complete model of interpersonal functioning in friendships of individuals with varying levels of social anxiety that includes self- and informant-report and that captures friendship functioning across time. The current study focuses on (a) obtaining a multidimensional assessment of social anxiety and friendship constructs, (b) testing whether interpersonal styles explain how social anxiety affects friendships, and (c) elucidating the role of depression in conceptualizing social anxiety and friendships.

The current study tests the assumption that interpersonal styles, such as avoidant and overdependent interpersonal styles, play a key role in understanding how individuals higher in social anxiety think about and behave in friendships. In other words, interpersonal styles (rather than social anxiety symptoms alone), can help explain the effects of social anxiety on friendships. The interpersonal styles that are assessed in the current study include dependence, avoidance, dominance, warmth, and emotional expressivity. Previous research (Davila & Beck, 2002) has tested interpersonal styles as mediators between social anxiety and interpersonal chronic stress, but this research has not (a) utilized multiple measures of relationship functioning, (b) included informant-report of interpersonal styles and relationship functioning, and (c) tested whether the model holds when predicting relationship functioning over time.

HYPOTHESES

The first major hypothesis is that interpersonal styles will mediate the relationship between social anxiety and friendship dysfunction over time (2-3 months later). The five interpersonal styles that will be tested in the current study are: avoidance, dependence, warmth, dominance, and emotional expressivity. Each of these styles has been shown to correlate with social anxiety and close relationship functioning, and thus is hypothesized to mediate the relationship between social anxiety and friendship functioning. Below are more specific hypotheses corresponding to each interpersonal style, with supporting references in parentheses: 1a. Higher levels of avoidant interpersonal style will predict lower friendships functioning three months later (Davila & Beck, 2002). 1b. Higher levels of dependent interpersonal style will predict lower friendships functioning three months later (Davila & Beck, 2002). 1c. Lower levels of warm interpersonal style will predict lower friendships functioning three months later (Alden & Phillips, 1990). 1d. Lower levels of dominant interpersonal style will predict lower friendships functioning three months later (Fernandez & Rodebaugh, 2014). 1e. Lower levels of emotional expressivity will predict lower friendships functioning three months later (Kashdan, Volkmann, Breen, & Han, 2007; Sparrevohn & Rapee, 2009). Effects 1a through 1e are hypothesized to be independent and additive, such that individuals who endorse multiple interpersonal styles (in the hypothesized directions) will experience greater friendship impairment than individuals who endorse a single interpersonal style.

Because interpersonal styles have been found to play a role in friendships when correlating self-report measures administered at a single point in time (Alden & Taylor, 2010), and because interpersonal styles are conceptualized as stable (Davila & Beck, 2002), it is

hypothesized that the association between interpersonal styles and friendship functioning will hold across time.

The second major hypothesis is that interpersonal styles will mediate the relationship between social anxiety and friendship dysfunction over time (2-3 months later) above and beyond the effects of depressive symptoms. Because of some evidence indicating that social anxiety interacts with interpersonal styles above and beyond the effects of depression (avoidant and dependent interpersonal styles; Davila & Beck, 2002), it is hypothesized that this same pattern will be found for all interpersonal styles tested in the current study.

METHODS

Participants

      Primary participants. Eighty-nine participants were recruited from a private Midwestern university's Psychology undergraduate research pool and compensated with course credit for their participation. Of the 89 participants,[1] more than half were female ($n = 61$; 68.5%), and one participant did not report his or her gender ($n = 1$; 1.1%). The mean age was 19.12 years ($SD = 1.21$). In terms of ethnicity, the majority of participants were not of Hispanic origin ($n = 82$; 92%), with one person not specifying his ethnicity ($n = 1$; 1.1%), and in terms of race, the majority of participants were White ($n = 60$; 67.4%). Other races reported included Asian ($n = 18$; 20.2%), Black/African American ($n = 5$; 5.6%), Multiracial ($n = 5$; 5.6%), and one person reported that her race was not listed ($n = 1$; 1.1%). Participant social anxiety, as measured by the straightforward items of the Social Interaction Anxiety Scale (see **Measures**; $M = 21.8$, $SD = 13.9$) ranged from very low to very high (range: 1-60). A straightforward score of 28 has been found to correspond to a cutoff for possible SAD (Rodebaugh et al., 2011); in our sample, approximately 30 participants (33.7%) scored at or above this cutoff. Therefore, it is likely that clinically meaningful social anxiety exists in our sample.

      Of the 89 participants, 12 did not complete Time 2. When comparing the participants who completed both time points to participants who only completed Time 1, groups differed in terms of age ($t(87) = 2.22$, $p < .001$), such that participants who did not complete Time 2 tended to be younger. Groups were demographically equivalent in terms of gender and ethnicity.

      Friends. All 89 primary participants nominated a friend to participate in the study. Of the 89 nominated friends, 60 friends completed Time 1 and 40 completed Time 2; the 40 friends

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[1] One of the 89 participants completed assessments at Time 2, but not at Time 1.

who completed Time 2 all completed Time 1 as well.[2] Of the 60 friends who completed Time 1, one participant did not complete the demographics section. Of the remaining 59 participants, more than half were female ($n = 40$; 66.7%). The mean age was 19.12 years ($SD = 1.21$). In terms of ethnicity, the majority of participants were White, not of Hispanic Origin ($n = 39$; 65%). Other races reported included Asian or Pacific Islander ($n = 14$; 23.3%), Black/African American, not of Hispanic Origin ($n = 2$; 3.3%), Hispanic ($n = 1$; 1.7%), Multiracial ($n = 1$; 1.7%), American Indian or Alaskan Native ($n = 1$; 1.7%), and one person reported that his or her race was not listed ($n = 1$; 1.7%).

As mentioned above, of the 60 friends, 20 did not complete Time 2. When comparing the friends who completed both time points to friends who only completed Time 1, groups were demographically equivalent in terms of gender, age, and ethnicity.

Friendship Characteristics. The average relationship length of the friendship was 42.4 months ($SD = 39.9$; Range: 1-168), according to primary participant report. Relationship length did not significantly correlate with any of the variables under study (social anxiety, interpersonal styles, or friendship functioning). Of the 60 dyads (primary participants and their friends) who participated in Time 1, two dyads had one member of the dyad who did not indicate his or her gender. Of the remaining 58 dyads, 48 (83%) dyads were same-gendered.

Measures

Below is a description of each measure used in the current study. All internal consistency estimates are based on data gathered at Time 1.

Social Interaction Anxiety Scale (SIAS; Mattick and Clarke, 1998). The SIAS is a 20-item measure employing a 0 (*not at all*) to 4 (*extremely*) Likert-type scale. The items describe anxiety-related reactions to a variety of social interaction situations. Overall, research on the

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[2] Completion of a visit was defined as having completed at least one measure of friendship quality at that time point.

scale suggests good to excellent reliability and good construct and convergent validity (see Heimberg & Turk, 2002, for a review). The three reverse-scored items were omitted in the proposed study because available evidence suggests that these items fail to load on the same factor as the other items (Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006) and appear less related to social anxiety and more related to extraversion than is desirable (Rodebaugh, Woods, & Heimberg, 2007). Primary participants completed the SIAS in the current study, and the internal consistency for the straightforward SIAS score was excellent across Time 1 and Time 2 (αs $\geq$ .94).

The Social Phobia Scale (SPS; Mattick & Clarke, 1998). The SPS is a 20-item measure employing a 0 (*not at all*) to 4 (*extremely*) Likert-type scale. It assesses social anxiety related to being observed in a variety of situations. Research suggests good to excellent reliability and good construct validity for the SPS (Heimberg & Turk, 2002). In the current study, the SPS was used as a measure of social anxiety. Primary participants completed the SPS in the current study, and the internal consistency for the SPS was excellent across Time 1 and Time 2 (αs $\geq$ .93). A social anxiety composite variable was created by summing the standardized straightforward Social Interaction Anxiety Scale total and the standardized Social Phobia Scale total score. This composite had excellent reliability across Time 1 and Time 2 (reliability coefficient = .96; see Nunnally & Bernstein, 1994, p. 269).

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a self-report measure containing a series of 21 statements describing depressive symptomatology. Most items are on a 0 to 3 Likert-type scale; however, items assessing changes in sleeping pattern and appetite are on a 0 to 6 Likert-type scale. Various studies have supported the reliability and validity of the BDI-II (Beck et al., 1996; Steer, Ball, Ranieri, & Beck, 1999). In

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the current study, the suicide item was removed per IRB request. Primary participants completed the BDI-II in the current study, and the internal consistency for the remaining BDI-II items was excellent across Time 1 and Time 2 (αs ≥ .91).

Interpersonal Dependence Inventory (IDI; Hirschfeld, Klerman, Goiugh, Barrett, Korchin, & Chodoff, 1977). The IDI is one of the most widely used objective measures of interpersonal dependency, and is comprised of three scales: emotional reliance on another person (ER; 18 items), lack of social-self confidence (LSS; 16 items), and assertion of autonomy (AUT; 14 items). IDI whole-scale scores can be calculated by summing each participant's scores on the ER and LSS subscales, and then subtracting this total from the participant's score on the AUT scale. The current study utilized the whole-scale score only to test Hypothesis 1b. All items on the IDI are measured on a 1 (*not characteristic of me*) to 4 (*very characteristic of me*) Likert-type scale. Bornstein (1994) conducted a review of the IDI that demonstrated that the IDI possesses good test-retest reliability, convergent validity, and predictive validity. The internal consistency for the whole-scale score was very good across Time 1 and Time 2 (αs ≥ .85).

Berkeley Expressivity Questionnaire (BEQ; Gross & John, 1997). The BEQ is a measure of emotional expressivity. More specifically, it assesses three facets of emotional expressivity: impulse strength, negative expressivity, and positive expressivity. Impulse strength assesses the strength of emotion response tendencies (e.g., *I experience my emotions very strongly*), negative expressivity assesses the degree to which negative emotional responses are expressed behaviorally (e.g., *It is difficult for me to hide my fear*), and positive expressivity assesses the degree to which positive emotional responses are expressed behaviorally (e.g., *Whenever I feel positive emotions, people can easily see exactly what I am feeling*). The scale allows for a total score of emotional expressivity to be calculated, in addition to subscale scores

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for the three facets of emotional expressivity; the current study utilized the total score to test Hypothesis 1e. The scale has strong psychometric properties, particular in terms of test-retest reliability (Gross & John, 1997), and in terms of convergent and discriminant validity (Gross & John, 1997; 1998). The internal consistency for the whole-scale score was very good across Time 1 and Time 2 (αs $\geq$ .85).

The Experiences in Close Relationships-Revised questionnaire (ECR-R; Fraley, Waller, & Brennan, 2000). The ECR-R consists of 36 items that are used to assess anxious (e.g., *I often worry that my partner doesn't really love me*) and avoidant (e.g., *I prefer not to show a partner how I feel deep down*) attachment styles. All items employ a 1 (*very strongly disagree*) to 7 (*very strongly agree*) Likert-type scale. The scale has demonstrated good temporal stability and a stable factor structure (Sibley & Liu, 2004). In the current study, the items were altered to assess friendships (i.e., all references to *romantic partner* were changed to *relationship partner*). Additionally, only the avoidance scores were utilized to assess avoidant interpersonal style in these types of close relationships; these scores were used to test Hypothesis 1a. The avoidance subscale demonstrated excellent internal consistency across Time 1 and Time 2 (αs $\geq$ .95).

The Inventory of Interpersonal Problems (IIP-64; Horowitz, Alden, Wiggins, & Pincus, 2000). The IIP assesses interpersonal difficulties based on the interpersonal circumplex model (Wiggins, 1979), a circumplex that characterizes interpersonal problems on the basis of two traits (located on two axes): Dominance on one axis, and Warmth on the other axis. The IIP-64 has demonstrated good internal reliability and construct validity (Horowitz, Alden, Wiggins, & Pincus). The IIP-64 consists of 64 items employing a 0 (*not at all*) to 4 (*extremely*) Likert-type scale. The IIP-64 yields eight scales (i.e., domineering/controlling, vindictive/self-centered,

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cold/distant, socially inhibited, nonassertive, overly accommodating, self-sacrificing, and intrusive/needy), each corresponding to an octant in the interpersonal circumplex. In addition to these eight subscales, two scales reflecting the two main circumplex dimensions (i.e., Dominance and Warmth) were calculated using a formula suggested by LaForge (1977) and Leising, Rehbein, and Sporberg (2007) for analyses involving the IIP-64. The current study utilized only the Dominance and Warmth (and not the eight subscales) scores to test Hypotheses 1c and 1d. Both the dominance and warmth subscales demonstrated very good reliability across Time 1 and Time 2 (reliability coefficients $\geq$ .88 for both subscales; see Nunnally & Bernstein, 1994, p. 269).

McGill Friendship Questionnaire—Friend's Functions (MFQ-FF; Mendelson & Aboud, 1999). The MFQ-FF is a 30-item measure assessing friendship quality of a specific friend. The MFQ-FF includes six subscales: stimulating companionship, help, intimacy, reliable alliance, emotional security, and self-validation. An overall friendship quality score can be created by calculating the average of scores across the six subscales. All items are on a 0 (*never*) to 8 (*always*) Likert-type scale. The questionnaire has demonstrated high internal consistency, and good convergent and divergent validity (Mendelson & Aboud). In the current study, the overall friendship quality score was used as a measure of friendship functioning. The internal consistency for the items was very good for both primary participants ($\alpha s \geq$ .97) and their friends ($\alpha s \geq$ .97) across Time 1 and Time 2.

Inclusion of the Other in Self Scale (IOS; Aron, Aron, & Smollan, 1992). The IOS is a pictorial, one-item scale measuring the degree to which respondents feel close to someone. Aron et al. report good test-retest reliability and good convergent validity with measures of marital intimacy and closeness. The scale consists of a series of 7 increasingly overlapping pairs of circles that represent the participant and the target person (i.e., friend or romantic partner);

participants are instructed to choose the pair of circles that best illustrates their relationship with the target person. In the current study, the IOS score was used as a measure of friendship functioning, more specifically closeness within a friendship.

The Sternberg Intimacy Scale (SIS; Sternberg, 1988 as cited in Tzeng, 1993). The SIS is a 14-item measure on a 1 (*Not at all*) to 9 (*Extremely*) Likert-type scale measuring both emotional and psychological intimacy. The SIS was initially developed as part of a measure of a theory of romantic love; however, the items on the SIS can be used for both friendships and romantic relationships, as the items themselves are not specific to romantic love (e.g., *I am able to count on [target person] in times of need*). The SIS has been shown to have good internal consistency and factor validity, as well as good convergent relationships with related measures. The SIS total score was used as a measure of friendship functioning. The internal consistency for the items was excellent for both primary participants (αs $\geq$ .95) and their friends (αs $\geq$ .97) across Time 1 and Time 2.

The Liking Scale (LS; Rubin, 1970). The LS assesses the degree to which an individual likes a target person (e.g., his or her friend). The scale contains 13 items (e.g., *[the person] is one of the most likable individuals I know*). Rubin reported that the scale showed expected moderate correlations with measures of romantic love in a sample of romantic partners; however, the scale can be adopted for use in friendships (e.g., Rodebaugh et al., 2014). The LS total score was used as a measure of friendship functioning. The internal consistency for the items was very good for both primary participants (αs $\geq$ .91) and their friends (αs $\geq$ .93) across Time 1 and Time 2.

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS is a 12-item measure assessing social support received from friends, family, and a special person. The scale employs a 1 (*very strongly disagree*) to 7

(*very strongly agree*) Likert-type scale. Zimet et al. (1988) report that the total scale has good internal consistency and test-retest reliability. Studies have confirmed the three-subscale structure of the MSPSS, in addition to demonstrating strong factorial validity (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). In the current study, the MSPSS was administered to primary participants; the friend subscale was used to obtain a measure of global friendship functioning (as opposed to friendship functioning within a specific friendship). Internal consistency for the friend subscale at Time 1 was excellent ($\alpha = .94$).

Procedure

Time 1. All measures under study were available via a paper-and-pencil and online format. Primary participants completed all Time 1 measures via paper-and-pencil format; a subset of these participants ($n = 47$) completed the Time 2 measures via paper-and-pencil format, and the remainder completed the Time 2 measures via online format (this change was made later in the study to decrease participant burden and increase compliance for Time 2). All informants completed Time 1 and Time 2 measures via online format.

After obtaining consent from participants, participants completed a packet containing all the questionnaires listed in the **Measures** section, in addition to other measures not analyzed in the current study. After completing the packet, participants were asked to provide contact information (i.e., name and email address) for a close friend and, if applicable, a romantic partner; the data collection on romantic partner relationships are not presented in the current study. Participants were told that the researcher would send an email to the participant's friend and/or romantic partner with a link to a website in which he or she can answer questions about the participant.

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Informant report. Primary participants identified one close friend. Once contact information for these informants was obtained, the researcher emailed the friends and invited them to fill out a survey in which they report on the primary participant. Friends completed the same relationship questionnaires as the primary participants and were offered a chance to win a $100 gift card to Target in exchange for their participation.

Time 2. Approximately 2-3 months after attending Time 1 ($M = 68.7$ days, $SD = 13.3$; Range: 30-124), primary participants were contacted and asked to complete a questionnaire packet again; this questionnaire packet was identical to the packet given at Time 1, except that all demographic and many trait measures were removed. Following this task, participants were debriefed and the study ended.

Informant report. Approximately 2-3 months after the friends completed Time 1 ($M = 66.4$ days, $SD = 13.1$; Range: 43-94) they were contacted again via email and asked to fill out the same questionnaires that they filled out previously online again, in addition to filling out an update sheet delineating their current status with the participant (i.e., denoting whether they still considered the primary participant to be a friend). Participants were offered a chance to win another $100 gift card to Target for completing this follow-up questionnaire set.

Data Analytic Procedure

All analyses were conducted using the statistical software MPlus (Muthén & Muthén, 1998-2010, version 6.1). The maximum likelihood estimator in the Mplus program was used to report standardized path estimates. In determining factor structure, global model fit was evaluated using the following: Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), comparative fit index (CFI; Bentler, 1990), root mean square error of approximation (RMSEA; Steiger & Lind, 1980), and the standardized root mean square residual (SRMR; Bentler, 1995). The

following values indicate a good fit of the model to the data: TLI and CFI ranging from .95 to 1, RMSEA below .06, and SRMR below .08 (Hu & Bentler, 1999).

Hypothesis 1: According to Cole & Maxwell (2003), "mediation is a causal chain involving at least two causal relations…and a fundamental requirement for one variable to cause another is that the cause must precede the outcome in time" (p. 559). In the case of a longitudinal study with two time points, the most parsimonious application of the definition of mediation is when the independent variable at Time 1 predicts the mediating variable at Time 2, and the mediating variable at Time 1 predicts the dependent variable at Time 2; in this manner, the variable proposed to cause the other always precedes it in time. Additionally, researchers have traditionally recommended using a cross-lagged panel design when testing longitudinal mediation (Cole & Maxwell, 2003; Selig & Preacher, 2009).

As such, to determine a potential significant mediation, a full cross-panel model was tested for each interpersonal style; a full cross-panel model consists of all variables at Time 1 (the independent variable, or X1; the mediating variable, or M1; the dependent variable, or Y1) predicting all variables at Time 2 (the independent variable, or X2; the mediating variable, or M2; the dependent variable, or Y2), yielding a total of nine paths. Additionally, all covariances within each time point were allowed, yielding a total of six estimated covariances. Within these structural equation models (SEMs), two requirements must be met for evidence of significant mediation: (a) the path from the independent variable at Time 1 (X1) to the mediating variable at Time 2 (M2) must be significant, and (b) the path from the mediating variable at Time 1 (M1) to the dependent variable at Time 2 (Y2) must be significant. Additionally, the global model fit was assessed to further support the fit of the model. All estimates reported are standardized path estimates.

Hypothesis 2: Once an interpersonal style has been found to be a significant mediator between social anxiety and friendship functioning, follow-up analyses were conducted to determine whether the mediation was still significant when depression was entered into the analysis. More specifically, all models tested in Hypothesis 1 were rerun with depression included. This new model was a four-variable cross-lagged panel including depression at Time 1 and Time 2; again, the two requirements for significant mediation delineated in Hypothesis 1 needed to be met for Hypothesis 2 to be supported.

RESULTS

Friendship Functioning

Self-report friendship functioning and friend-report friendship functioning were analyzed

separately to discern whether mediation applied to both reports of friendship functioning.

Additionally, the self- and friend-report friendship functioning variables were tested separately at

Time 1 and Time 2 to capture longitudinal effects of friendship functioning. To create and test

variables of friendship functioning, two confirmatory factor analyses (CFA) were conducted: one

reflecting self- and friend-report friendship functioning at Time 1 and one reflecting self- and

friend-report friendship functioning at Time 2. In the first CFA ($n = 87$), the self-report scores of

the IOS, SIS, MFQFF, and LS at Time 1 all loaded onto one factor, and the friend-report scores

of the IOS, SIS, MFQFF, and LS at Time 1 all loaded onto a second factor. The model, which

included a correlation between the two latent factors, resulted in excellent fit (CFI = 1.00, TLI =

1.04, RMSEA = .00, SRMR = .05). The latent variable intercorrelation was .31 ($p = .01$). In the

second CFA ($n = 81$), the self-report scores of the IOS, SIS, MFQFF, and LS at Time 2 all

loaded onto one factor, and the friend-report scores of the IOS, SIS, MFQFF, and LS at Time 2

all loaded onto a second factor. This model, which included a correlation between the two latent

factors, resulted in excellent fit (CFI = .99, TLI = .98, RMSEA = .05, SRMR = .07). The latent

variable intercorrelation was nonsignificant ($r = .05$, $p = .79$).

Zero-order and Structural Equation Modeling Intercorrelations

Time 1. The zero-order correlations for all variables at Time 1 are presented in Table 1;

the structural equation modeling intercorrelations between predictor variables and the latent

variables of self- and friend-report friendship functioning at Time 1 are presented in Table 2.

Social anxiety significantly correlated with dependence, avoidance, dominance, and warmth, but

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did not significantly correlate with emotional expressivity. Contrary to hypothesis, social anxiety did not significantly correlate with any self-report or friend-report measures of friendship functioning at Time 1. Social anxiety also did not significantly correlate with latent variables of self- or friend-report friendship function at Time 1. Regarding the interpersonal styles, dependence significantly correlated with one measure of self-report friendship functioning, IOS, but did not significantly correlate with any other self- or friend-report measures of friendship functioning. Warmth significantly correlated with three of four measures of self-report friendship functioning (IOS, SIS, and MFQFF) and one measure of friend-report friendship functioning (MFQ). Dominance correlated with one measure of self-report friendship functioning (LS), but did not significantly correlate with any other self-report or friend-report measures of friendship functioning. Emotional expressivity significantly correlated with two measures of self-report friendship functioning (SIS and MFQFF), but did not significantly correlate with any other self- or friend-report measures of friendship functioning. Finally, avoidance did not correlate with any self-report or friend-report measures of friendship functioning.

Time 1 and Time 2. The zero-order correlations between predictor variables at Time 1 and outcome variables (i.e., friendship functioning) at Time 2 are presented in Table 3; the structural equation modeling intercorrelations between predictor variables at Time 1 and the latent variables of self- and friend-report friendship functioning at Time 2 are presented in Table 4. The correlations between predictor variables at Time 1 and outcome variables at Time 2 are similar to those obtained between predictor variables at Time 1 and outcome variables at Time 1. Again, social anxiety did not correlate with any self-report or friend-report measures of friendship functioning at Time 2; social anxiety also did not significantly correlate with latent variables of self- or friend-report friendship function at Time 2. Regarding the interpersonal

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styles, none of the interpersonal styles at Time 1 significantly correlated with self- or friend-report measures of friendship functioning at Time 2; however, dominance at Time 1 significantly correlated with the latent variable of friend-report friendship functioning at Time 2.

Time 2. The zero-order correlations for all variables at Time 2 are presented in Table 5; the structural equation modeling intercorrelations between predictor variables and the latent variables of self- and friend-report friendship functioning at Time 2 are presented in Table 6. Social anxiety significantly correlated with dependence and dominance, but did not significantly correlate with warmth, avoidance, or emotional expressivity. Social anxiety did significantly correlate with one measure of friend-report friendship functioning (IOS), but this correlation (a) was positive, whereas a negative correlation was hypothesized, and (b) did not significantly correlate with any other self- or friend-report measures of friendship functioning. Social anxiety also did not significant correlate with latent variables of self- or friend-report friendship function at Time 2. In terms of the interpersonal styles, dominance significantly correlated with one measure of self-report friendship functioning (LS), but did not significantly correlate with any other self- or friend-report measures of friendship functioning. Emotional expressivity significantly correlated with two measures of self-report friendship functioning (SIS and MFQFF). Neither dependence, avoidance, nor warmth significantly correlated with any self-report or friend-report measures of friendship functioning.

Hypothesis 1: Mediation Analyses

As stated above, within the following SEMs, two requirements must be met for evidence of significant mediation: (a) the path from the independent variable at Time 1 (X1) to the mediating variable at Time 2 (M2) must be significant, and (b) the path from the mediating variable at Time 1 (M1) to the dependent variable at Time 2 (Y2) must be significant. In Figures

1-5, these paths are denoted in red.

Dependence. Figure 1 depicts the SEM for dependence as a mediator between social anxiety at Time 1 and self- and friend-report friendship functioning at Time 2. In terms of the two requirements that must be met to satisfy mediation: neither path a (Estimate = -.057, p = .662) nor path b (Estimate = -.173, p = .132) was significant for self-report friendship functioning. Similarly, neither path a (Estimate = -.144, p = .271) nor path b (Estimate = .082, p = .637) was significant for friend-report friendship functioning.

Avoidance. Figure 2 depicts the SEM for avoidance as a mediator between social anxiety at Time 1 and self- and friend-report friendship functioning at Time 2. In terms of the two requirements that must be met to satisfy mediation: neither path a (Estimate = .164, p = .076) nor path b (Estimate = -.080, p = .493) was significant for self-report friendship functioning, though path a approached significance. Similarly, neither path a (Estimate = .150, p = .141) nor path b (Estimate = -.107, p = .484) was significant for friend-report friendship functioning.

Warmth. Figure 3 depicts the SEM for warmth as a mediator between social anxiety at Time 1 and self- and friend-report friendship functioning at Time 2. In terms of the two requirements that must be met to satisfy mediation: neither path a (Estimate = .138, p = .234) nor path b (Estimate = -.101, p = .365) was significant for self-report friendship functioning. Similarly, neither path a (Estimate = .130, p = .258) nor path b (Estimate = -.037, p = .815) was significant for friend-report friendship functioning.

Dominance. Figure 4 depicts the SEM for dominance as a mediator between social anxiety at Time 1 and self- and friend-report friendship functioning at Time 2. In terms of the two requirements that must be met to satisfy mediation: neither path a (Estimate = -.106, p = .293) nor path b (Estimate = -.039, p = .721) was significant for self-report friendship

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functioning. Similarly, neither path a (Estimate = -.050, p = .635) nor path b (Estimate = -.388, p = .064) was significant for friend-report friendship functioning, though path b approached significance.

Emotional Expressivity. Figure 5 depicts the SEM for emotional expressivity as a mediator between social anxiety at Time 1 and self- and friend-report friendship functioning at Time 2. In terms of the two requirements that must be met to satisfy mediation: neither path a (Estimate = -.127, p = .192) nor path b (Estimate = -.126, p = .215) was significant for self-report friendship functioning. Similarly, neither path a (Estimate = -.141, p = .179) nor path b (Estimate = .031, p = .843) was significant for friend-report friendship functioning.

Summary. None of the five interpersonal styles mediated the relationship between social anxiety and friendship functioning at Time 2. The closest pair of paths was emotional expressivity (p = .192 and p = .215) as a mediator between social anxiety at Time 1 and self-report friendship functioning at Time 2. The most significant individual path was the path from avoidance at Time 1 to friend-report friendship functioning at Time 2 (p = .064).

Hypothesis 2

Due to the fact that none of the interpersonal styles mediated the relationship between social anxiety at Time 1 and friendship functioning at Time 2, there was no need to test Hypothesis 2, as it was conditional upon at least one interpersonal style mediating this relationship. However, it is possible that, due to the high comorbidity between social anxiety and depression (and the high intercorrelation between social anxiety and depression in the current sample), the relationship between social anxiety and friendship functioning may become significant once the variance associated with depression is included in the model (i.e., depression and social anxiety may have disparate prospective relationships with friendship functioning, and

thus, both should be included in the model to discern their respective effects). As a result, all models were run again via a four-variable cross-lagged panel now including depression. In all models, the two necessary paths for significant mediation between social anxiety, the interpersonal style, and friendship functioning were nonsignificant. Additionally and interestingly, in all models, the two necessary paths for significant mediation between depression, the interpersonal style, and friendship functioning were also nonsignificant.

Post-Hoc Analyses

  Testing Mediators Simultaneously. The main analyses focused on testing whether interpersonal styles mediated the relationship between social anxiety and friendship functioning via separate models (i.e., each model featured a different interpersonal style). A model in which all mediators could be tested simultaneously was not possible to conduct in the current sample, as such a model would have contained more parameter estimates than participants. However, it is possible to conduct several piecemeal models that each include all mediators as predictors. Five cross-lagged models were run in which all predictor variables at Time 1 predicted social anxiety, friendship functioning, and one interpersonal style at Time 2. Again, none of the models contained significant a and b paths, and as such none of the models supported longitudinal mediation.

  Inclusion of the Other in the Self. In the current study, the only significant correlation between social anxiety and friendship functioning across all combinations of time points was between social anxiety and friend report of the inclusion of the other in the self (IOS) at Time 2. Therefore, it is possible that the interpersonal styles may not mediate the relationship between social anxiety and friendship functioning, but may mediate the relationship between social anxiety and inclusion of the other in the self specifically.

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All models tested in Hypothesis 1 were re-run with self- and friend report inclusion of the other in the self as the dependent variable; depression was not included. In all models, the requirement that both necessary paths for significant mediation between social anxiety, the interpersonal style, and inclusion of the other in the self be significant was not met. In the model in which avoidance and emotional expressivity were the mediators between social anxiety and self-report inclusion of the other in the self, path a (social anxiety at Time 1 predicting the mediator at Time 2) was significant, but path b was not. In the model in which avoidance and warmth were the mediators between social anxiety and friend-report inclusion of the other in the self, path a (social anxiety at Time 1 predicting the mediator at Time 2) was again significant, but path b was not. There was one model in which path b approached significance (the model in which warmth mediated the relationship between social anxiety and self-report inclusion of the other in the self), but in this model path a was not significant.

Liking. A recent study focusing on individuals with SAD and their friendships found that the construct of liking, as opposed to other friendship constructs (e.g., intimacy), may play the most important role in explaining friendship dysfunction in social anxiety (Rodebaugh et al., 2014). More specifically, the effects of SAD on a specific friendship may be limited to liking. Therefore, it is possible that the interpersonal styles may not mediate the relationship between social anxiety and friendship functioning, but may mediate the relationship between social anxiety and liking specifically.

All models tested in Hypothesis 1 were re-run with self- and friend report liking (LS) as the dependent variable; depression was not included. In all models, the requirement that both necessary paths for significant mediation between social anxiety, the interpersonal style, and liking be significant was not met. In the model in which avoidance was the mediator between

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social anxiety and self-report liking, path a (social anxiety at Time 1 predicting avoidance at Time 2) was significant (Estimate = .184, p = .044), but path b was not (p = .882).

Friend Social Support. One possibility for the results obtained is that participants who enrolled in the study did so because they felt they had a close friend with relatively high relationship functioning; as a result, many participants who do experience greater impairment in specific friendships would have excluded themselves from the study. It is therefore possible that, at least in the current sample, social anxiety was significantly related to friendship quality in general, but not friendship quality related to a specific friend. In the current study, social anxiety did correlate significantly and negatively with a measure of support received from friends in general at Time 1 (r = -.28, p = .009).

DISCUSSION

The main purpose of the current study was to discern (a) whether the relationship between social anxiety and friendship functioning was mediated by interpersonal styles (dependence, avoidance, warmth, dominance, and emotional expressivity) over time and (b) whether any such mediation would continue to hold above and beyond the effects of depression. Contrary to hypothesis, none of the five interpersonal styles significantly mediated the relationship between social anxiety at Time 1 and either self- or friend-report friendship functioning at Time 2. Similarly, none of the five interpersonal styles significantly mediated the relationship between social anxiety at Time 1 and either self- or friend-report friendship functioning at Time 2 when all models included depression. Several post-hoc hypotheses were examined, including whether the interpersonal styles tested mediated the relationship between social anxiety and two specific components of friendship functioning (i.e., inclusion of the other in the self or liking); results indicated no significant mediation results. Models in which all interpersonal styles simultaneously predicted outcome variables were also examined for prospective mediation, and too yielded no significant mediation results. Finally, post-hoc analyses revealed that though social anxiety did not significantly correlate with self-report measures of friendship functioning, it did correlate with self-report measures of social support received from friends in general; this raises the possibility of perhaps social anxiety causing more impairment in global friendship functioning, as opposed to functioning of a specific friendship. For example, an individual higher in social anxiety may have a single friend with whom he or she has a high-functioning friendship, but may have no other friends or may report lower functioning with other friends. Another possibility relates to the idea of individuals higher in social anxiety underestimating their performance in social situations and having a generally

more negatively biased view of themselves than individuals lower in social anxiety: perhaps individuals higher in social anxiety tend to rate their performance globally in social domains (e.g., friendships) negatively, regardless of the actual nature of their social impairment, and that asking individuals higher in social anxiety about specific individual relationships buffers against such negatively biased views. In this case, the negative relationship between social anxiety and friendship functioning would be present in global ratings of friendship functioning, but not necessarily in specific ratings of friendship functioning.

It is important to note that the current study tested longitudinal mediation via direct paths (i.e., paths a and b). It is possible for two direct paths to be nonsignificant, but still to have a significant overall indirect path; however, to calculate the indirect effect properly ($X1 \rightarrow M2 \rightarrow Y3$), three time points would be needed. As a result, it is most accurate to state that the results of the current study suggest no prospective prediction, versus suggesting absolutely no longitudinal mediation (due to the absence of an overall indirect effects test). Though an analysis focusing on the calculation of an overall indirect effect was not conducted in the current study, future studies should consider assessing longitudinal mediation via both direct paths and an overall indirect effect. However, it is worth noting that the current results (i.e., no significant mediation through direct paths) suggest that, even with the inclusion of a third time point, such an overall indirect path is unlikely to be significant.

There are several possible explanations for the lack of support across hypotheses. First, there were no significant zero-order correlations between social anxiety at Time 1 and friend-report friendship functioning at either Time 1 or Time 2 (with the exception of a single significant correlation between social anxiety and scores on the friend-report IOS at Time 2); this includes both the individual self- and friend-report friendship functioning measures and the latent

variable of self- and friend-report friendship functioning. It is unsurprising that none of the interpersonal styles significantly mediated the relationship between social anxiety at Time 1 and friendship functioning at Time 2, given that social anxiety was largely uncorrelated with any of the self- or friend-report friendship functioning measures. This lack of correlation could be due to the relatively small sample size or the nature of the sample (undergraduate vs. clinical sample); power analyses conducted with the obtained sample size suggest only 35-40% power available to detect effects. However, recent research suggests that social anxiety correlates with self-report friendship functioning, and less so with friend-report friendship functioning, in an undergraduate sample (Rodebaugh et al., 2014). Furthermore, it is quite possible that such a lack of correlation is legitimate; in other words, the lack of significant findings in the relationship between social anxiety and friendship functioning over time could be because such effects are either very small or nonexistent.

Some other possible explanations for the obtained null findings could relate to the study design itself. More specifically, it is possible that, because the study required that enrolling participants have a friend to nominate to participate in the study with them, individuals higher in social anxiety with greater impairment in their friendships would not have participated at all. As aforementioned, it is also possible that participants who enrolled in the study did so because they felt they had a close friend with relatively high relationship functioning; as a result, many participants who do experience greater impairment in their friendships would have excluded themselves from the study. In other words, participants in the current study higher in social anxiety may experience greater global friendship impairment, but still possess at least one friend with whom they have higher friendship functioning. In the current study, social anxiety did correlate significantly and negatively with social support received from friends globally. It is

therefore possible that, at least in the current sample, social anxiety significantly related to friendship quality in general, but not friendship quality related to a specific friend. Individuals higher in social anxiety may have brought their closest friend, whereas those lower in social anxiety may have been less concerned about bringing their closest friend; this would explain why the lack of impairment in the friendship functioning of a specific friendship was seen. Though some of the aforementioned possibilities were not directly assessed in the current study, they nonetheless remain viable explanations for why the expected negative relationship between social anxiety and friendship functioning was not found.

In terms of the interpersonal styles, social anxiety did significantly correlate with all interpersonal styles except emotional expressivity at Time 1. In addition to the reasons posed above for why none of the interpersonal styles significantly mediated the relationship between social anxiety at Time 1 and friendship functioning at Time 2, it's possible that the interpersonal styles selected may not be the best predictors of friendship functioning specifically (e.g., as opposed to romantic relationship functioning). Future studies could include a greater variety of interpersonal styles when testing them as mediators between social anxiety and friendship functioning over time.

Limitations

The current study has several limitations. First, though the sample sizes for primary participants and friends were adequate at Time 1, the sample sizes at Time 2 were much smaller. The smaller sample size at Time 2 could be due to several factors, such as participants no longer needing course credit at Time 2, participants being too busy to participate (Time 2 occurred at the end of the semester when participants were completing their classes and taking finals), or participants perceiving the Time 2 assessment to be too cumbersome (e.g., due to completing the

friendship measures or due to experiencing a decline in their friendship). Replication utilizing

larger samples would be useful. Similarly, due to a study design error toward the beginning of

data collection, self-report data on social anxiety and interpersonal styles at Time 2 were not

administered to all primary participants; this increased the amount of missing data in the sample.

Second, our study design only included the use of two time points that were 2-3 months part. To

test longitudinal mediation more properly, three time points are preferable; in such a case, the

cross-lagged panel would test the independent variable at Time 1 predicting the mediating

variable at Time 2, which in turn predicts the dependent variable at Time 3 (X1$\rightarrow$M2$\rightarrow$Y3).

Third, all of our data were based on responses to questionnaires made by primarily Caucasian,

female undergraduate students, which limits the generalizability of our findings. Finally, our

strategy was to test relationships between variables with a sample that displayed a large range of

social anxiety, but we did not test whether these findings held in a clinical sample. Future studies

should include tests in samples that include people with SAD (as well as more diverse

demographics).

Future Directions

Though the current study utilized a multidimensional assessment approach, there are still

ways to improve the assessment of social anxiety, interpersonal styles, and friendship

functioning. For example, observation ratings of interactions between friend dyads on the various

interpersonal styles and friendship functioning could yield results different from those obtained

in the current and similar studies. Additionally, using ecological momentary assessment to track

friendship quality over time more frequently could shed more light on the impact of social

anxiety on daily friendship functioning. Additionally, a study more closely disentangling the

relationship between social anxiety, interpersonal styles, friendship functioning with a specific

person vs. global friendship functioning would help advance understanding of the impact of social anxiety on friendships.

Conclusion

Overall, the results obtained in the current study do not support either of the main hypotheses. The implication—that none of the interpersonal styles mediate the relationship between social anxiety and friendship functioning over time—appears inconsistent with several studies illustrating the relationship between social anxiety and these interpersonal styles, and social anxiety and friendship functioning. However, it is important to note that the majority of such studies studied cross-sectional relationships, as opposed to prospective or longitudinal relationships. It is possible that such relationships exist cross-sectionally, but do not hold over time; similarly, it is possible that social anxiety affects self-report of friendship functioning more so than friend report of friendship functioning. If this possibility holds, it will challenge and change the widely-held belief that having higher levels of social anxiety (a) affects friendship quality over time and (b) correlates with the way friends perceive their friendships with individuals higher in social anxiety. Replication with larger samples is needed to confirm whether effects truly exist that were not detected in the current study or if the lack of effects found is reflective of the true relationship between social anxiety and friendship functioning over time. Recommendations for future research include more through assessment of the constructs under study, along with the inclusion of additional interpersonal styles to help better explain and understand the impaired friendship functioning seen in individuals higher in social anxiety.

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Table 1

Zero-order correlations between social anxiety, interpersonal styles, and friendship functioning at Time 1

	SA	Depress	Depend	Avoid	Warm	Dom	EE	IOS	SIS	MFQ	LS	IOS-F	SIS-F	MFQ-F	LS-F
SA															
Depress	.39**														
Depend	.51**	.46**													
Avoid	.28*	.02	-.13												
Warm	-.31**	-.12	.27*	-.50**											
Dom	-.38**	-.05	-.26*	.01	-.04										
EE	-.19	-.01	.39**	-.41**	.47**	.09									
IOS	-.04	-.05	.24*	-.06	.23*	-.02	.19								
SIS	-.12	-.23*	.18	-.17	.32**	.00	.41**	.35**							
MFQ	-.11	-.24*	.20	-.14	.32**	-.09	.39**	.37**	.88**						
LS	.02	-.10	.09	-.04	.21	-.22*	.12	.22*	.53**	.56**					
IOS-F	.03	.06	.12	-.05	.04	-.14	-.19	.06	.22	.23	.19				
SIS-F	-.05	-.11	.20	.07	.25	-.23	.13	.15	.29*	.22	.17	.43**			
MFQ-F	-.19	-.19	.09	-.04	.27*	-.14	.06	.19	.29*	.29*	.15	.43**	.64**		
LS-F	-.16	-.24	-.01	.03	.19	-.22	-.16	.13	.11	.13	.13	.42**	.59**	.77**	

Note. N ranges from 54 to 87. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Depression = Beck Depression Inventory-II total score; Depend = Interpersonal Dependency Inventory total score; Avoid = Experiences in Close Relationships-Revised avoidance subscale; Warm = Inventory of Interpersonal Problems—64 Warmth subscale; Dom = Inventory of Interpersonal Problems—64 Dominance subscale; EE = Berkeley Expressivity Questionnaire total score; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score; IOS-F = Inclusion of the Other in the Self Scale (friend report); SIS = Sternberg Intimacy Scale total score (friend report); MFQ = McGill Friendship Questionnaire—Friend's Function total score (friend report); LS = Liking Scale total score (friend report).
*$p < .05$; **$p < .01$.

Table 2

Structural equation modeling intercorrelations between social anxiety, interpersonal styles, and friendship functioning at Time 1

	SA	Depress	Depend	Avoid	Warm	Dom	EE	Self-Report FQ	Friend-Report FQ
SA									
Depress	.39**								
Depend	.51**	.45**							
Avoid	.27**	.01	-.15						
Warm	-.33**	-.11	.28**	-.52**					
Dom	-.40**	-.04	-.27**	-.01	-.02				
EE	-.19	-.01	.40**	-.41**	.48**	.10			
Self-Report FQ	-.13	-.25*	.21*	-.16	.34**	-.06	.42**		
Friend-Report FQ	-.15	-.23*	.13	-.003	.21	-.25	-.03	.30*	

Note. $N = 88$. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Depression = Beck Depression Inventory-II total score; Depend = Interpersonal Dependency Inventory total score; Avoid = Experiences in Close Relationships-Revised avoidance subscale; Warm = Inventory of Interpersonal Problems—64 Warmth subscale; Dom = Inventory of Interpersonal Problems—64 Dominance subscale; EE = Berkeley Expressivity Questionnaire total score; Self-Report FQ = latent variable for self-report friendship functioning; Friend-Report FQ = latent variable for friend-report friendship functioning.
*$p \leq .05$; **$p < .01$.

Table 3

Zero-order correlations between social anxiety and interpersonal styles at Time 1 and friendship functioning at Time 2

	SA	Depress	Depend	Avoid	Warm	Dom	EE	IOS	SIS	MFQ	LS	IOS-F	SIS-F	MFQ-F	LS-F
SA															
Depress	.39**														
Depend	.51**	.46**													
Avoid	.28*	.02	-.13												
Warm	-.31**	-.12	.27*	-.50**											
Dom	-.38**	-.05	-.26*	.01	-.04										
EE	-.19	-.01	.39**	-.41**	.47**	.09									
IOS	.11	-.01	.17	-.12	.14	-.07	.17								
SIS	-.05	-.23	.02	-.15	.12	-.08	.11	.47**							
MFQ	-.12	-.33**	-.06	-.22	.15	-.06	.11	.36**	.87**						
LS	-.01	-.21	-.07	.00	.12	-.17	.01	.42**	.73**	.66**					
IOS-F	-.07	.07	.12	-.16	.07	-.12	-.07	.03	.22	.21	.17				
SIS-F	-.12	-.17	-.01	.16	-.01	-.20	-.04	-.18	.11	.00	-.01	.62**			
MFQ-F	-.14	-.13	-.00	.07	.04	-.22	-.02	-.16	-.01	-.06	-.07	.56**	.93**		
LS-F	-.14	-.20	-.04	-.12	.25	-.19	-.13	-.07	.03	.01	-.13	.50**	.75**	.82**	

Note. N ranges from 34 to 87. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Depression = Beck Depression Inventory-II total score; Depend = Interpersonal Dependency Inventory total score; Avoid = Experiences in Close Relationships-Revised avoidance subscale; Warm = Inventory of Interpersonal Problems—64 Warmth subscale; Dom = Inventory of Interpersonal Problems—64 Dominance subscale; EE = Berkeley Expressivity Questionnaire total score; IOS = Inclusion of the Other in the Self Scale at Time 2; SIS = Sternberg Intimacy Scale total score at Time 2; MFQ = McGill Friendship Questionnaire—Friend's Function total score at Time 2; LS = Liking Scale total score at Time 2; IOS-F = Inclusion of the Other in the Self Scale (friend report) at Time 2; SIS = Sternberg Intimacy Scale total score (friend report) at Time 2; MFQ = McGill Friendship Questionnaire—Friend's Function total score (friend report) at Time 2; LS = Liking Scale total score (friend report) at Time 2.
*$p < .05$; **$p < .01$.

Table 4

Structural equation modeling intercorrelations between social anxiety and interpersonal styles at Time 1 and friendship functioning at

Time 2

	SA	Depress	Depend	Avoid	Warm	Dom	EE	Self-Report FQ	Friend-Report FQ
SA									
Depress	.39**								
Depend	.51**	.45**							
Avoid	.27**	.01	-.14						
Warm	-.33**	-.11	.28**	-.52**					
Dom	-.40**	-.04	-.28**	-.01	-.02				
EE	-.19	-.01	.40**	-.40**	.48**	.10			
Self-Report FQ	-.05	-.27*	.02	-.10	.10	-.12	.13		
Friend-Report FQ	-.12	-.12	.08	-.10	.12	-.33*	.06	.15	

Note. N = 89. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Depression = Beck Depression Inventory-II total score; Depend = Interpersonal Dependency Inventory total score; Avoid = Experiences in Close Relationships-Revised avoidance subscale; Warm = Inventory of Interpersonal Problems—64 Warmth subscale; Dom = Inventory of Interpersonal Problems—64 Dominance subscale; EE = Berkeley Expressivity Questionnaire total score; Self-Report FQ = latent variable for self-report friendship functioning; Friend-Report FQ = latent variable for friend-report friendship functioning.

*p ≤ .05; **p < .01.

Table 5

Zero-order correlations between social anxiety, interpersonal styles, and friendship functioning at Time 2

	SA	Depress	Depend	Avoid	Warm	Dom	EE	IOS	SIS	MFQ	LS	IOS-F	SIS-F	MFQ-F	LS-F
SA															
Depress	.12														
Depend	.55**	.29													
Avoid	.24	.09	-.14												
Warm	-.24	-.09	.49**	-.39*											
Dom	-.41*	-.33	-.48**	.09	-.06										
EE	-.05	-.35*	.36*	-.36*	.44**	.06									
IOS	-.28	.00	.15	-.07	.20	-.28	.31								
SIS	.01	-.22	.05	-.07	.24	-.30	.35*	.47**							
MFQ	-.01	-.35*	.03	-.10	.26	-.28	.40*	.36**	.87**						
LS	.07	-.20	-.06	.14	.03	-.48**	.10	.42**	.73**	.66**					
IOS-F	.53*	.15	.21	-.28	-.23	-.44	.02	.03	.22	.21	.17				
SIS-F	.11	.01	-.23	-.31	-.37	-.12	.15	-.18	.11	.00	-.01	.62**			
MFQ-F	-.10	.08	-.26	-.33	-.28	-.07	.10	-.16	-.01	-.06	-.07	.56**	.93**		
LS-F	.08	-.24	-.20	-.42	-.12	-.15	.26	-.07	.03	.01	-.13	.50**	.75**	.82**	

Note. N ranges from 14 to 77. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Depression = Beck Depression Inventory-II total score; Depend = Interpersonal Dependency Inventory total score; Avoid = Experiences in Close Relationships-Revised avoidance subscale; Warm = Inventory of Interpersonal Problems—64 Warmth subscale; Dom = Inventory of Interpersonal Problems—64 Dominance subscale; EE = Berkeley Expressivity Questionnaire total score; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score; IOS-F = Inclusion of the Other in the Self Scale (friend report); SIS = Sternberg Intimacy Scale total score (friend report); MFQ = McGill Friendship Questionnaire—Friend's Function total score (friend report); LS = Liking Scale total score (friend report).
*$p < .05$; **$p < .01$.

Table 6

Structural equation modeling intercorrelations between social anxiety, interpersonal styles, and friendship functioning at Time 2

	SA	Depress	Depend	Avoid	Warm	Dom	EE	Self-Report FQ	Friend-Report FQ
SA									
Depress	.17								
Depend	.52**	.29*							
Avoid	.33*	.09	-.13						
Warm	-.29	-.09	.44**	-.42**					
Dom	-.38**	-.31*	-.46**	.05	-.03				
EE	-.13	-.34*	.34*	-.36*	.49**	.07			
Self-Report FQ	-.14	-.24	-.01	-.06	.26	-.29	.36*		
Friend-Report FQ	-.08	-.04	-.26	-.23	-.26	-.01	-.08	.01	

Note. $N = 81$. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Depression = Beck Depression Inventory-II total score; Depend = Interpersonal Dependency Inventory total score; Avoid = Experiences in Close Relationships-Revised avoidance subscale; Warm = Inventory of Interpersonal Problems—64 Warmth subscale; Dom = Inventory of Interpersonal Problems—64 Dominance subscale; EE = Berkeley Expressivity Questionnaire total score; Self-Report FQ = latent variable for self-report friendship functioning; Friend-Report FQ = latent variable for friend-report friendship functioning.
*$p \leq .05$; **$p < .01$.

Figure 1

Structural equation models for social anxiety, dependence, and friendship functioning
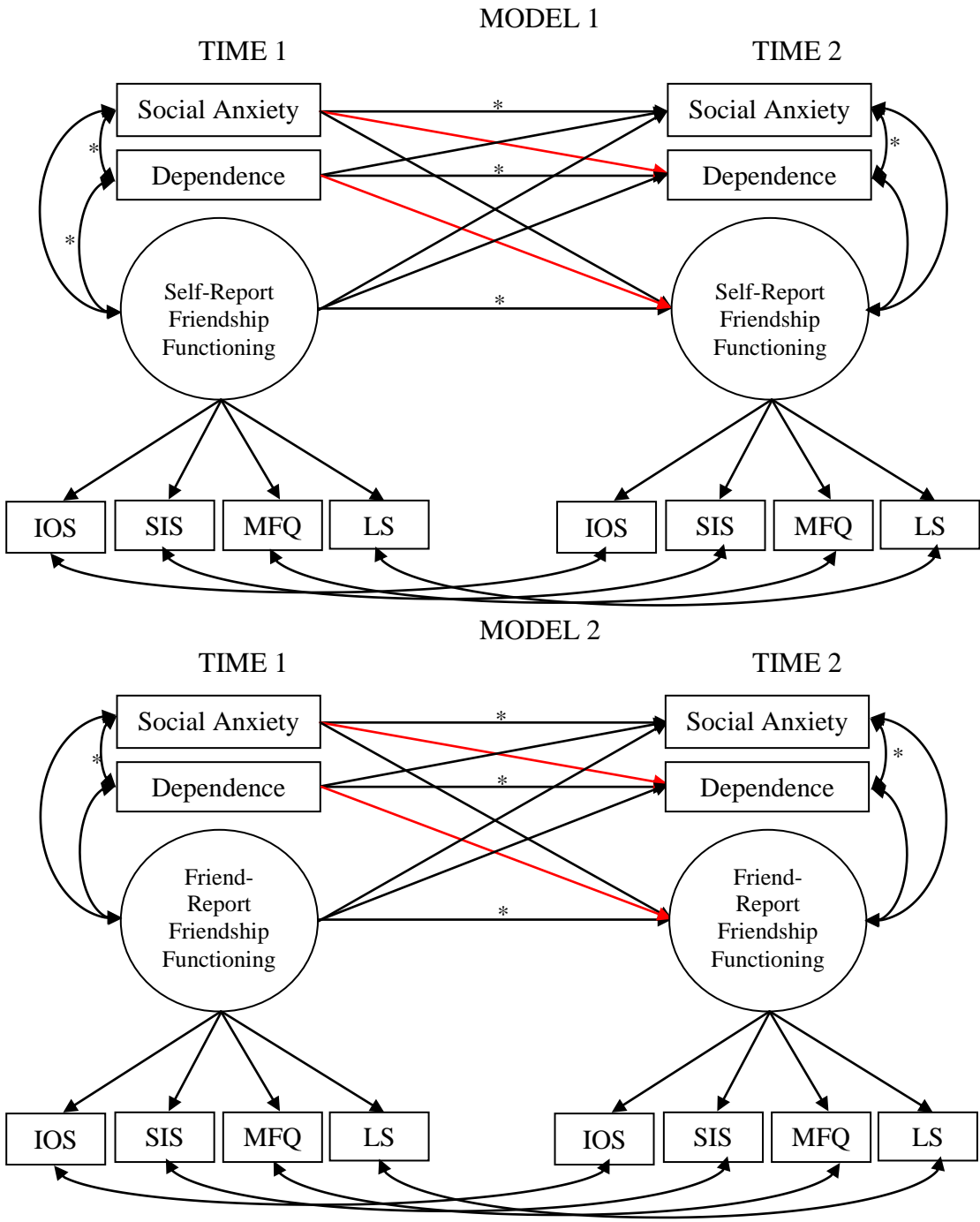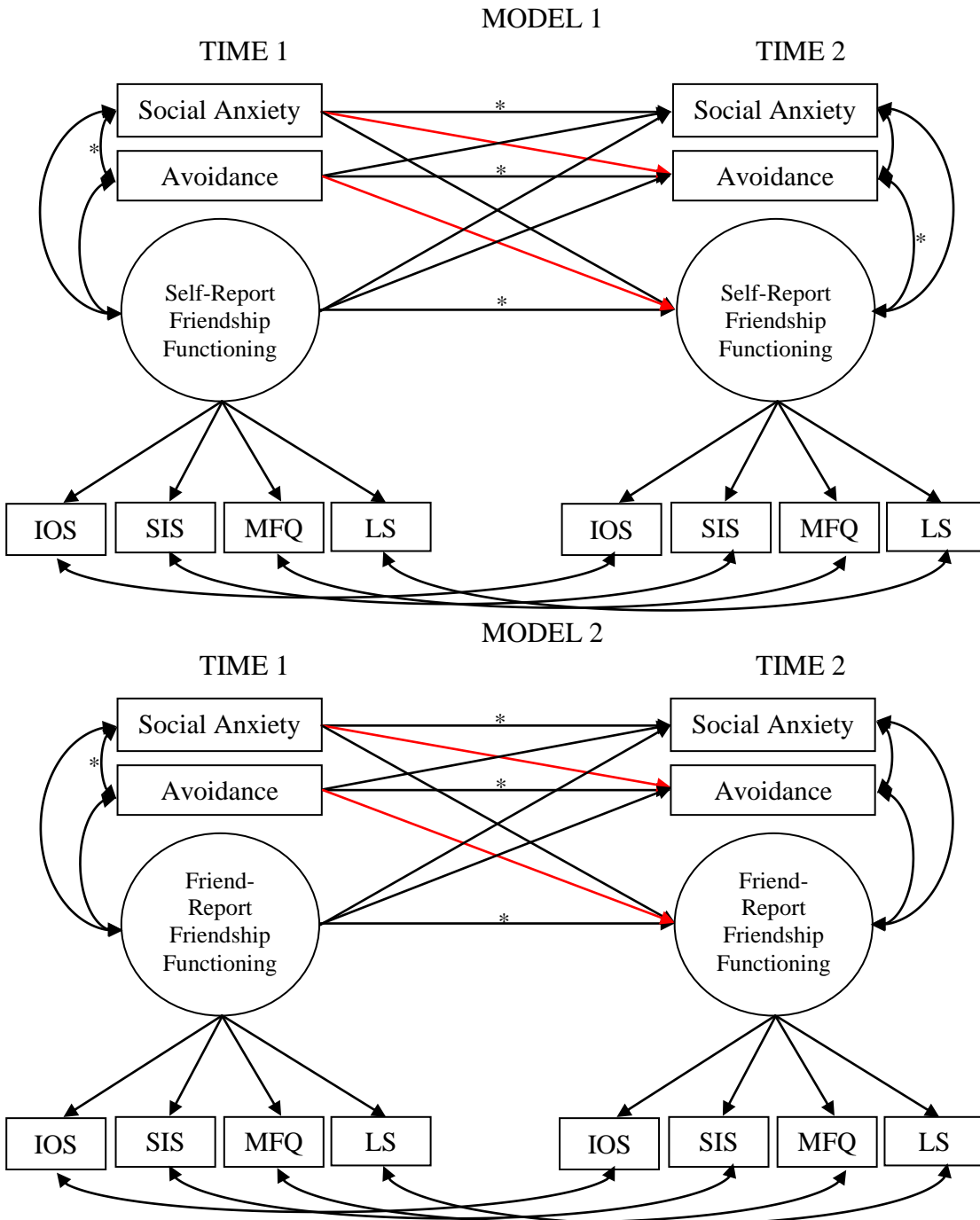

Note. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and Social Phobia Scale total scores; Dependence = Interpersonal Dependency Inventory total score; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score. The paths tested for mediation are highlighted in red.
*Denotes significant path at $p \leq .05$.

Figure 2

Structural equation models for social anxiety, avoidance, and friendship functioning
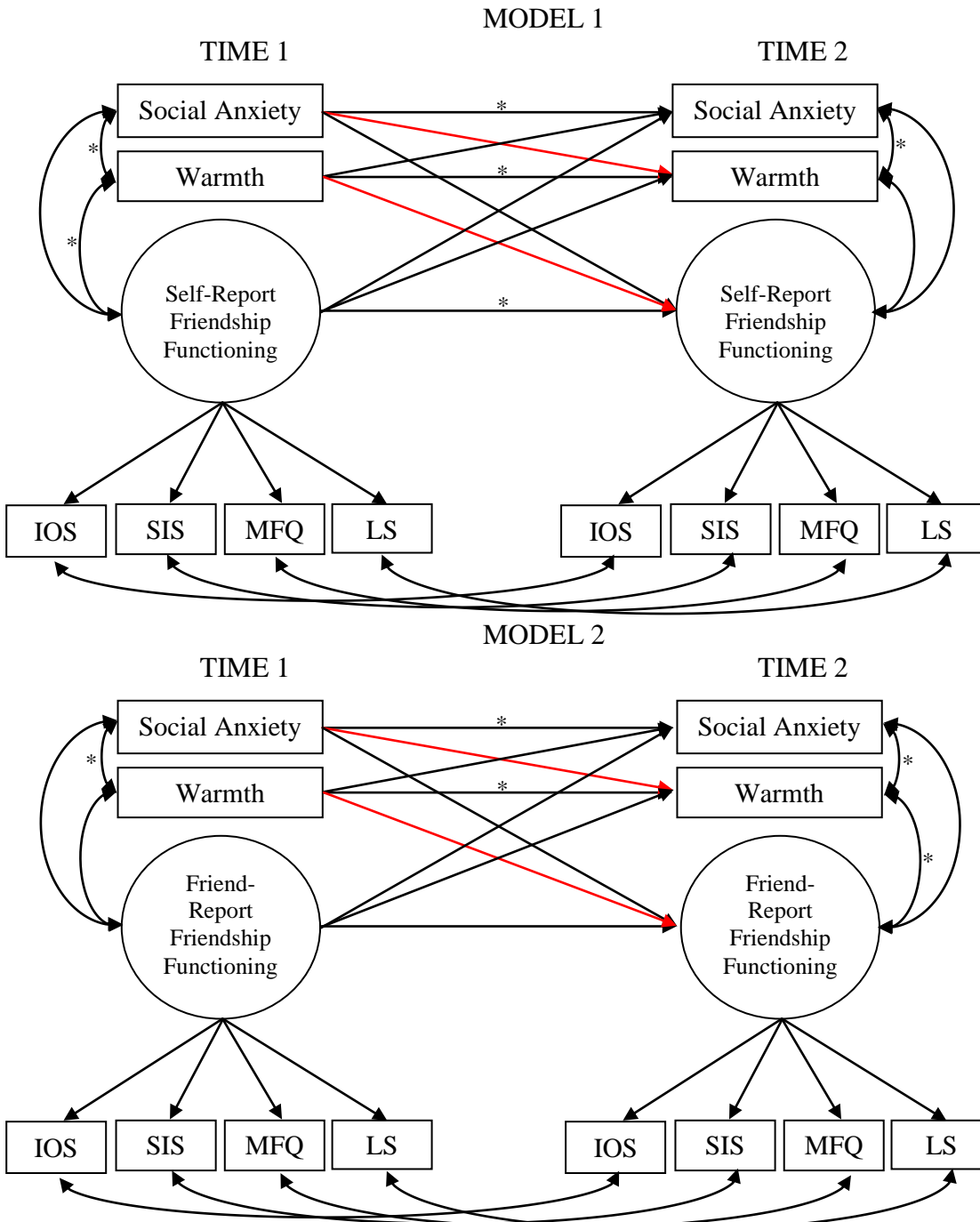

Note. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Avoidance = Experiences in Close Relationships—Revised avoidance subscale; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score. The paths tested for mediation are highlighted in red.

*Denotes significant path at $p \leq .05$.

Figure 3

Structural equation models for social anxiety, warmth, and friendship functioning
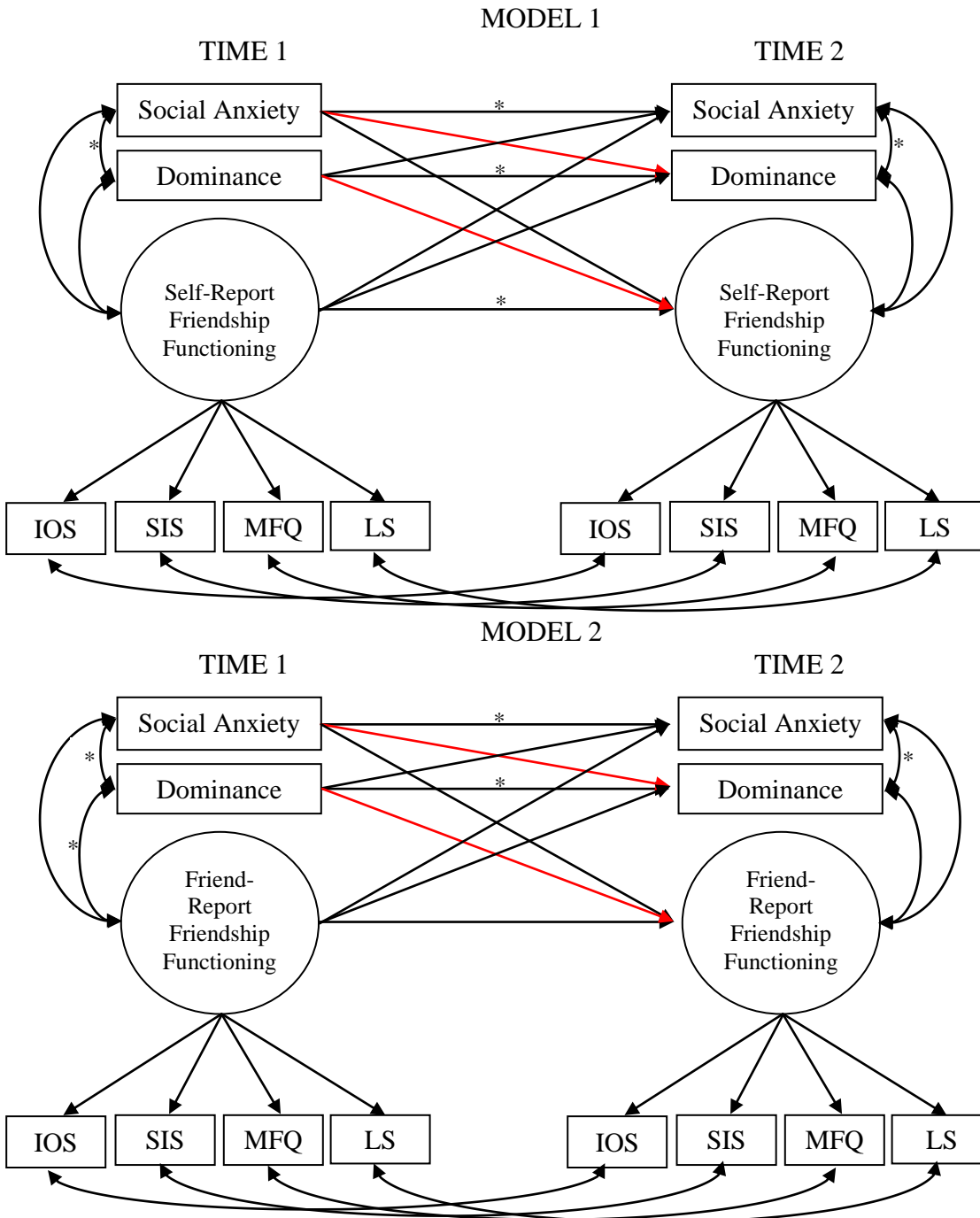

Note. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Warmth = Inventory of Interpersonal Problems—64 Warmth subscale; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score. The paths tested for mediation are highlighted in red.
*Denotes significant path at $p \leq .05$.

Figure 4

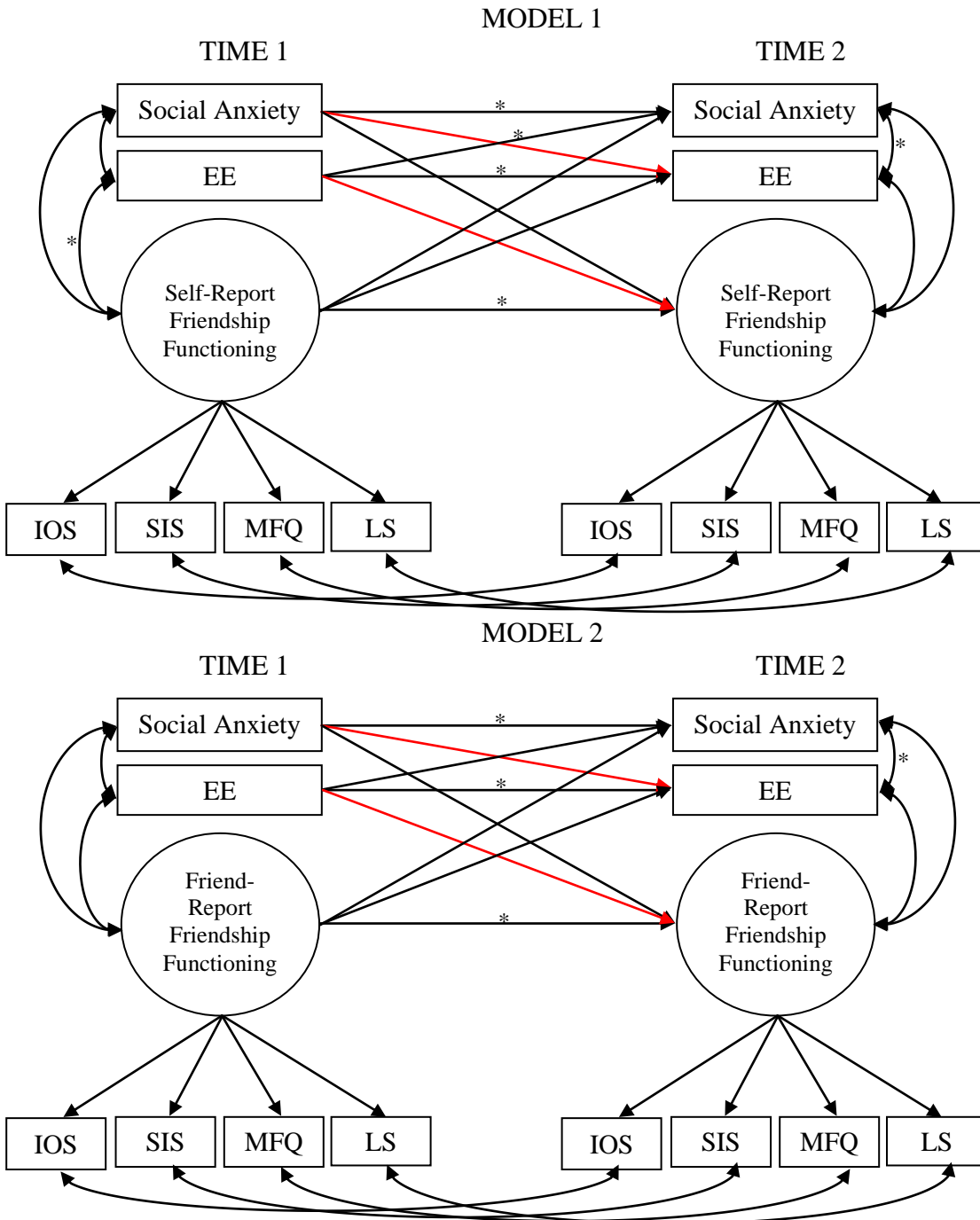*Structural equation models for social anxiety, dominance, and friendship functioning*

Note. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; Dominance = Inventory of Interpersonal Problems—64 Dominance subscale; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score. The paths tested for mediation are highlighted in red.
*Denotes significant path at $p \leq .05$.

Figure 5

Structural equation models for social anxiety, emotional expressivity, and friendship functioning

Note. SA = Social anxiety composite created by summing the standardized straightforward Social Interaction Anxiety Scale score and the standardized Social Phobia Scale total score; EE = Berkeley Expressivity Questionnaire total score; IOS = Inclusion of the Other in the Self Scale; SIS = Sternberg Intimacy Scale total score; MFQ = McGill Friendship Questionnaire—Friend's Function total score; LS = Liking Scale total score. The paths tested for mediation are highlighted in red.
*Denotes significant path at $p \leq .05$.