

What's behind the link between social anxiety and low friendship satisfaction? Exploring the roles of perceived closeness, self-disclosure, friendship maintenance behaviours, and relational reciprocity

by

Vanja Vidovic

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### **Author's Declaration**

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## **Abstract**

Prior studies have found that high socially anxious (SA) individuals suffer from lower quality friendships and poorer social supports, which contribute to chronic feelings of loneliness and social isolation as well as diminished overall well-being and life satisfaction. The present research sought to clarify the relationship between SA and friendship satisfaction across different levels of friendship intimacy. We also aimed to gain insight into the associations between trait SA, friendship satisfaction, and key relationship characteristics that relational scientists have deemed important to the development and maintenance of friendships, including levels of self-disclosure, use of “friendship maintenance behaviours” (FMBs), and focus on relational reciprocity. To this end, we conducted two online studies, in which participants completed a variety of questionnaires in which they reported on their thoughts and behaviours in relationships with three specific individuals in their life representing different levels of friendship intimacy: a superficial friend (acquaintance), casual friend, and close (or best) friend. In study 1, we recruited 177 undergraduate students at the University of Waterloo, whereas in Study 2 we recruited 320 community-based North American adults through Amazon’s Mechanical Turk. Results revealed that for both undergraduate students and community adults, friendship satisfaction increased with increasing levels of friendship intimacy, but SA was consistently associated with lower friendship satisfaction. Irrespective of trait SA, both self-disclosure and use of FMBs increased as friendships deepened and increases in both were associated with greater friendship satisfaction. However, for student (but not community) participants, trait SA was marginally significant in moderating the relation between FMBs and friendship satisfaction, such that FMBs may be a more important for friendship satisfaction among higher SA individuals. Finally, participants reported that their focus on strict reciprocity decreased as

relationships became more intimate, but individuals with higher SA endorsed more concern over reciprocity than individuals lower in SA within all types of friendships and greater preoccupation with reciprocity predicted lower friendship satisfaction. Lower friendship satisfaction, in turn, predicted reduced well-being across several domains. These findings offer preliminary insights into potential reasons for lower friendship satisfaction among high SA individuals, providing clues about potential targets for developing interventions that could be used to help socially anxious clients improve aspects of their relationships and, in turn, enhance their life satisfaction and overall well-being.

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## Literature Review and General Introduction

### Friendships predict well-being

The link between high quality friendships and human well-being has been well-established and well-documented in recent decades (Blieszner, 2014; Demir & Weitekamp, 2007; Lewis, Al-Shawaf, Russell, & Buss, 2015; Pietromonaco & Collins, 2017). Formation and maintenance of strong interpersonal bonds has even been postulated to be not merely pleasant and desirable, but a fundamental need driving human behaviour (Baumeister & Leary, 1995). In addition, not only have friendships been shown to relate positively to mental and physical well-being (Umberson & Karas Montez, 2010), but a recent review of this literature ranked friendships as the single most important predictor of health outcomes (Dunbar, 2018). For instance, friendships have been shown to help increase people's immune functioning, dampen the harmful effects of stress responses on their bodies, and improve their cardiovascular health (Dunbar, 2018; Holt-Lunstad, Uchino, Smith, & Hicks, 2007).

Furthermore, the contribution of friends to one's experiences of positive emotions (e.g., happiness; Blieszner, 2014) has been established as a robust finding across cultures (Brannan, Biswas-Diener, Mohr, Mortazavi, & Stein, 2013; Lewis et al., 2015), and more satisfying friendships are associated with higher general life satisfaction. For instance, Diener and Seligman (2002) found that individuals who spend the greatest amount of time socializing with friends, and the least amount of time alone, also provide the highest ratings of life satisfaction. In contrast, poor social adjustment and lack of social support have been linked to increased experiences of depressive symptoms and suicidality (Grunebaum, Galfalvy, Mortenson, Oquendo, & Mann, 2010; Marver et al., 2017; Wade & Kendler, 2000).

**Friendships at different levels of intimacy.** Naturally, not all friends are equivalent, and researchers in this domain are carefully attuned to the fact that people have many types of friends, characterized by different levels of emotional closeness (Blieszner, 2014). Similarly, people are readily able to distinguish individuals in their own lives based on perceived emotional closeness or interpersonal intimacy (e.g., close friend vs. casual friend), and are able to report on similarities and differences across different categories of friendship (Blieszner, 2014; Demir & Ozdemir, 2010). To this end, Hays (1984, 1985) aimed to categorize non-romantic relationships according to levels of closeness, and initially postulated four distinct levels of friendship intimacy: Best friend, close friend, casual friend, and superficial friend (i.e., acquaintance). However, Hays' empirical studies testing this framework found that people tend to behave similarly with close and best friends, so that only three distinct categories of friendship emerged (Hays, 1984, 1985). Although there is slight variability in the exact terms used by researchers to describe the categories of friendship, most literature on friendships differentiates between friends at three different levels of intimacy (e.g., Oswald, Clark, & Kelly, 2004).

**Close friendships confer the most benefits.** Rather than quantity, or size of one's social network, it is the quality of friendships that has emerged as the most important predictor of well-being (Demir & Weitekamp, 2007; Gellespie, Lever, Frederick, & Royce, 2015; Lewis et al., 2015). For example, it has been noted that close friendships comprise the types of social connections that are uniquely implicated in the severity, progression, and treatment of both mental health disorders (e.g., schizophrenia, depression, addiction) and physical diseases (e.g., cardiovascular disease, cancer), rather than an accumulation of several weaker social supports (Dunkel Schetter, 2017). The importance of high quality close friendships is thought to be due to the type of emotional and instrumental support that close friends are able to provide, which is

quantitatively and qualitatively different from what is offered from friends at lower levels of intimacy. Compared to friends at lower levels of interpersonal intimacy (e.g., casual friends), close friends are more likely to be sensitive to one's distress and to respond with attempts to relieve the distress, even if such responses require an investment of their own time or effort (Requena, 1995). As such, it is specifically support from close friends that is most closely tied to psychological well-being and life satisfaction (Lewis et al., 2015; Rook & Ituarte, 1999), making high quality close friendships among the most reliable and robust predictors of health and mortality (Hold-Lunstad, Robles, & Sbarra, 2017).

Therefore, the ability to cultivate close friendships is of paramount importance to one's well-being (Tooby & Cosmides, 1996). However, the extent to which people are able to develop and access strong social supports varies considerably across individuals within the population (e.g., Hays, 1984; Horowitz & French, 1979).

**Friendship satisfaction and social anxiety (SA).** Despite the abundance of research on friendships within the field of social psychology, how such findings relate to specific forms of psychopathology remains relatively understudied. Given the interpersonal nature of friendships, and the social skills vital to both establishing and maintaining friendships, it appears that individuals with social anxiety disorder (SAD) may be particularly susceptible to difficulties in this domain. SAD is a highly prevalent disorder that affects approximately 12% of the population in their lifetime (Kessler, Berglund, Demler, Jin, Merikangas & Walters, 2005) and is thought to hinder one's ability to establish social connections (Ruscio et al., 2007; Alden & Taylor, 2004).

Indeed, previous work has found that higher trait SA is associated with poorer social supports, smaller social networks, and lower quality friendships (e.g., Alden, Regambal, & Plasencia, 2014; Fernandez & Rodebaugh, 2011). Using two large epidemiological datasets,

Rodebaugh (2009) found that SAD was the only mental disorder related to decreased perceptions of friendship quality, above and beyond perceived family relationship quality, diagnosis of other mental disorders, and other demographic variables. Furthermore, Rodebaugh and colleagues (2014) found that when dyads of friends were invited into the laboratory, there was a tendency for individuals higher in SA to rate their particular friendships as lower in quality than their friend rated that same friendship, whereas the ratings of low SA individuals tended to be more closely aligned with their friends' ratings. Despite these recent studies, the extant literature on SA and friendship development and satisfaction is quite sparse, as most of the work on SA has focused on social performance situations and first-meeting encounters. Therefore, much remains unknown about the friendship characteristics of high SA individuals and the potential factors that may underlie real or perceived discrepancies in friendship quality between individuals with varying levels of SA.

One of our primary aims was to shed light on how friendship characteristics may vary across the SA spectrum, with a focus on how qualitative differences in cognitions and behaviours within friendships may ultimately help explain discrepancies in ratings of friendship satisfaction and well-being. To better understand which underlying processes may impair high SA individuals' access to optimally satisfying friendships, we consulted the literature on relationship formation and maintenance, drawing upon empirical studies of both friends and romantic partners to identify factors that contribute to satisfaction within close interpersonal relationships.

### **Self-disclosure**

**Social penetration theory.** One aspect of interpersonal functioning that has been shown to closely relate to friendship satisfaction is *self-disclosure* (Graham, Huang, Clark, & Helgeson, 2008; McCarthy, Wood, & Holmes, 2017), a process which involves the revelation of personal

information to another (Omarzu, 2000). Patterns of self-disclosure across different types of relationships are commonly described using Social Penetration Theory, which states that both the breadth and depth of self-disclosure increase as a relationship increases in intimacy (Altman & Taylor, 1973; Taylor, 1968). The *breadth* of information refers to the number of topics that are discussed (e.g., family, hobbies, educational background, etc.), whereas *depth* refers to the degree of intimacy within the topics discussed (e.g., sharing of trivial information and preferences versus family problems or life ambitions; Carpenter & Greene, 2015). According to social penetration theory, early stages of relationship formation are characterized by superficial disclosure (e.g., sharing of preferences in fashion or music), which are then superseded with disclosures about topics like political views and social attitudes, followed by spiritual values, deep fears, and personal goals. Ultimately, the deepest level of self-disclosure reached in some relationships is that of the “core personality,” comprised of the most private information about the self (Carpenter & Greene, 2015). Such increases in the amount of information that is disclosed as well as increases in the intimacy of the content of disclosures have both been shown to relate to greater relationship satisfaction and to be vital for the maintenance of social connections (Altman & Taylor, 1973; Baxter, 1979; Carpenter & Greene, 2015; Morry, 2005).

**Social anxiety and self-disclosure within close relationships.** At the core of SA is a fear that perceived personal deficits will be exposed to the scrutiny and criticism of others (Moscovitch, 2009), suggesting that individuals high in SA may be more hesitant to progress through to the most intimate levels of self-disclosure within their relationships. Support for this view comes from a study showing that, after controlling for depression, higher SA among female but not male participants was associated with less disclosure in both romantic relationships and close friendships (Cuming & Rapee, 2010). Moreover, within that study, females’ low disclosure

within romantic relationships was indirectly related to decreased relationship quality (Cuming & Rapee, 2010). Sparrevohn and Rapee (2009) found similar results when they compared the self-disclosure tendencies and romantic relationship quality of individuals diagnosed with SAD and community controls. Sparrevohn and Rapee (2009) observed that, for both males and females, a diagnosis of SAD predicted less self-disclosure and lower perceptions of relationship intimacy. Although these studies (i.e., Cuming & Rapee, 2010; Sparrevohn & Rapee, 2009) offered valuable insights into self-disclosure of high SA individuals within the context of close relationships, they were limited by the nature of their cross-sectional designs. As such, both of these studies investigated the relation between SA and self-disclosure within the context of established close friendships or romantic relationships, but no conclusions could be drawn about how individuals high in SA might moderate their levels of self-disclosure as relationships form or as they interact with individuals at different levels of interpersonal intimacy. In addition, the indirect association between high SA and lower relationship quality was found only for women's romantic relationships but not for their close friendships, resulting in a lack of clarity about the nature of the relationship between self-disclosure and satisfaction within close friendships – a gap we wished to address in the present study.

**Social anxiety and reciprocity of self-disclosure.** Given the reciprocal nature of increases in the breadth and depth of self-disclosure as friendships develop (Carpenter & Greene, 2015), it is important to consider the extent to which high SA may impair one's ability to moderate their self-disclosures in ways that correspond appropriately to the nature of disclosures being made by an interaction partner. This question was investigated experimentally by Maleshko and Alden (1993), within the context of a laboratory study and with the use of study confederates who were trained to disclose at either high or low levels of intimacy. Maleshko and

Alden (1993) found support for differences in self-disclosure patterns based on level of SA. Specifically, it was observed that low SA individuals were more likely than those with high SA to adjust their level of self-disclosure appropriately to match the self-disclosure of their in-lab interaction partner (Maleshko & Alden, 1993). Therefore, it is possible that high SA individuals might show less variability in amounts of self-disclosure in their everyday lives with friends at different levels of intimacy (e.g., acquaintances, casual friends, and close friends).

An unvaryingly moderate level of self-disclosure across different types of friendships would be expected to thwart friendship development, given that self-disclosure is vital to experiences of increased intimacy (Altman & Taylor, 1973). Specifically, since gradually revealing more information about the self, as a means of deepening friendship intimacy, is a reciprocal process (Carpenter & Greene, 2015), a lack of reciprocity by a high SA individual could be interpreted by an interaction partner as a sign that increased emotional closeness is not desired. Consequently, this could result in the interaction partner ceasing further self-disclosure, thereby bringing development of the friendship to a halt. One way in which such a situation may be manifested is through the categorization of friends based on perceived emotional closeness. If high SA individuals routinely fail to reach the most intimate forms of social connection with others, then we might expect their friendships across different levels of intimacy to show more similarity with one another than might be observed among low SA individuals' friendships across levels of intimacy.

### **Friendship Maintenance Behaviours (FMBs)**

Beyond the application of social penetration theory to acts of self-disclosure, the notion may be broadened to describe the progression of breadth and intimacy of interpersonal interactions more generally. Given that friendships are largely based on spending time together

in mutually pleasant and satisfying ways, the types of social activities in which friends engage matter (Demir & Weitekamp, 2007; Gillespie et al., 2015; Oswald, 2016). In fact, one way that individuals distinguish between friends at different levels of interpersonal intimacy is by the activities in which they engage with those specific friends (e.g., Blieszner, 2014). Though *friendship maintenance behaviours* (FMBs) are difficult to define precisely, they essentially encompass any joint behaviours in which people engage between the initiation and termination of a friendship, and which keep them connected as friends (Hays, 1984; Oswald et al., 2004). Elaborations on this definition, and FMB typologies, are discussed below.

**FMBs vary across levels of friendship intimacy.** To test the hypothesis that FMBs across levels of friendships intimacy increase in both breadth and depth as friendships develop (as proposed by social penetration theory), Hays (1984) assessed behavioural change across stages of friendship formation. The specific content areas assessed by Hays (1984, 1985) included: companionship (e.g., sharing of experiences), consideration or utility (e.g., provision of services or support), communication (e.g., self-disclosure), and affection (e.g., expressions of emotion). Results of this study showed that behavioural patterns as friendships evolved were consistent with the social penetration theory model and followed Guttman-like progressions from superficial interactions (e.g., pair of friends attending a party) to increasingly intimate behaviours (e.g., one member of the friendship helping the other with a personal problem; Hays, 1984). Furthermore, both the breadth and depth of behavioural interaction correlated with perceptions of interpersonal intimacy and decreases in FMBs preceded friendship dissolution (Hays, 1984). The fact that the nature of the relationship between FMBs and friendship intimacy closely resembled the findings concerning self-disclosure is perhaps not surprising, especially considering that the communication facet of FMBs encompasses self-disclosure.

Although Hays' (1984, 1985) early work represented one of the first attempts to categorize the types of the FMBs that play a role in relational maintenance, several other researchers have attempted to categorize relational maintenance strategies and have separately converged on similar typologies (e.g., Stafford & Canary, 1991; Fehr, 1996; Oswald et al., 2004). The most recent typology of FMBs comes from Oswald and colleagues (2004), whose four key types of FMBs (*positivity, supportiveness, openness, and interaction*) resemble the categories previously outlined by Hays (1984), as well as the maintenance typologies identified by Stafford and Canary (*positivity, assurances, openness, shared tasks, and shared networks*; 1991) and Fehr (*support and assurance, self-disclosure, provision of rewards, and shared time*; 1996). Whereas some of these models of relational maintenance (e.g., Stafford & Canary, 1991) were originally developed within the context of and primarily for the purposes of research on romantic relationships, the relational maintenance typologies empirically derived by Hays (1984) and Oswald and colleagues (2004) offer the advantage of having been designed specifically for research on friendships.

The present discussion will focus on the FMB typology embodied in the Friendship Maintenance Scale (FMS) created by Oswald and colleagues (2004), since the FMS represents the most recently developed measure for the assessment of friendship maintenance and has been used in other recent investigations of friendship processes (e.g., Ledbetter & Kuznekoff, 2012; Fearer, 2013). Similar to previous research on engagement in FMBs across levels of friendship intimacy, Oswald and colleagues (2004) found that individuals moderate their engagement in FMBs as friendships deepen, such that they engage in more FMBs with friends at higher levels of intimacy (e.g., best friends) than with friends at lower levels of intimacy (e.g., casual friends). As friendships increased in intimacy, both the amount of behaviours and the intimacy of such

behaviours was observed to increase (Oswald et al., 2004). In addition, increased use of FMBs was found to be significantly related to increases in friendship satisfaction (Oswald et al., 2004).

**Social anxiety and FMBs.** Given the strong emphasis on skillful interpersonal interaction inherent in these relational maintenance strategies, it is possible that the adaptive moderation of FMBs across different types of friendships, which may be crucial for maximizing friendship satisfaction, poses unique challenges for high SA individuals. Although previous studies have not investigated how FMBs relate to SA, we may draw on studies regarding SA and self-disclosure to develop hypotheses. As described above, high SA individuals engage in less self-disclosure within close relationships (e.g., Cuming & Rapee, 2010; Sparrenvohn & Rapee, 2009), and are less responsive to a new acquaintance's cues to reciprocate the intimacy of self-disclosure (e.g., Maleshko & Alden, 1993). Generalizing from these findings to engagement in FMBs, we would expect individuals higher in SA to exhibit less variability in FMBs across levels of interpersonal intimacy. That is, we would expect patterns of FMB use to mirror the predicted patterns of self-disclosure, such that high SA participants would demonstrate relatively high use of FMBs with acquaintances and relatively low use of FMBs with close friends in comparison to low SA individuals.

Increased use of FMBs at higher levels of intimacy has consistently been linked to greater friendship satisfaction (Hays, 1984; Oswald et al., 2004), suggesting that any atypical patterns of FMB use could help explain the previously observed discrepancies in friendship satisfaction between high and low SA individuals. Therefore, differences in FMBs may have meaningful implications for friendship satisfaction and well-being among high SA individuals.

**Experiences of positivity during social interactions.** Lastly, in addition to objective differences in use of FMBs based on trait SA, high and low SA individuals may have different

emotional experiences as they engage in FMBs. Given that SA has been linked to decreased experiences of positive emotions (Kashdan, 2007; Kashdan & Steger, 2006), it is possible that the previously established link between appropriate use of FMBs and greater friendship satisfaction might be attenuated at higher levels of SA. Thus, even if high and low SA individuals were to report engaging in similar amounts and types of FMBs, people high versus low in SA might still experience such social interactions differently and feel less satisfied with them.

### **Expectations of reciprocity**

**Equity Theory.** Inherent in both the patterns of self-disclosure and behaviour within friendships is the notion of *reciprocity* within social exchanges. This idea fits within the framework of social exchange for understanding rules governing dyadic interactions, and is specifically outlined in the Equity Theory of relational maintenance (Stafford & Canary, 1991, 2006; Thibaut & Kelley, 1959; Walster, Berscheid, & Walster, 1973). Equity Theory states that individuals keep track of costs and benefits within their interpersonal relations, and that the balance of costs and benefits experienced within the relationship contributes to relationship satisfaction (Thibaut & Kelley, 1959; Walster et al., 1973). An example of a cost within this framework is the investment of time or energy to help a friend cope with a difficult situation, whereas an example of a benefit is the presence of someone to confide in about one's own problems when they arise (Thibaut & Kelley, 1959). Whereas relationships in which costs incurred approximately equal benefits received are most satisfying (e.g., Hatfield, Traupmann, Sprecher, Utne, & Hay, 1985), the perception that one is receiving either more benefits (overbenefitted) or fewer benefits (underbenefitted) than one has invested into a relationship has been linked to decreased friendship satisfaction (Stafford & Canary, 1991; Thibaut & Kelley,

1959). Perceptions of being either underbenefitted or overbenefitted have also been linked to experiences of distress and negative emotions including anger, resentment, hurt, and guilt (Fearer, 2013; Hatfield & Traupmann, 1980; Sprecher, 1986).

**Individual differences in exchange orientation.** Reciprocity is linked to relationship satisfaction, in that individuals tend to rate equitable relationships as most satisfying, but the strength of this relation has been shown to depend on the strength of one's *exchange orientation* (Buunk & Prins, 1998; Murstein, Cerreto, & MacDonald, 1977). Exchange orientation, a concept initially proposed by Murstein and colleagues (1977), refers to the degree to which an individual is concerned with strict reciprocity within social interactions (e.g., reciprocity with respect to goods, services, privileges, and demonstrations of affection provided). Exchange orientation may be thought of as a stable personality-like variable. At one extreme of this trait is the high exchange-orientated individual, who has a low tolerance for even temporary imbalances in the cost-benefit ratio and is prone to feeling uncomfortable when someone does them a favour that they are unable to repay promptly. Conversely, at the other extreme, is the nonexchange-oriented individual, who is minimally concerned with keeping track of what they have done for others and what others have done for them (Mustein et al., 1977).

In addition to individuals differing from each other in the tendency to focus on social exchange processes, exchange orientation has also demonstrated intraindividual variability, depending on perceived closeness to the interaction partner. For example, it is thought that friendships, as opposed to relationships with unfamiliar others, are characterized by trust and a mindset of long-term reciprocity (e.g., that costs and benefits will even out in the long run; Buuk & Schaufeli, 1999). Moreover, as relationships develop, the decreasing importance of quantity of benefits obtained is replaced by increasing weight allocated to the nature of the benefits received,

such that adequately meeting each other's needs becomes the ultimate goal in close friendships (Berg, 1984).

To investigate social exchange processes with different types of friends, Hays (1989) studied the day-to-day functioning of close versus casual friends. Hays (1989) found that friends at all levels of intimacy adhered to the basic principles of equity, in that benefits offered approximately equaled benefits received; however, other social exchange factors varied with type of friendship. For instance, exchange factors were monitored more closely at the beginning of friendships, and individuals were observed to be particularly sensitive to perceived friendship "costs" at these superficial levels of intimacy, which was an attitude posited to be attributable to uncertainty as to whether or not the potential friendship was worth the investments being made (Hays, 1989). In contrast, at deeper levels of friendship intimacy, when interaction partners had presumably proven to be worth the costs associated with maintaining the friendship, investments were tracked less closely despite actually having increased alongside increasing levels of intimacy (Hays, 1989).

Additional evidence suggests that, whereas strictly reciprocal exchanges serve to increase trust within new relationships or convey an interest in the other person, and are therefore viewed favourably, tit for tat approaches tend to be viewed negatively within close friendships (Addison, 2000; Murstein & Azar, 1986). For example, a high exchange orientation (e.g., tit for tat approach) has been linked to lower friendship satisfaction (Jones, 1991), possibly because explicit contingent exchange and turn-taking reciprocation are understood to be characteristic of low-trust relationships (e.g., in which friendship is either weak or absent), and such behaviours are therefore interpreted as conveying low trust even when they appear within closer friendships (Tooby & Cosmides, 1996).

More recent research on social exchange processes within friendships has yielded similar results, suggesting that exchange orientation is both a stable individual difference between people, and that it varies depending on the interaction partner. For example, Addison (2000) examined expectations regarding (in)equities in social exchanges and found that concerns over fairness and reciprocity were lower for friends than for acquaintances. Moreover, a subsequent longitudinal study showed that as acquaintanceships evolved into friendships, concerns over equity decreased (Addison, 2000).

**Social anxiety and focus on reciprocity within friendships.** To date, little research has specifically investigated the relation between SA and exchange orientation, although early work has found more general experiences of anxiety (e.g., trait anxiety) to be characteristic of people high in exchange orientation (Murstein & Azar, 1986). Addison (2000) hypothesized that the risk-averse tendencies and increased sensitivity to threat experienced by higher SA individuals would render them less tolerant of inequities in social exchanges (i.e., higher in exchange orientation). To test this hypothesis, Addison (2000) investigated whether the combination of high shyness and high sociability, conceptualized as capturing trait SA, related positively to concerns over reciprocity across different types of relationships. Addison (2000) found that the combination of high shyness and high sociability predicted expectations of reciprocity only within acquaintanceships, but not in relationships with siblings, cousins, or close friends. However, this study was limited by the absence of a validated measure of trait SA, and it is not clear to which extent the combination of high shyness and high sociability accurately capture the experiences of socially anxious individuals. Moreover, this study only assessed concern with being underbenefitted within relationships (e.g., cheated of rewards), whereas it is plausible that

high SA individuals experience distress by the thought of either experiencing less *or more* than their fair share of rewards within a friendship.

A more recent study, approaching this question from a slightly different perspective, corroborated and extended the idea that exchange orientation may be uniquely related to SA. Fernandez and Rodebaugh (2011) sought to test the hypothesis that higher SA individuals apply acquaintanceship-based rules to their friendships, such that they are more likely than low SA individuals to interpret positive friendship behaviours by a close friend (termed “favours”) to be rendered with the expectation that they will be promptly reciprocated. The fundamental basis of this hypothesis was the premise that at least some people with elevated trait SA lack experience with truly close friendships, thus resulting in their acquisition of an atypical model of close relationships. As a consequence, it was proposed that high SA individuals would be more likely to apply interpersonal strategies shown to be effective for navigating many types of cooperative relationships other than friendships (e.g., tit for tat behaviours) to their close friendships (Fernandez & Rodebaugh, 2011).

In three studies of undergraduate students across the SA spectrum, Fernandez and Rodebaugh (2011) consistently found support for their hypothesis, demonstrating a positive association between SA and beliefs that friendships require strict reciprocity. Specifically, negative responses to favours, with perceived pressure to reciprocate (e.g., *I shouldn't ask my friend for any more help until I've repaid them back somehow*), were found to strongly relate to SA. SA was also significantly associated with: (a) fewer positive reactions to favours (e.g., *the favour shows I can count on my friend in the future*) and (b) stronger beliefs that friendships require strict reciprocity (e.g., *my friend probably did that because they're hoping I'll help them out on something*), and both of these associations were mediated by negative responses to

favours. Furthermore, higher SA and fewer positive reactions to favours predicted lower friendship quality, and there was a significant indirect path from SA to friendship quality through (more) negative reactions to favours and (less) positive reactions to favours (Fernandez & Rodebaugh, 2011). However, one limitation of this work is that these pathways, including mediating pathways, were established in the context of a cross-sectional study design. As such, the direction of causality between the variables under study could not be established (Fernandez & Rodebaugh, 2011).

Thus, higher SA individuals may have atypical models of close friendships, particularly concerning social exchange processes, and continued application of acquaintanceship-based rules to friendships may have important implications for the quality of high SA individuals' social relationships and well-being.

## The Current Studies

In light of the previously reviewed gaps in current literature, the present studies sought to clarify the relationship between SA and satisfaction within different types of friendships. Furthermore, we aimed to provide preliminary insight into ways in which levels of trait SA are associated with key friendship characteristics (levels of self-disclosure, FMB use, and focus on strict reciprocity), how these associations may vary across levels of friendship intimacy, and how these factors may contribute to experiences of friendship satisfaction. To this end, we conducted two online studies, in which we asked people to report on their thoughts and behaviours with three specific individuals in their life: a superficial friend (acquaintance), casual friend, and close (or best) friend. Procedures were nearly identical across the two studies, with the sample in Study 1 consisting of university undergraduate students and the sample in Study 2 consisting of a community-based sample of North American adults.

### Study hypotheses

**Friendship satisfaction.** In line with previous findings (Lewis et al., 2015; Dunkel Schetter, 2017), increased interpersonal intimacy was expected to be associated with higher friendship satisfaction (i.e., expected that friendship satisfaction would increase from acquaintances to casual friends, and from casual friends to close friends). It was also hypothesized that higher SA would be associated with lower levels of friendship satisfaction within each of the three friendships, and especially within close friendships.

**SA and friendship attitudes and characteristics.** With respect to the link between SA and levels of self-disclosure, FMB use, and exchange orientation, several specific hypotheses were tested. For self-disclosure, it was hypothesized that higher SA would predict more moderate levels of self-disclosure across the levels of closeness, such that individuals with higher

SA would self-disclose more to acquaintances and self-disclose less to their close (or best) friends. Similarly, it was hypothesized that higher SA, as compared to lower SA, would be associated with more moderate levels of FMB engagement, such that individuals higher in SA would use more FMBs with acquaintances and less FMBs with close (or best) friends. Finally, SA was expected to be associated with a greater and more persistent focus on reciprocity within friendships, such that the link between SA and preoccupation with reciprocity was expected to be most exaggerated within close friendships. We also predicted that lower self-disclosure and lower FMB use, as well as greater focus on social exchange, would be correlated with lower friendship satisfaction regardless of one's level of SA.

**Well-being.** Past research has indicated that satisfaction within close friendships confer significant benefits (e.g., in terms of emotional and instrumental support that contribute to one's health and happiness; e.g., Hold-Lunstad et al., 2017). We therefore also expected decreased satisfaction in close friendships to be most strongly correlated with decreased well-being. As described below in the Measures section, we conceptualized well-being in line with Diener's (1984) widely used tripartite model of subjective well-being, which contains the components of positive affect, negative affect, and satisfaction with life (see Brannan et al., 2013; Geerling & Diener, 2018). In addition, given the known inverse association between depression and well-being (Siddaway, Wood, & Taylor, 2017), we also assessed depressive symptomatology and included it as a measure of well-being. We hypothesized that: (a) satisfaction with acquaintances would be unrelated to all measures of well-being; (b) satisfaction with casual friends would be moderately associated with measures of well-being; and (c) satisfaction with close friends would be strongly related to measures of well-being.

## Study 1

Study 1 investigated the research questions outlined above, within a sample of university undergraduate students. Study hypotheses, consistent across our two studies, are presented in the preceding section.

## Method

### Participants

The sample for Study 1 consisted of undergraduate students at the University of Waterloo ( $N = 177$ ), who were enrolled in at least one psychology course at the time of data collection. Following data cleaning and exclusion of incomplete response sets, the mean age of the sample included in analyses ( $N = 125$ ) was 20.18 years old ( $SD = 2.41$ ; range: 18-31), and participants identified predominantly as female (76.0%). The majority of participants self-identified as White/European (40.1%), with the rest identifying as South Asian (18.4%), Asian (17.6%), Southeast Asian (4.8%), Black (4.8%), West Indian (3.2%), Arab (2.4%), Filipino (1.6%), and Latin American (1.6%). In addition, 3.2% of participants identified their ethnicity as “other” and 1.6% preferred not to indicate their ethnicity. Individuals participated in this study entirely online, in exchange for bonus credit towards their psychology courses. Participation in the study was completely voluntary and took about 60 minutes to complete. All study procedures were approved by the University of Waterloo’s Human Research Ethics Board.

To maximize data integrity within the online context, a CAPTCHA feature, in the form of an, “I am not a robot” button, provided through Qualtrics™, was included to prevent robots from accessing the study questionnaires. In addition, long answer questions were included in the questionnaire, for which participants were provided with three text boxes and asked to describe how they met each of the selected friends. Following data collection, long-answer responses

were manually reviewed by the first author for evidence of nonsensical data, which typically represent robots that were not blocked by the CAPTCHA feature. The review of long answer responses did not result in the exclusion of any participants from analyses.

Next, attention and effort scores were computed for the remaining participants and used to filter out unreliable respondents (see *Measures*, below). The value of using attention checks in online research has been a subject of debate in recent years, with some researchers presenting data in favour of such practices (e.g., Kung, Kwok, & Brown, 2018) and others suggesting that use of attention checks is likely to introduce sample bias and influence participant response patterns on items following the attention check (Vannette, 2018). As such, the current study aimed to strike a balance between the costs and benefits of excluding participants based on such attention checks, and used this method in combination with additional measures of data quality (e.g., CAPTCHA feature, manual review of responses, and assessment of self-reported effort). We implemented a predetermined cut-off attention score of five (out of nine), so that only participants who responded incorrectly to half or more of the attention items were excluded from analyses. Finally, participant effort was taken into account, as described in the subsequent section.

### **Overview of procedure and measures**

Participants completed all study questionnaires using Qualtrics<sup>TM</sup>, a US-based online survey tool. All participants first completed several friend-specific questionnaires, which assessed self-disclosure, use of FMBs, exchange orientation, and satisfaction within each of their three selected friendships. Next, participants completed a measure of trait SA and measures of well-being. Attention scores were computed from attention checks dispersed throughout the study questionnaires, and effort was rated at the end of the study.

## Measures

**Attention score.** Nine attention checks were scattered throughout the study questionnaires (e.g., *If you are paying attention, please select “Somewhat disagree” for this question*).

Responses were scored as correct when participants selected the requested response option. Each correct response was worth one point, whereas selecting any of the other, incorrect, response options was worth zero points. Points from the nine attention check items were summed to create a total attention score for each participant, ranging from zero to nine. As noted above, participants with attention scores below 5 were excluded from study analyses.

**Participant effort.** Effort was assessed using a single-item measure, created to capture the self-reported validity of responses to our study scales. Participants were encouraged to rate their effort as truthfully as possible, with the following question, *“To know whether or not to include your responses in our study analyses, we are interested in the accuracy of the data you provided. Therefore, we would like to ask you to rate how much effort you honestly applied to the study tasks. Your response to this question will have no impact on your receipt of the participation remuneration. How much effort did you put into answering all questions to the best of your ability?”*. Response options ranged from 1 (Very minimal effort; I hardly read the questions) to 5 (I put in my best effort to answer all questions to the best of my ability). To ensure we analyzed high quality data, we applied a somewhat stringent criterion to this rating such that participants who rated their effort as 3 (“Some effort, but not my best effort and not consistently”) or lower on this scale were excluded from analyses.

**Self-disclosure.** The Jourard Self-Disclosure Questionnaire (JSDQ; Jourard & Lasakow, 1958) measures the amount and content of a respondent’s self-disclosure to another specific person. The original questionnaire consists of 60 items, with 10 items assessing self-disclosure

within each of the following domains: Attitudes and Opinions, Tastes and Interests, Work or Studies, Money, Personality, and Body. Because participants were to complete this questionnaire three times, once in relation to each friend, we were cognizant of the potential for this task to promote participant fatigue with each administration of all 60 items. As such, we opted to shorten this questionnaire to strike a balance between accurately capturing self-disclosure within the friendship and keeping demands on participants reasonable enough to keep them engaged. Consequently, the Money and Body domains were excluded from the present study, as they were deemed least relevant to all three type of friendships. In addition, the JSDQ scale was shortened such that only four items were administered from the subscales of Attitudes and Opinions (e.g., *What I think and feel about religion*), Tastes and Interests (e.g., *My favorite foods, the ways I like food prepared, and my food dislikes*), and Work or Studies (e.g., *My ambitions and goals in my work*). The four items that were deemed most representative of each of these subscales were selected, with author VV and supervisor DM in 100% agreement about which items to include in each instance. Further, all 10 items of the Personality subscale were administered (e.g., *Things in the past or present that I feel ashamed and guilty about*), because those items contained the type of personal information about the self in which we were most interested. To ensure the measure was perceived as relevant to the experiences of our participants, certain items (e.g., *the TV shows that are my favorites*) were updated in minor ways to better reflect current media use and social activities (e.g., *what I like to watch on Netflix*).

Participants completed this questionnaire three times, once in relation to each of their selected friends. Response options ranged from 0 (Have told this [acquaintance/casual friend/close (or best) friend] nothing about this aspect of me) to 2 (Have talked in full and complete detail about this item to this [acquaintance/casual friend/close (or best) friend]). They

should know me fully or almost fully in this respect and could probably describe me accurately). For each item, participants also had the option to indicate that they had lied or misrepresented themselves to the friend with respect to that particular item, so that the friend has a false picture of them in that respect. Consistent with the scoring outlined by Jourard and Lasakow (1958), misrepresentations were scored as zeros. Cronbach's alphas across the three types of friendship ranged from .89 to .93, indicating good to excellent internal consistency.

**FMBs.** The Friendship Maintenance Scale (FMS; Oswald et al., 2004) is a 37-item measure assessing FMBs across the domains of openness, positivity, supportiveness, and interaction. The positivity subscale captures behaviours that are intended to make the friendship more rewarding and enjoyable for both parties, and includes both forward-scored items (e.g., *Try to make each other laugh?*) and reverse-scored items (e.g., *Ignore each other?*). The supportiveness subscale assesses the amount of supportive behaviours within the friendship (e.g., *Listen without making any judgement?*). The openness subscale captures communication within the friendship, and asks about both general self-disclosure (e.g., *Share your private thoughts with each other?*) and open communication (e.g., *Repair misunderstandings?*). Lastly, the interaction subscale of the FMS assesses joint engagement in a wide range of activities (e.g., *Visit each other's homes?*).

Two items from the original scale (e.g., *How often do you and this friend phone or email each other?*) were updated to reflect more modern technologies and interaction styles (e.g., *How often do you and this friend text or phone each other?*). In addition, we supplemented the original 37 items with two "authenticity" items (*How often do you and this friend: (a) show each other your personal foibles (small mistakes or imperfections)?; (b) tell each other about mistakes or embarrassing experiences?*). These additional items were included to capture the extent to

which participants allowed themselves to be vulnerable around each of the selected friends. It was thought that lower scores on these items could be indicative of higher levels of self-concealment, which may be a coping strategy employed by high SA individuals (e.g., Plasencia, Alden, & Taylor, 2011), and therefore may represent FMBs that are particularly important to explicitly assess within the context of SA. Participants responded using a 7-point Likert scale, from 1 (Never) to 7 (Very frequently/Nearly all of the time). After responding to each of the 39 questions, participants were asked whether their responses were based on real or imagined interaction frequencies. The Cronbach's alpha for the total 39-item FMS score indicated excellent internal consistency for all three types of friends, ranging from .93 to .95.

***Exchange orientation.*** The Exchange-Orientation Scale (EOS; Murstein & Azar, 1986) assesses the extent to which an individual is concerned with inequalities within friendships. This scale asks participants to rate the degree to which they agree with 21 statements (e.g., *When buying a present for this friend, I often try to remember what they have given me in the past*) on a Likert scale from 1 (Strongly disagree) to 5 (Strongly agree). One item from the original 21-item scale was deleted for the present study, as pilot testing indicated that it might cause confusion and not be very informative (*I would campaign for someone whom I don't agree with politically, if I knew he/she would get me a better job*). Within the present study, internal consistency within this scale was good to excellent across the three types of friendships (Cronbach's alphas ranging from .87 to .91).

***Friendship satisfaction.*** To assess friendship satisfaction, a modified version of Hendrick's (1988) Research Assessment Scale was used. Although this scale was originally developed for the assessment of romantic relationships, it has previously been adapted and used for the assessment of friendships, by changing items such as, "*In general, how satisfied are you*

*with your relationship?*” to, “*In general, how satisfied are you with this friendship?*” (e.g., Emmers-Sommer, 2004; Morry, 2003). Following the methods of Morry, Hall, Mann, and Kito (2014), participants rated their responses on a 7-point Likert scale instead of on the original 5-point scale, with response options ranging from 1 (Not at all or Never) to 7 (Very much or Always). Furthermore, the original 7-item scale was reduced to 4 items for our assessment of friendship satisfaction, because certain items (e.g., *How much do you love your [acquaintance/ casual friend/ close (or best) friend]?*) appeared inappropriate to administer in relation to friends at all levels of friendship intimacy and were thus removed.

Although Cronbach’s alphas in the present study were acceptable with the four-item measure of friendship satisfaction, results of Study 2 (below) showed that the reverse-coded item decreased Cronbach’s alpha below the acceptable threshold value of .70 (e.g., Tavakol, & Dennick, 2011), suggesting that the item might have caused confusion among community participants. As such, for consistency across datasets, the reverse-scored item (i.e., *How often do you wish you hadn’t gotten into this friendship?*) was removed from the friendship satisfaction scale in both Study 1 and Study 2. All Study 1 analyses were re-run with the friendship satisfaction scale total score comprised of the three forward-coded items (1. *How well does this close (or best) friend meet your needs, as you would expect from someone at this particular level of friendship?*; 2. *In general, how satisfied are you with this friendship?*; 3. *How much do you care about the wellbeing of this close (or best) friend?*). This measure demonstrated acceptable internal consistency across all three levels of friendship intimacy in this study (Cronbach’s alphas for the three-item friendship satisfaction scale ranged from .74 to .83).

**Trait SA.** The Social Phobia Inventory (SPIN; Connor et al., 2000) is a well-validated 17-item measure of SA symptoms (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006). This

scale presented participants with problems related to SA over the past week and asked them to rate the extent of their agreement with each statement (e.g., *Parties and social events scare me*) on a scale from 0 (Not at all) to 4 (Extremely). The SPIN demonstrated excellent internal consistency in this study, with a Cronbach's alpha of .96.

***Depression.*** Depressive symptoms were assessed as one aspect of well-being, using the depression subscale of the Depression, Anxiety and Stress Scale – Short Version (DASS 21; Lovibond & Lovibond, 1995), which is a valid and reliable measure of depression symptoms (Antony, Bieling, Cox, Enns, & Swinson, 1998). This subscale asked participants how much seven items (e.g., *I felt down-hearted and blue*) applied to them over the past week. Response options were provided using a 4-point Likert scale from 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time). The scale demonstrated excellent internal consistency in the current study, with a Cronbach's alpha of .91.

***Positive and negative affect.*** Positive and negative affect are considered core components of subjective well-being (Diener, 1984), and were assessed in this study using the Positive and Negative Affect Schedule – trait version (PANAS-Trait; Watson, Clark, & Tellegen, 1988). This scale assesses trait affect by asking participants to rate their feelings “over the past week” in relation to 10 positive mood adjectives (e.g., *happy, proud*) and 10 negative mood adjectives (e.g., *irritable, ashamed*). Participants rated all items using a 5-point Likert scale ranging from 1 (Very slightly or not at all) to 5 (Extremely). The positive mood adjectives were then summed to create the positive affect subscale, and the negative items were summed to create the negative affect subscale. Within this study, both subscales of the PANAS demonstrated high internal consistency (Cronbach's alpha of .92 for positive affect and Cronbach's alpha of .89 for negative affect).

*Satisfaction with life.* The third component of the tripartite model of subjective well-being, alongside positive and negative affect, is satisfaction with life (Diener, 1984), which was assessed in this study using the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS assesses satisfaction with life using 5 items (e.g., *In most ways my life is close to my ideal*) which are rated on a 7-point Likert scale from 1 (Strongly disagree) to 7 (Strongly agree). This scale demonstrated good internal consistency in this study, with a Cronbach's alpha of .88.

## **Procedure**

Recruitment materials advertised this as a study investigating how people think about, and behave with, different types of friends. The advertisements stated that participants would be asked to answer questions in relation to three specific individuals in their lives, corresponding to three levels of interpersonal intimacy (acquaintance, casual friend, close friend) and that only individuals who have all three of these types of friends are eligible to participate. Anyone who signed up for the study yet failed to meet the inclusion criteria was redirected out of the study without exposure to the questionnaires.

Following informed consent, participants were provided with a visual representation of social networks and levels of interpersonal intimacy, which was created for the purpose of the present study (see Figure 1). Consistent with friend selection prompts in previous work (e.g., Hays, 1989), no additional guidance or definitions of different types of friends were provided to assist participants in the task of selecting an acquaintance, casual friend, and close (or best) friend. This was done for two reasons. First, what constitutes a friend at each level of intimacy is, to at least some extent, idiosyncratic and therefore for each individual to decide for themselves. Indeed, people have been shown to readily be able to distinguish between different types of

friends within their lives (Blieszner, 2014). Moreover, if categorization of friendships varied as a function of SA (e.g., in terms of the criteria used to assign friends to the different levels of closeness), we did not want to eliminate such naturally-occurring differences by providing excessive structure to the task of friend selection. Second, we recognized that definitions of friendships tend to provide many cues as to the normative friendship maintenance behaviours at each level (e.g., a definition such as, “A close friend is someone to whom you feel very close and make an effort to see even when you are busy”), which would be problematic given that testing use of FMBs across friendships that vary in their level of intimacy was one of the aims of this study. Therefore, we were careful not to contaminate the data by telling people how they *should* act or feel with each selected friend at any point in the study. Thus, participants selected their three friends based on the visual depiction of intimacy provided in Figure 1.

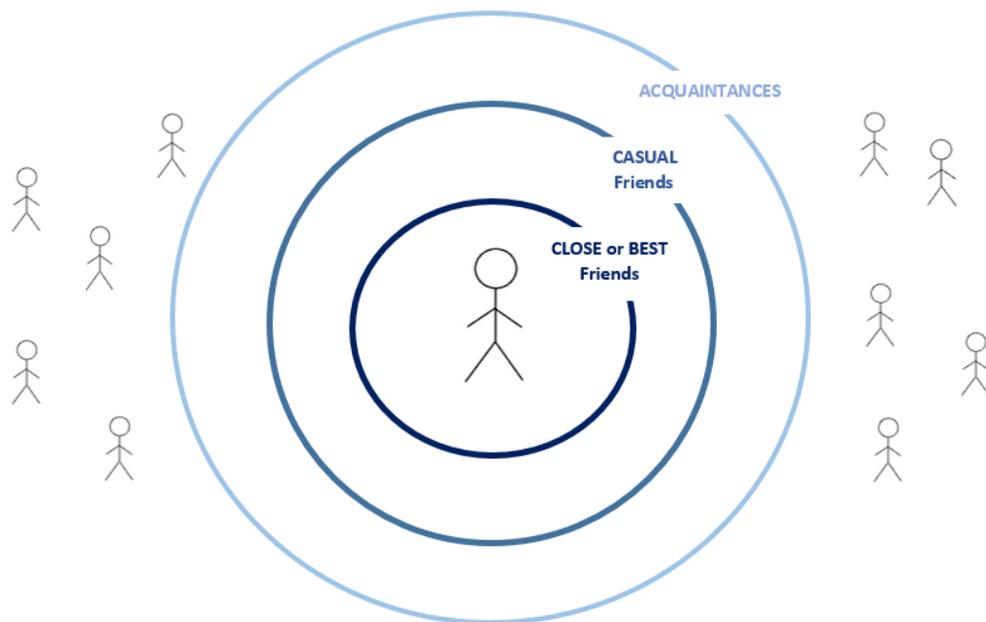


Figure 1. Visual representation of different friendships within one's social network.

Some general guidelines for the types of friends to be selected for this study were, however, provided. Since consultation of prior literature revealed evidence of sex differences in friendship processes that are likely to influence friendship satisfaction (e.g., Hall, Larson, & Watts, 2011; Hays, 1984, 1989; Parker & Vries, 1991), in order to increase confidence in our ability to interpret results, study participants were asked to select a same-sex non-romantic friend for the present study. Participants were further instructed that they should *not* select someone with whom they wish to have a romantic relationship in the future, as romantic interest would be expected to elicit specific motivations and behaviours that differ from the ones under investigation in the present study. Participants unable to select a same-sex friend were asked whether they instead had an opposite-sex friend at that specific level of intimacy, rather than being excluded from the study. People were required to have all three types of friends to be eligible to participate in the study; potential participants who were unable to select a friend at each level of intimacy failed to meet the outlined eligibility criteria and were therefore redirected out of the study.

After participants selected three specific individuals within their lives on whom to report, they were asked to type the name of each of these friends into an open text box. In addition to the name, participants were asked to provide a brief description of how they met each friend; this was done in order to facilitate recall and increase commitment to consistently responding with regards to those particular individuals. To further ensure that participants' responses pertained to the same friends for the duration of the study, the friend names provided at the start of the study appeared as embedded text in subsequent questionnaires, to remind participants which person they had initially selected for which type of friendship.

Once all three friends were selected and their names provided, participants proceeded to the study questionnaires. First was a series of friend-specific questionnaires, assessing self-disclosure, engagement in FMBs, exchange orientation, and friendship satisfaction. Each questionnaire in this portion of the study was adapted to be specific to each of the particular levels of friendship under examination (e.g., *how often do you and this [acquaintance/casual friend/close (or best) friend]...*). Friend-specific questionnaires were presented in order of decreasing intimacy, going outwards from the center of the social circle depicted in Figure 1 (i.e., starting with the close (or best) friend questionnaires, then casual friend questionnaires, and lastly acquaintance questionnaires). After all friend-specific questionnaires were completed, participants were presented with measures assessing symptoms of SA and components of well-being (positive affect, negative affect, satisfaction with life, and depressive symptoms), prior to being provided with a feedback letter signifying the end of the study.

## **Results**

Because each participant answered the same friend-specific questionnaires with respect to each of the three friends selected for this study, data were analyzed using a multilevel modeling (MLM) approach to account for correlated participant error in ratings of the dependent variables, testing random intercept models with fixed effects. MLM analyses were conducted in RStudio (R Core Team, 2019), using the nlme R package version 3.1-140 that tests for linear and nonlinear mixed effects (Pinheiro et al., 2019). Linear mixed-effects models were fit by maximum likelihood. Fit of models with and without the effects of interest was compared using the Akaike Information Criterion (AIC), for which a lower value indicated better model fit (e.g., Vrieze, 2012). Plots of R results were created using ggplot2 (Wickham, 2016) and ggeffects version

0.11.0 (Lüdecke, 2019). In addition, a portion of the data preparation and simple regression analyses were conducted in IBM SPSS Statistics 25 (2017), as specified below.

### **Data integrity and preliminary analyses**

Data analysis commenced with exclusion of participants based on the attention and effort cutoffs, as described above. Based on the predetermined criteria of an attention score of at least five (out of nine) for inclusion in analyses, 5.1% of the sample ( $n = 9$ ) was excluded from analyses. An additional 15 participants were excluded based on self-reported effort below the acceptable threshold, and 2 participants were excluded due to missing data on the question assessing effort. Long-answer responses were then manually reviewed for evidence of robot responses or highly incoherent responses. No additional response sets were excluded based on incoherence of long-answer responses.

Following exclusion of low quality responses, data were screened for missing values within the study variables of interest. Missing values, which constituted 1.04% of the total number of values in the dataset, were excluded from scale score computation. Executing the Analyze Patterns command under Multiple Imputation in IBM SPSS Statistics 25 (2017) indicated that there was no pattern to missing values in the scale scores. The total portion of missing values in the dataset was 1.68%, spread out over 24 participants. Given the small number of missing values, these cases were simply excluded from analyses<sup>1</sup>. Therefore, a total of 50 participants were excluded, leaving 127 participants for further analysis.

Next, data were screened for extreme outliers, defined as 3SDs above or below the mean for a particular variable. At least one univariate outlier was found for each of the following seven variables: EOS - close friend, friendship satisfaction - casual and close friend, FMS -

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<sup>1</sup> When preparing the data for potential publication, missing data will imputed prior to analysis.

acquaintance, and JSDQ - acquaintance, casual, and close friend. All univariate outliers were winsorized, such that the extreme scores ( $>3SD$  above or below the mean) were recoded to be less extreme (equal to  $3SD$  above or below the mean). Data were also screened for multivariate outliers prior to analyses. Testing for multivariate outliers with a Mahalanobis' distance of 40.79 as the critical value ( $df = 17; p = .001$ ) revealed the presence of two multivariate outliers in the data. Responses from these two participants with multivariate outliers were excluded from analyses. This resulted in a final number of 125 participants included in study analyses. Examination of the skew ( $< 3.0$ ) and kurtosis ( $< 10.0$ ) with the remaining participants indicated that all variables were normally distributed and, therefore, did not require transformations (Kline, 1998). All variables were grand mean-centered prior to inclusion as predictors in analyses.

The average amount of effort exerted by the participants included in analyses was 4.62 out of 5.00 ( $SD = 0.49$ ), and the average attention score was 8.60 out of 9.00 ( $SD = 0.92$ ). Variable means and SDs, as well as zero-order variables, are presented in Table 1.

Table 1

*Means, standard deviations, and correlations between Study 1 variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. SA	26.67	16.98								
2. Self-disclosure	19.02	13.12	-.01							
3. FMBs	19.76	7.04	-.01	.82**						
4. Exchange orientation	51.57	14.10	.25**	-.23**	-.21**					
5. Friendship satisfaction	16.82	3.61	-.18**	.49**	.56**	-.49**				
6. Satisfaction with life	22.86	6.73	-.45**	.07	.08	-.16**	.24**			
7. Positive affect	30.77	8.66	-.43**	.06	.09	-.09	.20**	.60**		
8. Negative affect	24.49	8.22	.57**	.04	.02	.26**	-.16**	-.44**	-.22**	
9. Depression	6.29	5.03	.55**	.00	-.03	.19**	-.17**	-.67**	-.51**	.60**

*Note.*  $N = 125$ . *M* and *SD* are used to represent mean and standard deviation, respectively. Numbers represent values collapsed across the different types of friendships.

\* indicates  $p < .05$ . \*\* indicates  $p < .01$ .

## Friendship satisfaction

To test the hypothesis that (a) greater friendship satisfaction would be experienced within friendships at higher levels of intimacy, and (b) higher trait SA (continuous predictor) would be associated with lower satisfaction particularly within close friendships, a random intercept model was first tested. In this random intercept-only model, the predicted average rating of friendship satisfaction was permitted to vary by participant. The average level of friendship satisfaction in this model was 16.82 ( $SE = 0.22$ ), with differences attributed to variation between participants equal to a standard deviation of 1.51 (residual  $SD = 3.28$ ). The AIC for the random intercept model predicting friendship satisfaction was 2021.69.

Next, fixed effects were added to the random intercept model; that is, friendship intimacy (categorical variable with three levels), SA (continuous variable), and their interaction were entered as predictors of friendship satisfaction. Because level of friendship intimacy and SA did not interact to predict friendship satisfaction ( $p$ s for differences in the effect of SA across levels of friendship intimacy  $> .145$ ), the interaction term was trimmed from the model prior to interpretation of main effects. Controlling for correlated error between participants in friendship satisfaction ratings, this model showed that participants reported significantly higher satisfaction within casual friendships ( $M = 16.86$ ) than within acquaintanceships ( $M = 14.53$ ;  $SE = .30$ ,  $t(248) = 7.75$ ,  $p < .001$ ), as well as higher satisfaction within close friendships ( $M = 19.06$ ) than within acquaintanceships ( $SE = .30$ ,  $t(248) = 15.04$ ,  $p < .001$ ). Temporarily re-ordering levels of the friendship intimacy variable so that close friendship was the reference category demonstrated that satisfaction within close friendships was also significantly higher than within casual friendships ( $SE = .30$ ,  $t(248) = -7.29$ ,  $p < .001$ ). Consistent with study hypotheses, a significant effect of SA on friendship satisfaction ratings was also observed, such that higher SA was

associated with lower overall friendship satisfaction ( $b = -.04$ ,  $SE = 0.01$ ,  $t(123) = -3.01$ ,  $p = .003$ ; see Figure 2). The AIC for this model with fixed effects was 1856.39, which was observed to be significantly lower from the AIC reported for the random intercept only model ( $p < .001$ ). Therefore, findings partially support study hypotheses; the two expected main effects emerged, but the hypothesized friendship intimacy by SA interaction in the prediction of friendship satisfaction did not.

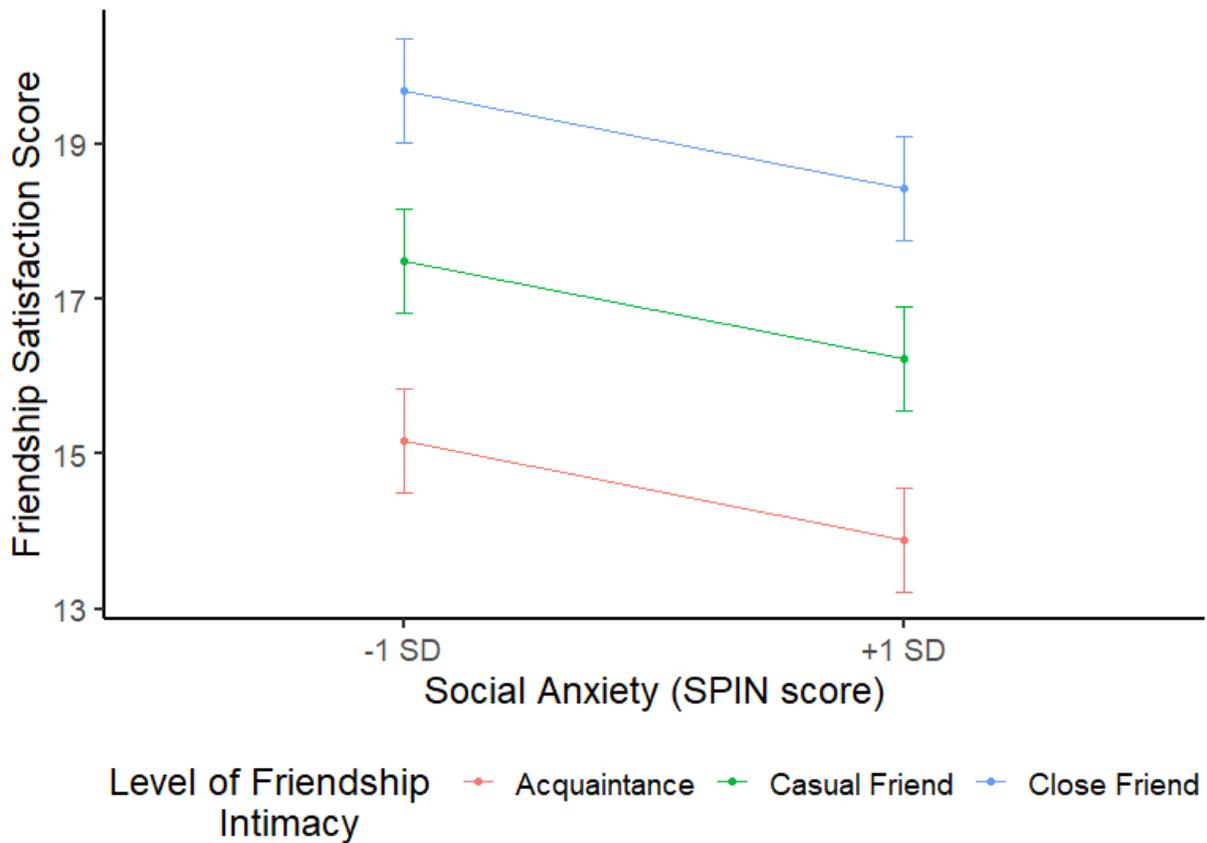


Figure 2. Level of friendship intimacy and SA predicting friendship satisfaction (Study 1). The figure depicts two main effects, in the absence of an interaction. Friendship satisfaction significantly increased from acquaintances to casual friends and from casual friends to close friends. Across all three types of friendships, higher SA was associated with lower ratings of friendship satisfaction.

## Self-disclosure

To test the hypothesis that higher levels of friendship intimacy would be associated with more self-disclosure, and that higher SA would be associated with less variability in self-disclosure across the levels of friendship intimacy (i.e., consistent engagement in a more moderate amount of self-disclosure), a random intercept model with fixed effects was tested. First, we tested a random intercept-only model in which the average level of self-disclosure was permitted to vary by participant. This model (AIC = 2999.74) showed minimal evidence of variability in self-disclosure ( $M = 19.02$ ,  $SE = 0.68$ ) attributable to differences among individuals (intercept  $SD < .01$ , residual  $SD = 13.10$ ). Nonetheless, because our data analytic approach was determined by our data structure rather than variance between participants, it was still deemed necessary to control for correlated participant error in ratings of self-disclosure.

Next, level of friendship intimacy, trait SA, and their interaction were added as fixed effects in the prediction of self-disclosure. The hypothesized level of intimacy by SA interaction was not statistically significant ( $ps > .227$ ), and was therefore trimmed from the model for interpretation of main effects. Consistent with expectations, there was a main effect of level of friendship intimacy, such that people disclosed more to casual friends ( $M = 17.01$ ) than acquaintances ( $M = 7.25$ ;  $SE = 0.76$ ,  $t(248) = 12.92$ ,  $p < .001$ ), and more to close (or best) friends ( $M = 32.81$ ) than acquaintances ( $SE = 0.76$ ,  $t(248) = 33.83$ ,  $p < .001$ ). Individuals also disclosed significantly more to close (or best) friends than to casual friends ( $SE = 0.76$ ,  $t(248) = -20.91$ ,  $p < .001$ ). As expected, there was no main effect of SA on self-disclosure ( $p = .757$ ). The AIC for this model with fixed effects was 2556.42, which was significantly lower than the AIC reported for the random intercept only model ( $p < .001$ ). Therefore, study hypotheses regarding the effects of type of friendship and SA on self-disclosure were partially supported.

It was further hypothesized that less self-disclosure would be associated with lower friendship satisfaction within all types of friendships, irrespective of one's level of trait SA. To test this, level of friendship intimacy, SA, and self-disclosure, along with all two- and three-way interactions of these variables, were added as fixed effects in a random intercept model predicting friendship satisfaction. Controlling for correlated participant error of friendship satisfaction ratings, there was a significant 3-way interaction between self-disclosure, level of friendship intimacy, and SA in predicting friendship satisfaction ( $b < -0.01$ ,  $SE < 0.01$ ,  $t(240) = -1.98$ ,  $p = .049$ ). This interaction was probed with regression analyses testing for the self-disclosure by SA interaction at each level of friendship separately, which revealed that self-disclosure and SA did not interact to predict acquaintanceship satisfaction ( $p = .143$ ), casual friendship satisfaction ( $p = .814$ ), or close friendship satisfaction ( $p = .258$ ). However, whereas both self-disclosure and SA significantly predicted friendship satisfaction with acquaintances and close friends ( $ps < .04$ ), neither self-disclosure ( $p = .226$ ) nor SA ( $p = .126$ ) predicted casual friendship satisfaction. The AIC of this model including self-disclosure and interaction terms in the prediction of friendship satisfaction (AIC = 1853.86) was significantly lower ( $p = .018$ ) than the AIC for the model with only friendship intimacy and SA predicting friendship satisfaction. Therefore, results partially supported the hypothesis that less self-disclosure would be associated with lower friendship satisfaction across levels of intimacy, irrespective of SA; we found that greater self-disclosure predicted higher friendship satisfaction only within acquaintanceships and close friendships (but not casual friendships) and, as expected, the relation between disclosure and satisfaction was not moderated by SA.

## **FMBs**

It was predicted that the pattern of results for FMBs would resemble the predicted results concerning self-disclosure. As such, we expected higher levels of friendship intimacy to be associated with greater FMB use, no main effect of trait SA, and a significant interaction effect such that higher SA, as compared to lower SA, would be associated with more moderate use of FMBs across the different levels of intimacy (i.e., relatively high use of FMBs with acquaintances, no difference in FMBs with casual friends, and relatively low use of FMBs with close friends). This was tested using a random intercept model with fixed effects, in which level of friendship intimacy, trait SA, and their interaction were entered as simultaneous predictors of FMBs. The model with only random intercepts predicting FMBs showed that FMBs ( $M = 19.76$ ;  $SE = 0.36$ ) varied minimally by participant (intercept  $SD < 0.01$ ; residual  $SD = 7.03$ ; AIC = 2533.18). When fixed effects were added to the model, it was found that the hypothesized level of friendship intimacy by SA interaction was not significant ( $ps > .178$ ). Therefore, the interaction term was trimmed from the model to facilitate interpretation of main effects.

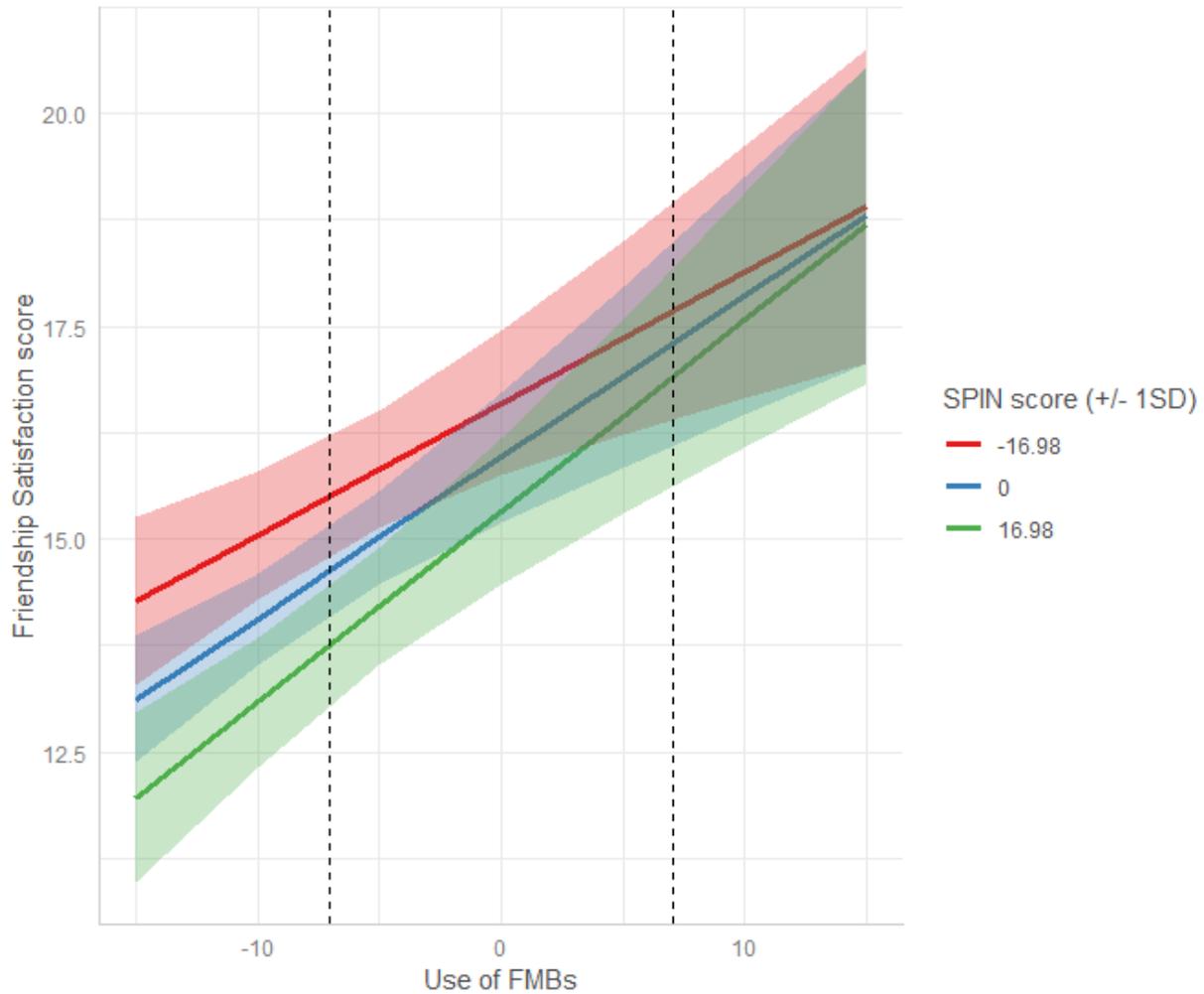
Consistent with hypotheses, there was no main effect of SA on engagement in FMBs ( $p = .861$ ), but there was a significant effect of level of intimacy on FMB engagement. Individuals engaged in significantly more FMBs with their casual friends ( $M = 20.99$ ) than acquaintances ( $M = 12.15$ ;  $SE = 0.40$ ,  $t(248) = 22.27$ ,  $p < .001$ ) and significantly more FMBs with close (or best) friends ( $M = 26.14$ ) than acquaintances ( $SE = 0.40$ ,  $t(248) = 35.22$ ,  $p < .001$ ). FMB use was also observed to increase from casual friends to close friends ( $t(248) = -12.95$ ,  $p < .001$ ). The model containing fixed effects in the prediction of FMBs generated an AIC of 2065.59 and therefore fit significantly better than the random intercept model for predicting FMBs ( $p < .001$ ). Thus, both the presence of a main effect of level of intimacy, and absence of a main effect of SA, were in

line with hypotheses. However, the non-significant level of friendship intimacy by SA interaction was unexpected.

Next, we tested the hypothesis that FMBs are vital to friendship satisfaction, such that higher use of FMBs would correlate with higher friendship satisfaction ratings regardless of one's level of SA. Level of intimacy, SA, FMBs, and all interactions of these variables, were added as fixed effects to a random intercept model predicting friendship satisfaction. Controlling for correlated participant error in friendship satisfaction ratings, the three-way interaction between level of friendship intimacy, trait SA, and FMBs was not significant ( $ps > .657$ ) and was therefore trimmed from the model. The two-way interaction between level of friendship intimacy and FMBs in the prediction of friendship satisfaction was also non-significant ( $ps > .421$ ), whereas the FMB by SA interaction was marginally significant ( $b < 0.01$ ,  $SE < .01$ ,  $t(246) = 1.95$ ,  $p = .052$ ). The main effects of level of friendship intimacy and SA on friendship satisfaction remained significant in this model, and, consistent with hypotheses, the newly added main effect of FMBs on friendship satisfaction was also significant ( $b = 0.19$ ,  $SE = .04$ ,  $t(247) = 4.96$ ,  $p < .001$ ). This model, with an AIC of 1834.57, was a significantly better fit for the data than the model without FMBs included as a fixed effect ( $p < .001$ ).

Finally, given the preliminary nature of this investigation of the role of FMBs in friendship satisfaction among high and low SA individuals, we opted to probe the marginally significant interaction. Follow-up simple slopes to probe the significant FMB by SA interaction showed that the number of reported FMBs was positively related to friendship satisfaction among individuals both higher and lower in SA ( $ps < .001$ ). However, among people who reported engaging in relatively few FMBs (1SD below the mean), the effect of SA on friendship satisfaction was significant ( $t(123) = 3.700$ ,  $p < .001$ ), whereas among people who reported

engaging in relatively many FMBs (1SD above the mean), the effect of SA on friendship satisfaction was not significant ( $t(123) = 1.68, p = .095$ ; see Figure 3).



*Figure 3.* Use of FMBs and trait SA predicting friendship satisfaction (Study 1). Engagement in FMBs was significantly, positively, related to friendship satisfaction among individuals at both higher and lower levels of SA. The FMB by SA interaction was marginally significant in predicting friendship satisfaction ( $p = .052$ ). Among people who reported engaging in relatively few FMBs (1SD below the mean), the effect of SA on friendship satisfaction was significant, whereas among people who reported engaging in relatively many FMBs (1SD above the mean), the effect of SA on friendship satisfaction was not significant. Bands around the slopes represent 95% confidence intervals. Dotted vertical lines represent 1SD above and below the mean on the measure of FMBs, which was mean-centered prior to inclusion in analyses.

## Exchange orientation

The data analytic approach used for assessing concerns over reciprocity (i.e., exchange orientation) within different types of friendships resembled the approach used for questions regarding self-disclosure and FMBs. It was hypothesized that exchange orientation would decrease as interpersonal relations progressed from acquaintanceships to casual friendships, and from casual to close friendships. It was further expected that higher SA would be associated with greater focus on reciprocity (i.e., higher exchange orientation) within all types of friendships, but that the effect of SA would become especially pronounced within close friendships (i.e., friendship intimacy by SA interaction in predicting exchange orientation).

First, a random intercept model predicting exchange orientation ( $M = 51.57$ ;  $SE = 1.05$ ) revealed approximately equal amounts of between person variance ( $SD = 10.30$ ) and residual variance ( $SD = 9.60$ ). The model AIC was 2953.05. To test how exchange orientation varied by type of friendship and trait SA, while controlling for correlated participant error, level of friendship intimacy, SA, and their interaction were added as fixed effects predicting exchange orientation in this initial random intercept model. Since the hypothesized interaction between level of friendship intimacy and trait SA did not emerge ( $ps > .447$ ), it was trimmed from the model prior to interpretation of main effects. As expected, more intimate friendships were characterized by decreased exchange orientation; exchange orientation differed significantly between acquaintances ( $M = 55.67$ ) and casual friends ( $M = 52.49$ ;  $t(248) = -2.98$ ,  $p = .003$ ), acquaintances and close friends ( $M = 46.56$ ;  $t(248) = -8.52$ ,  $p < .001$ ), and casual and close friends ( $t(248) = 5.54$ ,  $p < .001$ ). In addition, higher SA was associated with significantly higher exchange orientation at all levels of friendship intimacy ( $b = 0.21$ ,  $SE = 1.06$ ,  $t(123) = 3.55$ ,  $p < .001$ ). The presence of these two significant main effects was consistent with expectations,

whereas the absence of a significant interaction was not. The results therefore indicated that higher SA individuals tended to be more concerned with reciprocity than lower SA individuals across levels of intimacy, but that they moderated their levels of exchange orientation depending on friendship intimacy context in ways similar to people lower in SA (see Figure 4).

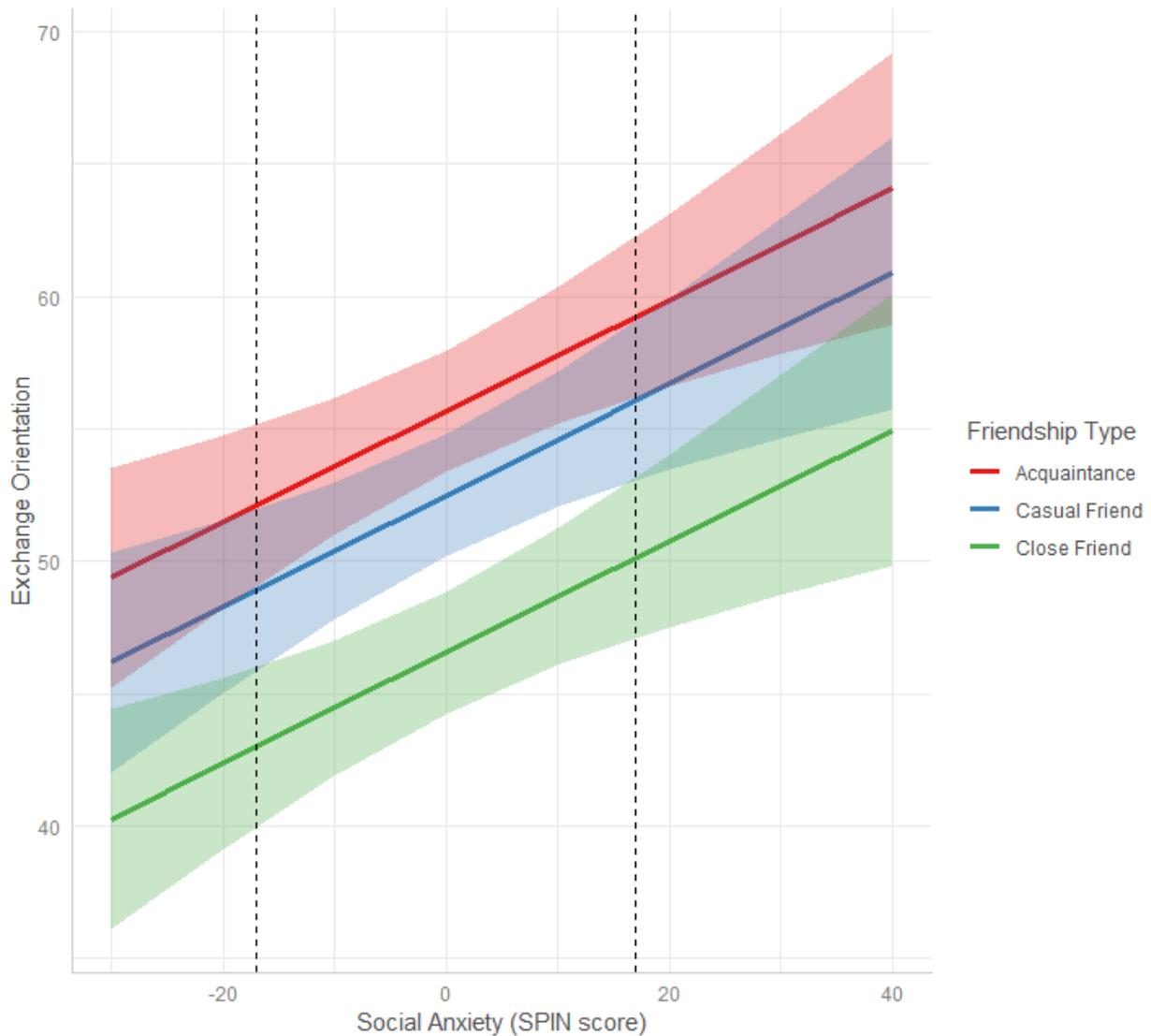


Figure 4. Level of friendship intimacy and SA predicting exchange orientation (Study 1). As seen in the figure, higher SA individuals tended to be more concerned with reciprocity than lower SA individuals, across all of their friendships. However, high SA individuals appeared to moderate their levels of exchange orientation depending on context in ways similar to people lower in SA. Bands around the slopes represent 95% confidence intervals. Dotted vertical lines represent 1SD above and below the mean on the measure of SA (SPIN), which was mean-centered prior to inclusion in analyses.

We next tested whether exchange orientation, when added as a fixed effect alongside level of friendship intimacy, SA, and interactions between these variables, predicted friendship satisfaction. It was hypothesized that higher exchange orientation would be associated with lower friendship satisfaction, and that this negative relationship between exchange orientation and satisfaction would be attenuated at higher levels of trait SA, suggesting that higher SA individuals would be more satisfied with stricter reciprocity than low SA individuals. However, contrary to expectations, this hypothesized interaction between exchange orientation and trait SA in predicting friendship satisfaction did not emerge ( $p = .282$ ). The relation between exchange orientation and satisfaction also did not differ by level of friendship intimacy ( $ps > .195$ ). Therefore, the interaction terms were removed from the model and main effects were interpreted.

As expected, higher exchange orientation significantly predicted lower friendship satisfaction with all types of friends (main effect of exchange orientation on satisfaction;  $b = -0.09$ ,  $SE = 0.01$ ,  $t(247) = -7.31$ ,  $p < .001$ ). The main effect of level of friendship intimacy remained significant in this model, whereas the main effect of SA was not significant when exchange orientation was included in the model ( $p = .099$ ). Thus, across all levels of friendship intimacy, a higher exchange orientation was associated with lower friendship satisfaction irrespective of participants' levels of SA.

### **Relative contribution to friendship satisfaction of all predictors together, by level of friendship intimacy**

After all of the hypothesized predictors of friendship satisfaction were tested independently, and in relation to SA, exploratory analyses were conducted in SPSS to test the relative contribution of each of these predictors within a single model. To this end, trait SA, self-disclosure, FMBs, and exchange orientation were entered as simultaneous predictors of

friendship satisfaction in a simple linear regression. This was done at each level of friendship intimacy separately.

For acquaintances, self-disclosure, FMBs, exchange orientation, and SA explained 17.4% of the variance in satisfaction with acquaintances ( $F(4, 120) = 6.34$ ,  $MSE = 13.77$ ,  $R^2 = .174$ ,  $p < .001$ ). However, in this model, only exchange orientation emerged as a significant unique predictor of acquaintance satisfaction ( $B = -0.90$ ,  $SE_B = .02$ , 95%  $CI_B [-0.136, -0.043]$ ,  $\beta = -.34$ ,  $p < .001$ ). Trait SA ( $p = .204$ ), self-disclosure ( $p = .156$ ), and FMBs ( $p = .323$ ) did not significantly predict acquaintance satisfaction.

In the second model, the four predictor variables accounted for 45.2% of the variance in casual friend satisfaction ( $F(4, 120) = 24.76$ ,  $MSE = 4.73$ ,  $R^2 = .45$ ,  $p < .001$ ). This effect was driven by use of FMBs as a positive predictor of casual friend satisfaction ( $B = 0.33$ ,  $SE_B = .06$ , 95%  $CI_B [0.219, 0.447]$ ,  $\beta = .46$ ,  $p < .001$ ) and by exchange orientation as a negative predictor of casual friend satisfaction ( $B = -0.11$ ,  $SE_B = .02$ , 95%  $CI_B [-0.135, -0.076]$ ,  $\beta = -.49$ ,  $p < .001$ ). Trait SA ( $p = .749$ ) and self-disclosure ( $p = .111$ ) were not significant predictors in this model.

In the final model, SA was a significant predictor of close friend satisfaction ( $B = -0.02$ ,  $SE_B = .01$ , 95%  $CI_B [-0.038, -0.002]$ ,  $\beta = -.16$ ,  $p = .029$ ) alongside both FMBs ( $B = 0.24$ ,  $SE_B = .05$ , 95%  $CI_B [0.141, 0.335]$ ,  $\beta = .42$ ,  $p < .001$ ) and exchange orientation ( $B = -0.07$ ,  $SE_B = .01$ , 95%  $CI_B [-0.092, -0.041]$ ,  $\beta = -.38$ ,  $p < .001$ ). Of all the predictor variables, only self-disclosure was not significantly associated with close friendship satisfaction in this model ( $p = .473$ ).

Together, this model explained 42.1% of the variance in close friendship satisfaction ( $F(4, 120) = 21.86$ ,  $MSE = 2.68$ ,  $R^2 = .42$ ,  $p < .001$ ).

## **Well-being**

Last, we analyzed the relative contribution of friendship satisfaction to various aspects of well-being (depression, positive affect, negative affect, and satisfaction with life) at each level of friendship intimacy. It was hypothesized that: (a) satisfaction with acquaintances would be unrelated to all four measures of well-being, (b) satisfaction with casual friends would be moderately related to all four measures of well-being, and (c) higher satisfaction within close friendships would be strongly related to higher scores on measures of positive affect and satisfaction with life, and lower scores on measures of negative affect and depression. To test these hypotheses, the three friendship satisfaction ratings were entered as simultaneous predictors of each of the four components of well-being in separate regression models. Thus, four separate regression models were tested in SPSS.

As expected, only satisfaction with close friends emerged as a significant predictor of positive affect ( $B = 1.10$ ,  $SE_B = .38$ , 95%  $CI_B [0.352, 1.842]$ ,  $\beta = .27$ ,  $p = .004$ ), whereas the contributions of acquaintance and casual friend satisfaction on experiences of positive affect were nonsignificant ( $p = .388$  and  $p = .542$ , respectively). Together, this model explained 12.2% of the variance in positive affect ( $F(3, 121) = 5.61$ ,  $MSE = 67.81$ ,  $R^2 = .12$ ,  $p = .001$ ).

Similarly, satisfaction with close friends significantly predicted greater life satisfaction ( $B = 1.16$ ,  $SE_B = .28$ , 95%  $CI_B [0.600, 1.709]$ ,  $\beta = .36$ ,  $p < .001$ ), whereas neither satisfaction with acquaintances ( $p = .068$ ) nor satisfaction with casual friends ( $p = .750$ ) predicted life satisfaction. Together, these variables explained 19.5% of the variance in satisfaction with life scores ( $F(3, 121) = 9.75$ ,  $MSE = 37.62$ ,  $R^2 = .20$ ,  $p < .001$ ).

In contrast, and unexpectedly, none of the friendship satisfaction ratings significantly predicted negative affect ( $ps > .190$ ), despite the overall model trending toward significance ( $F(3, 121) = 2.45$ ,  $MSE = 65.62$ ,  $R^2 = .06$ ,  $p = .067$ ).

Last, acquaintanceship satisfaction, casual friendship satisfaction, and close friendship satisfaction were entered as simultaneous predictors of depressive symptoms. In line with hypotheses, results revealed a significant negative relation between close friendship satisfaction and reports of depressive symptoms ( $B = -0.49$ ,  $SE_B = .22$ , 95%  $CI_B [-0.926, -0.046]$ ,  $\beta = -.20$ ,  $p = .031$ ). Neither acquaintance satisfaction ( $p = .084$ ) nor casual friendship satisfaction emerged as a significant predictor of depression ( $p = .720$ ).

Therefore, results concerning the relative contribution of satisfaction within different types of friendships largely supported study hypotheses, in that close friendship satisfaction was most strongly and consistently related to higher well-being, as measured by greater positive affect and life satisfaction and lower depression symptoms. However, unexpectedly, none of the friendship satisfaction ratings across levels of intimacy significantly predicted negative affect.

### **Summary of Study 1 Results**

Results of the present study demonstrated, as expected, that both self-disclosure and engagement in FMBs increased with increasing levels of friendship intimacy (i.e., from acquaintances to casual friends to close friends). Moreover, as expected, exchange orientation (i.e., preoccupation with strict reciprocity) decreased as friendships became more intimate. Higher SA was associated with lower satisfaction across all levels of intimacy. Greater self-disclosure, greater use of FMBs, and less focus on strict reciprocity were all associated with higher friendship satisfaction regardless of trait SA. The positive relation between FMBs and friendship satisfaction was marginally significantly moderated by SA in a way that suggested engagement in FMBs may be particularly important for experiences of friendship satisfaction among higher SA individuals. SA emerged as a significant unique negative predictor of close friendship satisfaction but not satisfaction with casual friends or acquaintances when examined

alongside FMBs, self-disclosure, and reciprocity. Finally, when satisfaction ratings across the three levels of intimacy were examined simultaneously as potential predictors of well being, only close friendship satisfaction emerged as a significant and unique predictor on three out of the four indicators of well being.

## Study 2

Though Study 1 findings were intriguing, their generalizability may be limited. The sample of university undergraduate students was composed primarily of young adults, many of whom were in a unique phase of life, having recently relocated to a new city and in the process of establishing new friendships. In addition, many of the friendships within this sample presumably unfolded primarily on, or around, the university campus. In light of this, a broader and more demographically diverse sample of community-based adults was recruited for Study 2. The aim of Study 2 was essentially to replicate results of Study 1, with a sample of community participants in place of the undergraduate students. Given the unique nature of university campuses, and the possibility that friendships in young adulthood (and on campus) vary in important ways from friendships later in life, including a community sample within this investigation was expected to ultimately provide more widely generalizable results. In addition, given the preliminary nature of the questions under investigations, replication of findings across two independent datasets was seen as important for increasing confidence in the results obtained, whereas divergent findings had the potential to shed light on areas requiring increased research attention.

Consistent with Study 1, above, this study investigated the relationship between trait SA and satisfaction with acquaintances, casual friends, and close (or best) friends. We also tested the extent to which SA predicted self-disclosure, use of FMBs, and exchange orientation within each of the three selected friendships, and examined whether SA moderated the relation between these variables and friendship satisfaction. Finally, we tested the relative contribution of satisfaction with acquaintances, casual friends, and close (or best) friends to well-being. Study hypotheses and their justification were consistent across the two studies.

## Method

### Participants

Study 2 participants were community adults across North America ( $N = 320$ ), recruited through Amazon's Mechanical Turk (MTurk; Buhrmester, Kwang, & Gosling, 2011). TurkPrime was used to facilitate recruitment via the MTurk crowdsourcing platform. Following data cleaning and exclusion of incomplete response sets, 235 participants were included in analyses. Participants were between the ages of 20 and 69 years old ( $M = 39.02$ ;  $SD = 10.9$ ), with 37.9% of participants identifying as male and 62.1% of participants identifying as female. Of these individuals, 81.3% identified as White/European (81.3%), 7.7% identified as Black, 3.4% identified as Asian, 3.0% identified as Latin American, 2.1% identified as South Asian, 0.9% identified as Southeast Asian, 0.4% identified as Arab, 0.4% identified as First Nations, and the rest reported their ethnicity as "other." Individuals participated in this 60-minute study entirely online. Participation was completely voluntary and all study procedures were approved by the University of Waterloo's Human Research Ethics Board.

As in Study 1, a CAPTCHA feature was included to prevent robots from accessing the study questionnaires. While generally effective, the CAPTCHA feature is not a foolproof method for eliminating robots from the study. As such, each long-answer response was manually reviewed by the first author, for evidence of nonsensical responses that were likely to be either robots or highly unreliable human participants. Next, attention and effort scores were computed for the remaining participants, and used to filter out unreliable respondents (for a detailed description of this approach, see *Measures* within Study 1).

### Overview of the measures and procedure

All questionnaires were administered online via Qualtrics™, a US-based online survey tool. See Study 1 for a detailed description of study measures. All study scales demonstrated good to excellent internal consistency within the community sample. For the friend-specific questionnaires, administered three times throughout the study, Cronbach alphas for the JSDQ measure of self-disclosure (Jourard & Lasakow, 1958) were .94 for all types of friendships, Cronbach's alphas ranged from .93 to .96 for the FMS assessing use of FMBs (Oswald et al., 2004), and Cronbach's alphas ranged from .92 to .93 for the EOS assessing exchange orientation (Murstein & Azar, 1986). Cronbach's alphas for the measure of friendship satisfaction (Hendrick, 1988; Morry et al., 2014) ranged from .82 to .86, also indicating good reliability. Scale reliability was similarly excellent for the assessment of trait SA via the SPIN (Connor et al., 2000; Cronbach's alpha of .96), depressive symptoms via the DASS (Lovibond & Lovibond, 1995; Cronbach's alpha of .93), positive affect (Cronbach's alpha of .91) and negative affect (Cronbach's alpha of .93) assessed via the PANAS (Watson et al., 1988), and satisfaction with life assessed via the SWLS (Diener et al., 1985; Cronbach's alpha of .93).

Apart from the logistics of using a different recruitment platform, the procedures used in Study 2 were identical to those utilized in Study 1. In summary, participants were first asked to select three specific individuals in their lives, corresponding to three levels of interpersonal intimacy (an acquaintance, casual friend, and close (or best) friend). Participants were then presented with several friend-specific questionnaires, which assessed self-disclosure, use of FMBs, exchange orientation, and satisfaction with each of the selected friends. Following three iterations of these friend-specific questionnaires, participants completed a measure of trait SA and three measures assessing four aspects of well-being (depression, positive affect, negative affect, and satisfaction with life).

## Results

The data analytic approach of Study 2 mirrored the MLM approach used in Study 1. Mixed-effects models were tested in RStudio (R Core Team, 2019) using the nlme package version 3.1-140 (Pinheiro et al., 2019), and plots were created using ggplot2 (Wickham, 2016) and ggeffects version 0.11.0 (Lüdtke, 2019). In addition, IBM SPSS Statistics 25 (2017) was used for a portion of the data preparation and analyses, as specified below.

### **Data integrity and preliminary analyses**

Data analysis commenced with a manual review of long-answer responses to the three questions asking how the participant met each of the selected friends. Eight percent of participants ( $n = 26$ ) were excluded due to high suspicion of robot or highly unreliable responding. Most commonly, nonsensical responses warranting exclusion contained verses from Shakespeare plays or dictionary definitions of words from study questions, in place of the requested response. Next, participants were excluded based on the attention and effort cutoffs, as described above. Based on the predetermined criteria of an attention score of at least five (out of nine) for inclusion in analyses, 4.4% of the sample ( $n = 13$ ) was excluded from analyses. An additional 8 participants were excluded based on self-reported effort below the acceptable threshold, and 8 participants were excluded due to missing data on the question assessing effort.

Following exclusion of low quality responses based on coherence of long answer responses, attention, and effort, data were screened for missing values within the study variables of interest. Missing values, which constituted 0.47% of the total number of values in the dataset, were excluded from scale score computation. Scale scores were computed, and analysis via the Analyze Patterns command under Multiple Imputation in IBM SPSS Statistics 25 (2017) indicated that there was no pattern to missing scale scores. The total portion of missing values in

the dataset was 1.27%, spread out over 26 participants. Given the small number of missing values, and lack of pattern in the missingness, these cases were excluded from analyses<sup>2</sup>.

Therefore, 239 participants were included in the analysis of outliers.

Next, all variables were screened for univariate outliers (> 3SDs above or below the mean) and multivariate outliers. At least one univariate outlier was detected for each of the following eight variables: FMS - acquaintance, casual, and close friend, friendship satisfaction - casual and close friend, JSDQ - acquaintance, negative affect, and depression. All univariate outliers were winsorized to be at exactly 3SD above or below the mean, prior to inclusion in analyses. Testing for multivariate outliers with a Mahalanobis' distance of 40.79 as the critical value ( $df = 17; p = .001$ ) revealed the presence of four multivariate outliers in the data.

Responses from these four participants with multivariate outliers were excluded from analyses.

This resulted in a final number of 235 participants included in study analyses. Examination of the skew (< 3.0) and kurtosis (< 10.0) with the remaining participants indicated that all variables were normally distributed (Kline, 1998). All variables were grand mean-centered prior to inclusion as predictors in analyses.

The average amount of effort exerted by the subset of participants included in analyses was 4.95 out of 5.00 ( $SD = 0.22$ ), and the average attention score was 8.60 out of 9.00 ( $SD = 0.85$ ). Variable means and SDs, as well as zero-order correlations, are presented in Table 2.

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<sup>2</sup> As in Study 1, missing data will be imputed prior to data analysis for potential publication.

Table 2

*Means, standard deviations, and correlations between Study 2 variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Trait SA	18.17	16.42								
2. Self-disclosure	19.66	13.40	.04							
3. FMBs	19.60	6.93	.01	.77**						
4. Exchange orientation	49.93	16.46	.23**	-.08*	-.02					
5. Friendship satisfaction	16.26	4.10	-.11**	.54**	.60**	-.25**				
6. Satisfaction with life	24.31	7.80	-.25**	.09*	.13**	-.03	.14**			
7. Positive affect	32.66	8.87	-.25**	.14**	.19**	-.00	.16**	.48**		
8. Negative affect	16.00	7.17	.42**	.03	.03	.23**	-.10**	-.34**	-.22**	
9. Depression	3.81	4.81	.51**	.01	.01	.17**	-.11**	-.57**	-.47**	.60**

*Note.*  $N = 235$ . *M* and *SD* are used to represent mean and standard deviation, respectively. Numbers represent values collapsed across the different types of friendships.

\* indicates  $p < .05$ . \*\* indicates  $p < .01$ .

## Friendship satisfaction

First, we tested how friendship satisfaction varied by level of friendship intimacy and trait SA, and whether these two variables interacted to predict satisfaction within a particular type of friendship. It was hypothesized that higher levels of friendship intimacy would be associated with higher ratings of friendship satisfaction, and that higher trait SA would be associated with lower ratings of friendship satisfaction, particularly within close friendships. Analysis of these hypotheses began with a random intercept model, in which mean collapsed friendship satisfaction scores were permitted to vary by participant. The average level of friendship satisfaction in this model was 16.25 ( $SE = 0.16$ ), with differences attributed to variation between participants equal to a standard deviation of 1.08 (residual  $SD = 3.95$ ). The AIC of this model was 3990.71. Next, level of friendship intimacy, SA, and their interaction were added to this model as fixed effects in the prediction of friendship satisfaction.

Analysis of fixed effects showed that level of friendship intimacy significantly predicted friendship satisfaction. Acquaintanceships ( $M = 13.79$ ) were reported to be less satisfying than either casual friendships ( $M = 15.73$ ;  $b = -1.95$ ,  $SE = .26$ ,  $t(466) = -7.49$ ,  $p < .001$ ) or close friendship ( $M = 19.24$ ;  $b = -5.46$ ,  $SE = 0.26$ ,  $t(466) = -20.10$ ,  $p < .001$ ), and close friendships were more satisfying than casual friendships ( $b = 3.51$ ,  $SE = 0.26$ ,  $t(466) = 13.50$ ,  $p < .001$ ). The model further showed that the effect of SA on friendship satisfaction was not consistent across levels of friendship intimacy. It was found that SA did not significantly predict acquaintanceship satisfaction ratings ( $p = .463$ ), but did significantly predict both casual friendship satisfaction ( $b = -.04$ ,  $SE = .01$ ,  $t(233) = -3.20$ ,  $p = .002$ ) and close friendship satisfaction ( $b = -.03$ ,  $SE = .01$ ,  $t(233) = -2.03$ ,  $p = .044$ ). The slope of the SA and friendship satisfaction relationship was significantly different between acquaintances and casual friends ( $t(466) = 2.10$ ,  $p = .036$ ), but

neither slope significantly differed from the slope for close friendship ( $ps > .270$ ; see Figure 5). The AIC of the model was 3272.10, indicating a significantly better fit for the data as compared to the random intercept model ( $p < .001$ ). Findings therefore supported the hypotheses regarding the presence and direction of effects of level of intimacy and SA, but did not support the hypothesized interaction showing that SA is most strongly associated with lower satisfaction within close friendships.

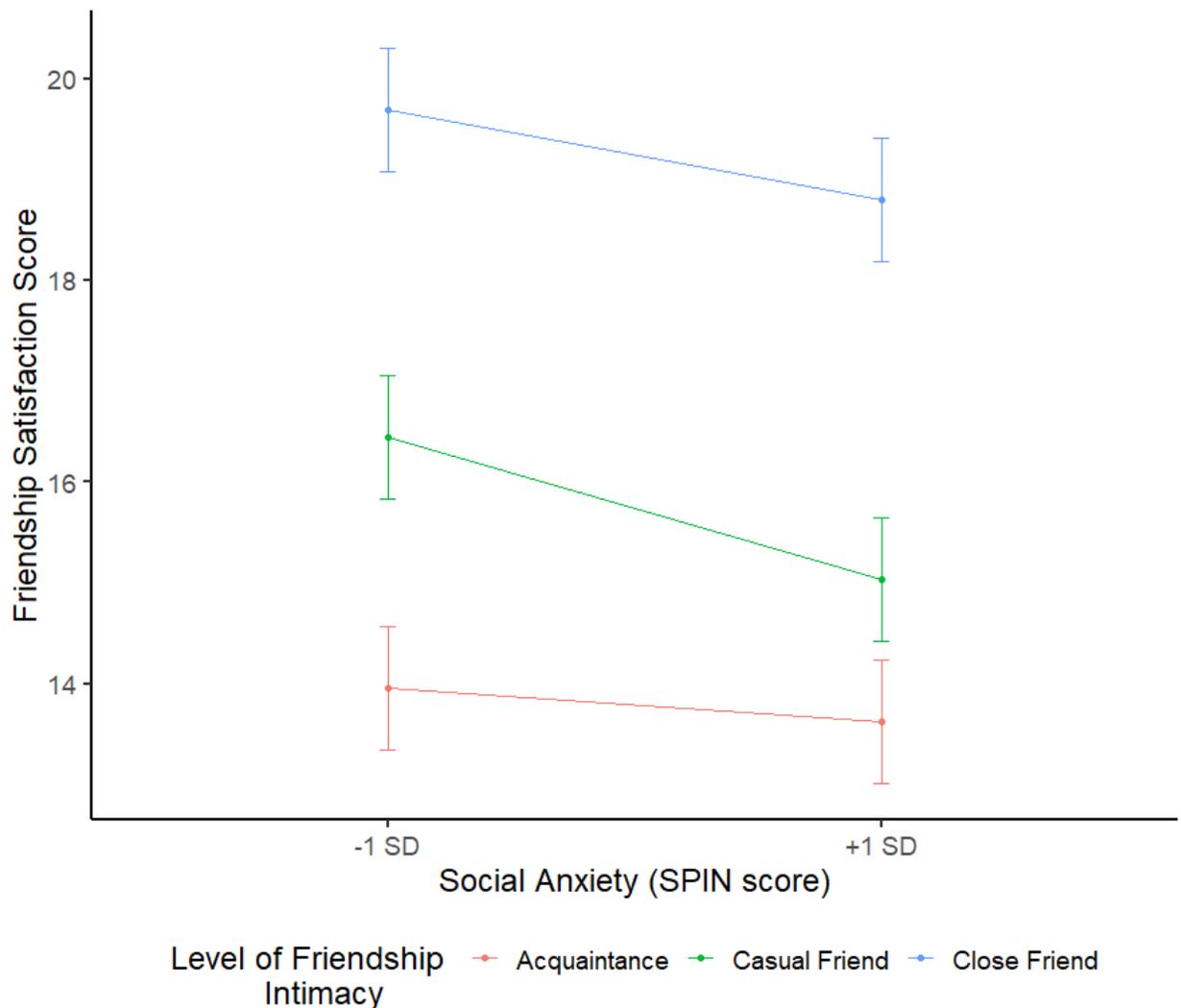


Figure 5. Level of friendship intimacy and SA predicting friendship satisfaction (Study 2). Friendship satisfaction increased with increasing levels of intimacy, regardless of trait SA. However, the effect of SA on friendship satisfaction varied across levels of friendship intimacy. Whereas SA did not significantly predict acquaintanceship satisfaction, it did significantly predict both casual and close friendship satisfaction. The slope of the SA and friendship

satisfaction relationship was significantly different between acquaintances and casual friends, but neither slope differed significantly from that the slope for close friendships.

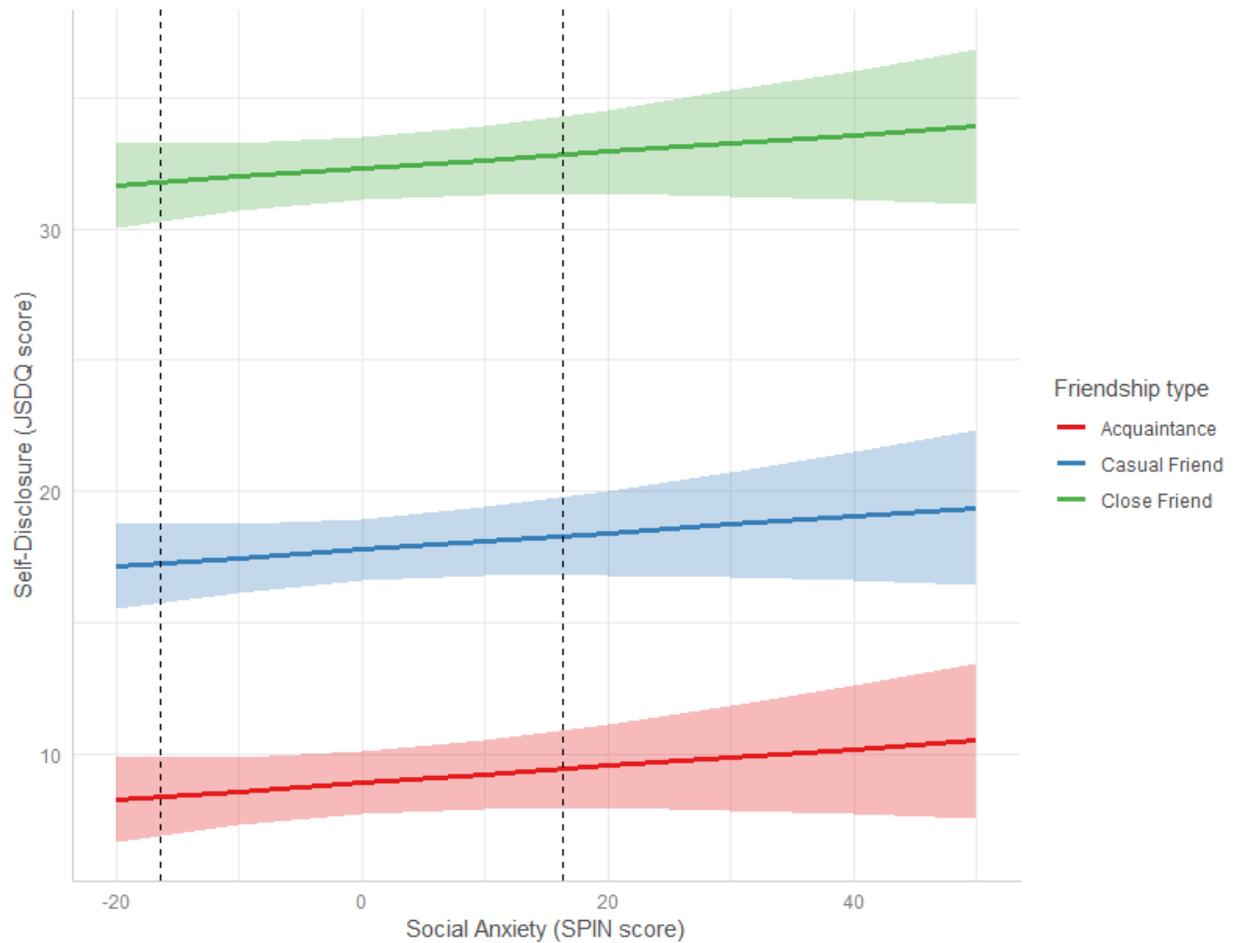
### **Self-disclosure**

Next, we tested how self-disclosure varied across the levels of friendship intimacy and whether the pattern of self-disclosure across different friendships was moderated by one's trait SA. It was predicted that, consistent with social penetration theory (Altman & Taylor, 1973), more intimate friendships would be associated with more self-disclosure. It was further predicted that higher SA would be associated with a more narrow range of self-disclosure, such that high SA individuals would self-disclose more to acquaintances and less to close (or best) friends than would low SA individuals (i.e., a level of friendship intimacy by trait SA interaction, in the prediction of self-disclosure, was expected).

A random intercept model in which self-disclosure was permitted to vary by participant, indicated that the mean level of self-disclose ( $M = 19.66$ ,  $SE = 0.50$ ) varied minimally between participants (random intercept  $SD < .01$ ; residual  $SD = 13.39$ ; AIC = 5665.36). Level of friendship intimacy, trait SA, and their interaction were subsequently added as fixed effects in this model predicting self-disclosure. The mixed-effects model revealed the hypothesized interaction between intimacy and SA to be nonsignificant ( $ps > .098$ ). The interaction term was therefore trimmed from the model for interpretation of main effects.

As expected, the overall effect of SA on self-disclosure was not statistically significant ( $p = .248$ ). In line with social penetration theory, level of friendship intimacy did, however, significantly predict amount of self-disclosure. Specifically, we found that participants self-disclosed significantly more to casual friends ( $M = 17.78$ ;  $b = 8.87$ ,  $SE = .70$ ,  $t(468) = 12.59$ ,  $p < .001$ ) and close friends ( $M = 32.30$ ;  $b = 23.39$ ,  $SE = 0.70$ ,  $t(468) = 33.19$ ,  $p < .001$ ) than acquaintances ( $M = 8.91$ ). Participants also reported disclosing significantly more to close

friends than to casual friends ( $b = 14.52$ ,  $SE = .70$ ,  $t(468) = 20.60$ ,  $p < .001$ ). The AIC of this model (AIC = 5086.64) was significantly lower than the AIC of the random intercept model predicting self-disclosure ( $p < .001$ ). Thus, results partially supported study hypotheses; people were observed to increase their level of self-disclosure in line with what was predicted based on social penetration theory, but self-disclosure did not vary by trait SA at any level of friendship intimacy (see Figure 6).



*Figure 6.* Level of friendship intimacy and SA predicting self-disclosure (Study 2). More intimate friendships were associated with more self-disclosure, regardless of trait SA. Bands around the slopes represent 95% confidence intervals. Dotted vertical lines represent 1SD above and below the mean on the measure of SA (SPIN), which was mean-centered prior to inclusion in analyses.

We then tested how self-disclosure and SA related to friendship satisfaction across levels of intimacy. It was hypothesized that more self-disclosure would be associated with higher friendship satisfaction across all types of friendships, with no moderating effect of SA. For this analysis, level of friendship intimacy, SA, self-disclosure, and the two- and three-way interactions of these variables were entered as fixed effects in a mixed-effects model predicting friendship satisfaction. Results fully supported study hypotheses, in that self-disclosure emerged as a significant predictor of greater friendship satisfaction ( $b = .08$ ,  $SE = .01$ ,  $t(647) = 5.77$ ,  $p < .001$ ) in this model, alongside friendship intimacy and SA, which remained significant predictors ( $ps < .001$ ). The positive relation between self-disclosure and friendship satisfaction was not moderated by either level of friendship intimacy or SA, with all two- and three-way interactions revealed to be nonsignificant ( $ps > .087$ ). This model (AIC = 3642.48) was a significantly better fit than the model containing only the fixed effects of type of friendship and SA, without self-disclosure (AIC = 3672.10;  $p < .001$ ).

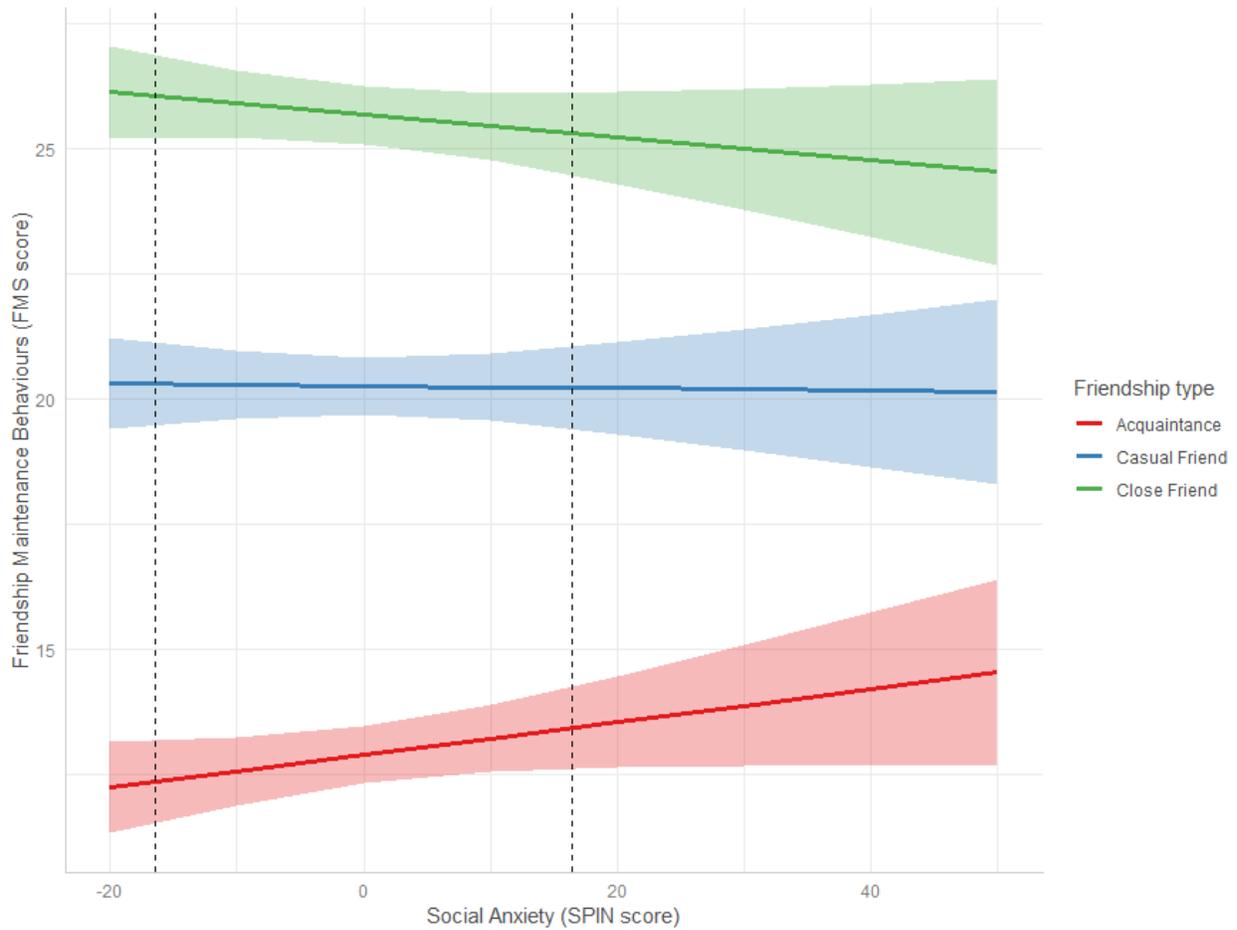
### **FMBs**

Next, we tested whether patterns of FMB use varied across the levels of friendship intimacy in ways consistent with social penetration theory. That is, we tested whether use of FMBs increased with increasing friendship intimacy, as well as whether the pattern of FMB use was moderated by level of trait SA. We hypothesized that results concerning FMBs would resemble the predicted results concerning self-disclosure, in that higher levels of friendship intimacy would be associated with more FMBs, and there would be no main effect of trait SA. Instead, we expected a significant interaction to emerge, such that higher SA would be associated with more moderate use of FMBs across the different levels of intimacy (i.e., relatively high use of FMBs with acquaintances, no difference in FMBs with casual friends, and relatively low use

of FMBs with close friends). A model with only random intercepts (participants) predicting FMB use showed that FMBs ( $M = 19.60$ ,  $SE = 0.26$ ) varied minimally by participant (random intercept  $SD < 0.01$ ; residual  $SD = 6.92$ ;  $AIC = 4734.79$ ).

Next, controlling for correlated participant error in endorsement of FMBs, level of friendship intimacy, trait SA, and their interaction were added to this mixed-effects model as fixed effects. Consistent with hypotheses, individuals engaged in significantly more FMBs with their casual friends ( $M = 20.25$ ) than acquaintances ( $M = 12.89$ ;  $b = 7.37$ ,  $SE = 0.31$ ,  $t(466) = 23.74$ ,  $p < .001$ ), and more FMBs with their close (or best) friends ( $M = 25.66$ ) than acquaintances ( $b = 12.77$ ,  $SE = 0.31$ ,  $t(466) = 41.16$ ,  $p < .001$ ). FMB use also increased from casual friends to close friends ( $b = 5.41$ ,  $SE = 0.31$ ,  $t(466) = 17.42$ ,  $p < .001$ ). This model containing fixed effects in the prediction of FMBs, with an AIC of 4012.01, fit significantly better than the random intercept only model ( $p < .001$ ).

As expected, the effect of SA on FMBs was qualified by a significant intimacy by SA interaction. The effect of SA on FMBs with acquaintances was not significant ( $b = .03$ ,  $t(233) = 1.82$ ,  $p = .070$ ). With acquaintances as the reference group, the effect of SA on FMBs with casual friends was not significantly different ( $b = -0.04$ ,  $t(466) = -1.86$ ,  $p = .064$ ); however, the effect of SA on FMBs with close friends was significantly different from the effect of SA on FMBs acquaintances ( $b = -0.06$ ,  $t(466) = -2.93$ ,  $p = .004$ ). With close friends set as the reference group, this model showed that despite the slopes for acquaintances and close friends being significantly different from each other, the effect of SA on close friendship FMBs was also not in itself significant ( $b = -.02$ ,  $t(233)$ ,  $p = .209$ ; see Figure 7).



*Figure 7.* Level of friendship intimacy and SA predicting FMBs (Study 2). More intimate friendships were characterized by greater engagement in FMBs, across all levels of SA. There was also a significant trait SA by friendship intimacy interaction, although SA did not significantly predict FMB use at any level of friendship intimacy. Bands around the slopes represent 95% confidence intervals. Dotted vertical lines represent 1SD above and below the mean on the measure of SA (SPIN), which was mean-centered prior to inclusion in analyses.

Next, we tested the hypothesis that FMBs would positively contribute to friendship satisfaction within all types of friendships. For this purpose, level of friendship intimacy, SA, FMBs, and all interactions of these variables, were added as fixed effects in a random intercept model predicting friendship satisfaction, in which the intercept was permitted to vary by participant. The three-way interaction in this model was not statistically significant ( $ps > .466$ ), and was therefore trimmed from the model. Next, two-way interactions were assessed. The FMBs by SA interaction also did not significantly predict friendship satisfaction ( $p = .660$ ), and neither did the friendship intimacy by FMBs interaction ( $ps > .384$ ). Both of these two-way interactions were therefore also removed from the model, to facilitate interpretation of main effects.

Consistent with hypotheses, more FMBs were associated with greater friendship satisfaction ( $b = 0.26$ ,  $SE = .03$ ,  $t(467) = 9.46$ ,  $p < .001$ ). In addition, both the previously observed negative relation between SA and friendship satisfaction ( $p = .003$ ) and the positive relation between friendship intimacy and friendship satisfaction ( $ps < .001$ ) remained significant in this model with FMBs as an additional fixed effect. The absence of significant interactions in this model indicated that the positive relation between FMBs and friendship satisfaction did not vary by either the type of friendship or the participant's level of SA. The AIC of this model (AIC = 3590.56) was significantly lower than the AIC of the fixed effects model containing only friendship intimacy and SA (AIC = 3672.10;  $p < .001$ ), indicating better model fit.

### **Exchange orientation**

We then examined whether the degree of exchange orientation (i.e., focus on strict reciprocity) varied across the levels of friendship intimacy, and by trait SA, within our community sample. We hypothesized that exchange orientation would decrease as interpersonal

relations progressed from acquaintanceships to casual friendships, and from casual to close friendships. It was further expected that higher SA would be associated with a higher exchange orientation within all types of friendships, but that the difference in exchange orientation, based on trait SA, would be greatest within close friendships (e.g., as high SA individuals continue to apply acquaintanceship-based rules to close friendships).

We first tested the extent to which focus on exchange orientation varied by participant, using a random intercept model in which the predicted mean rating of exchange orientation was permitted to vary by participant. Ratings of exchange orientation collapsed across different types of friends ( $M = 49.93$ ;  $SE = 0.89$ ) varied approximately equally between participants ( $SD$  of the random intercept = 12.04) and other, unaccounted for, sources of variance (residual  $SD = 11.22$ ). Thus, this model ( $AIC = 5766.27$ ) highlighted the importance of controlling for correlated participant error in analyses predicting exchange orientation. The addition of level of friendship intimacy and SA, as well as their interaction, as fixed effects improved model fit by decreasing the AIC to 5746.51 ( $p < .001$ ). However, because the effect of SA on exchange orientation did not vary significantly by type of friendship ( $ps > .590$ ), the interaction was removed from the model.

Examination of main effects supported study hypotheses. As expected, level of exchange orientation significantly differed by the level of friendship intimacy; however, it was unexpectedly not different between all three types of friends. Instead, concerns over strict reciprocity significantly differed only between interactions with casual ( $M = 50.89$ ) versus close friends ( $M = 47.99$ ;  $t(468) = 2.83$ ,  $p = .005$ ) and between acquaintances ( $M = 50.92$ ) and close friends ( $t(468) = 2.85$ ,  $p = .005$ ). Exchange orientation towards acquaintances was, however, no different from exchange orientation toward casual friends ( $t(468) = .02$ ,  $p = 0.980$ ). That is,

exchange orientation was lowest within close friendships and was significantly different from exchange orientation within either of the other two types of friendships, in which exchange orientation was similarly elevated. A significant effect of SA also emerged, in the expected direction, such that higher SA was associated with significantly higher exchange orientation at all levels of friendship intimacy ( $b = 0.23$ ,  $SE = .05$ ,  $t(233) = 4.37$ ,  $p < .001$ ). Thus, hypotheses regarding exchange orientation were partially supported.

Given the evidence of exchange orientation varying by both type of friendship and by trait SA, we next aimed to test whether one's level of exchange orientation related to friendship satisfaction within different types of friendships, and whether this association was moderated by SA. We hypothesized that higher exchange orientation would be associated with lower friendship satisfaction within all types of friendships. We further predicted that the relation between exchange orientation and friendship satisfaction would be attenuated at higher levels of trait SA, such that higher SA individuals would show a greater preference for strict reciprocity within friendships than do low SA individuals. To test this, exchange orientation was added as fixed effect alongside level of friendship intimacy, SA, and all variable interactions, in a model predicting friendship satisfaction, in which the intercept was permitted to vary by participant. Because the three-way interaction was not significant ( $ps > .086$ ), it was removed from the model. Contrary to expectations, examination of the exchange orientation by trait SA interaction in the prediction of friendship satisfaction was also non-significant ( $p = .175$ ). Though no interaction between level of friendship intimacy and exchange orientation was expected, we tested for this two-way interaction as well and found it to be non-significant ( $ps > .456$ ). Therefore, both of these interactions were removed from the model.

As expected, there was a significant effect of exchange orientation on satisfaction, such that higher exchange orientation significantly predicted lower friendship satisfaction ( $b = -0.05$ ,  $SE = .01$ ,  $t(467) = -5.93$ ,  $p < .001$ ). The previously significant positive effect of level of friendship intimacy on satisfaction remained significant in this model ( $p < .001$ ), whereas the previously significant effect of SA on friendship satisfaction was no longer significant when exchange orientation was added to the mixed-effects model ( $p = .117$ ). Therefore, within all types of friendships, a higher exchange orientation (but not SA) was associated with lower friendship satisfaction.

### **Relative contribution to friendship satisfaction of all predictors together, by level of friendship intimacy**

After all of the hypothesized predictors of friendship satisfaction were tested independently, we conducted exploratory analyses to test the relative contribution of each predictor within a single model predicting friendship satisfaction. For this analysis, trait SA, self-disclosure, FMBs, and exchange orientation were entered as simultaneous predictors of friendship satisfaction in three simple linear regression models, each predicting friendship satisfaction within one type of friendship.

The model in which self-disclosure, FMBs, and exchange orientation were entered as simultaneous predictors of acquaintanceship satisfaction, alongside SA, explained 11.9% of the variance in acquaintanceship satisfaction ( $F(4, 230) = 7.73$ ,  $MSE = 17.05$ ,  $R^2 = .12$ ,  $p < .001$ ). In this model, only exchange orientation ( $B = -0.05$ ,  $SE_B = .02$ , 95%  $CI_B [-0.078, -0.016]$ ,  $\beta = -.19$ ,  $p = .003$ ) and FMBs ( $B = 0.26$ ,  $SE_B = .07$ , 95%  $CI_B [0.127, 0.391]$ ,  $\beta = .31$ ,  $p < .001$ ) emerged as significant predictors of acquaintance satisfaction. Trait SA ( $p = .611$ ) and self-disclosure ( $p = .818$ ) did not significantly predict acquaintance satisfaction.

In the prediction of casual friend satisfaction, from SA, self-disclosure, FMBs, and exchange orientation, slightly different results emerged. Together, these four variables accounted for 27.2% of the variance in casual friend satisfaction ( $F(4, 230) = 21.47, MSE = 8.56, R^2 = .27, p < .001$ ). This effect was driven by use of FMBs as a positive predictor of casual friend satisfaction ( $B = 0.32, SE_B = .05, 95\% CI_B [0.214, 0.428], \beta = .40, p < .001$ ), and by exchange orientation ( $B = -0.07, SE_B = .01, 95\% CI_B [-0.091, -0.039], \beta = -.30, p < .001$ ) and SA ( $B = -0.03, SE_B = .01, 95\% CI_B [-0.051, -0.003], \beta = -.13, p = .030$ ) as negative predictors of casual friend satisfaction. Self-disclosure ( $p = .325$ ) was the only nonsignificant predictor in this model.

Similarly, in the prediction of close friend satisfaction, both FMBs ( $B = 0.20, SE_B = .03, 95\% CI_B [0.146, 0.263], \beta = .39, p < .001$ ) and exchange orientation ( $B = -0.05, SE_B = .01, 95\% CI_B [-0.060, -0.032], \beta = -.34, p < .001$ ) were significant simultaneous predictors. In addition, SA demonstrated a marginally significant effect ( $B = -0.01, SE_B = .01, 95\% CI_B [-0.026, 0.000], \beta = -.10, p = .052$ ), whereas the effect of self-disclosure was nonsignificant ( $p = .058$ ). Together, this model explained 44.0% of the variance in close friendship satisfaction ( $F(4, 230) = 45.18, MSE = 2.60, R^2 = .44, p < .001$ ).

### **Well-being**

To test the hypothesis that it is specifically satisfaction within close friendships, as opposed to casual friendships or acquaintanceships, that most strongly predicts well-being, we analyzed the relative contribution of friendship satisfaction at each of the levels of friendship intimacy to experiences of depressive symptoms, positive affect, negative affect, and satisfaction with life. It was hypothesized that: (a) satisfaction with acquaintances would be unrelated to all four measures of well-being, (b) satisfaction with casual friends would be moderately related to all four measures of well-being, and (c) higher satisfaction within close friendships would be

strongly related to higher scores on measures of positive affect and satisfaction with life, as well as lower scores on measures of negative affect and depression. To test these hypotheses, a separate linear regression model was tested for each of the four aspects of well-being, and satisfaction ratings within the three selected friendships were entered as simultaneous predictors in each model.

As expected, positive affect over the past week was significantly associated with higher close friendship satisfaction ( $B = 0.70$ ,  $SE_B = .28$ , 95%  $CI_B [0.151, 1.257]$ ,  $\beta = .17$ ,  $p = .013$ ), but nonsignificant effects on positive affect were observed for both casual friendship satisfaction ( $p = .137$ ) and acquaintanceship satisfaction ( $p = .196$ ). Together, this model explained 7.7% of the variance in reported positive affect ( $F(3, 231) = 6.44$ ,  $MSE = 73.68$ ,  $R^2 = .08$ ,  $p < .001$ ).

Consistent with hypotheses, close friendship satisfaction was also the only significant predictor of satisfaction with life ratings ( $B = 0.83$ ,  $SE_B = .25$ , 95%  $CI_B [0.345, 1.313]$ ,  $\beta = .23$ ,  $p = .001$ ), whereas nonsignificant effects were observed for both casual friendship satisfaction ( $B = 0.31$ ,  $SE_B = .16$ , 95%  $CI_B [-0.017, 0.630]$ ,  $\beta = .13$ ,  $p = .063$ ) and acquaintanceship satisfaction ( $p = .926$ ). Together, the three ratings of friendship satisfaction explained 8.6% of the variance in general life satisfaction ( $F(3, 231) = 7.28$ ,  $MSE = 56.53$ ,  $R^2 = .09$ ,  $p < .001$ ).

In the prediction of negative affect over the past week, as expected, only higher satisfaction with close friends emerged as a significant predictor of less negative affect ( $B = -1.15$ ,  $SE_B = .22$ , 95%  $CI_B [-1.569, -0.722]$ ,  $\beta = -.35$ ,  $p < .001$ ). Satisfaction with casual friends ( $p = .173$ ) and with acquaintances ( $p = .059$ ) were nonsignificant predictors of negative affect. Together, the three ratings of friendship satisfaction explained 13.3% of the variance in negative affect ( $F(3, 231) = 11.76$ ,  $MSE = 43.22$ ,  $R^2 = .13$ ,  $p < .001$ ). Finally, depression scores were regressed onto the three ratings of friendship satisfaction. In this model, both casual ( $B = -0.51$ ,

$SE_B = .15$ , 95%  $CI_B$  [- 0.800, - 0.210],  $\beta = -.23$ ,  $p = .001$ ) and close ( $B = -.26$ ,  $SE_B = .10$ , 95%  $CI_B$  [- 0.453, - 0.059],  $\beta = -.18$ ,  $p = .011$ ) friendship satisfaction emerged as significant predictors of fewer depressive symptoms. Although casual friendship satisfaction was not expected to significantly predict depression, the significant effect of close friend satisfaction on depression was consistent with expectations. Also consistent with expectations was the observation that acquaintanceship satisfaction did not predict depressive symptoms ( $p = .100$ ). Together, the three friendship satisfaction ratings predicted 9.1% of the variance in depressive symptoms ( $F(3, 231) = 7.67$ ,  $MSE = 21.00$ ,  $R^2 = .09$ ,  $p < .001$ ).

### **Summary of Study 2 Results**

Consistent with previous work, we observed that levels of self-disclosure and engagement in FMBs increased as the intimacy of friendships increased, whereas exchange orientation decreased in more intimate friendships. There was also a significant interaction between levels of SA and intimacy on use of FMBs; although the effects of SA on use of FMBs differed significantly for acquaintances versus close friends, SA was not significantly associated with use of FMBs at any specific level of friendship intimacy.

Moreover, individuals with higher, as compared to lower, SA reported significantly less satisfaction with casual and close friendship, but not with acquaintances. Greater self-disclosure and more FMBs, as well as decreased exchange orientation, correlated with higher friendship satisfaction regardless of the type of friendship or levels of trait SA. With all of these established predictors of friendships satisfaction within a single regression model, FMBs and exchange orientation were the variables that consistently emerged as the strongest predictors of friendship satisfaction. SA emerged as a marginally significant unique predictor in the model examining factors that predict satisfaction in close friendships but was not a significant unique predictor of

satisfaction in relationships with acquaintances or casual friends when considered alongside the other variables. Finally, as expected, close friendship satisfaction was a consistent predictor of various aspects of well-being (i.e., positive affect, negative affect, satisfaction with life, and depression), whereas casual friendship and acquaintance satisfaction were not.

## General Discussion

Past research has suggested that higher SA is associated with lower quality friendships and fewer social supports (e.g., Alden et al., 2014; Fernandez & Rodebaugh, 2011; Rodebaugh et al., 2014), yet the friendships of high SA individuals remain relatively understudied and rarely explicitly addressed in treatment protocols (Rodebaugh, 2009). Understanding the factors that might contribute to impoverished friendships among higher SA individuals has potentially important implications for the well-being of socially anxious individuals, given that high quality close friendships predict better health, happiness, and longevity (Blieszner, 2014; Demir & Weitekamp, 2007; Lewis et al., 2015; Dunkel Schetter, 2017). In the present study, we sought to clarify the link between SA and satisfaction with three types of friends, capturing friendships that vary in level of intimacy (i.e., acquaintanceship, casual friendship, and close friendship). We examined whether individual differences in self-disclosure, FMBs, and exchange orientation have the potential to help explain the discrepancies in friendship satisfaction that are often observed between high versus low SA individuals.

Our two studies, comprised of undergraduate university students in Study 1 and community adults across North America in Study 2, replicated and extended past findings regarding factors contributing to satisfaction within different types of friendships. Friendships at higher levels of interpersonal intimacy were consistently associated with more self-disclosure, greater use of FMBs, and decreased focus on social exchange processes, all of which contributed to higher friendship satisfaction within close friendships. A novel feature of our design was assessing these friendship characteristics within the same sample of participants in each of the two studies, which enabled us to comment on the relative contribution of each of these factors to participants' reported friendship satisfaction. Another unique feature of the present investigation

was the inclusion of trait social anxiety (SA) in all analyses, which enabled us to quantify the unique and interactive contribution of SA symptoms to friendship satisfaction across levels of friendship intimacy alongside other established relational processes.

### **Friendship satisfaction**

Participants in both studies reported being more satisfied with their close (or best) friends than casual friends, and more satisfied with their casual friends than with acquaintances. Furthermore, our findings corroborate past research suggesting that higher SA individuals perceive their friendships as being less satisfying than lower SA individuals (e.g., Rodebaugh, 2009; Rodebaugh et al, 2014). Study 1 showed that decreased friendship satisfaction among higher SA university students was not contained to any specific type of friendship, but was instead a pattern that spanned across levels of friendship intimacy. Similarly, among community adults, higher SA was correlated with lower satisfaction within both close and casual friendships.

Against the backdrop of these preliminary yet important findings on the relations between SA, friendship intimacy, and friendship satisfaction, was our observation of the relatively weak zero-order correlation between SA and friendships satisfaction in both studies (see Tables 1 and 2). Although these zero-order correlations were statistically significant, the size of the correlations was quite modest and somewhat weaker than expected. Indeed, these correlations appeared notably weaker than those characterizing friendship satisfaction's associations with self-disclosure, FMBs, and exchange orientation. The relative strengths of these zero-order relationships highlight the utility of examining the relations between SA and friendship satisfaction within the context of these additional variables rather than in isolation.

### **Self-disclosure**

Social penetration theory posits that self-disclosure is vital to increasing closeness among individuals, with interaction partners sharing increasingly more self-relevant and intimate information in a reciprocal manner as social bonds form (Altman & Taylor, 1973; Carpenter & Greene, 2015). We therefore expected self-disclosure to increase from acquaintances to casual friends, and from casual friends to close friends, and for higher self-disclosure to be associated more friendship satisfaction, regardless of participants' levels of SA. Although the literature on self-disclosure tendencies among high SA individuals was limited, there was evidence suggesting that people higher in SA self-disclose less within their close relationships (Cuming & Rapee, 2010; Sparrevojn & Rapee, 2009). In addition, high SA individuals have been shown to display more moderate amounts of self-disclosure, influenced less by an interaction partner's level of self-disclosure (Maleshko & Alden, 1993). Therefore, combining these previous findings, we predicted that individuals higher in SA would show less variability in self-disclosure across different types of friendships, and especially low self-disclosure within the context of close friendships.

Findings were very similar across our two studies, and partially supported hypotheses. As expected, in both samples, participants generally reported self-disclosing the most to their close friends and least to their acquaintances. Surprisingly, however, in both samples, there was no general tendency for higher SA individuals to self-disclose either more or less to their friends than lower SA individuals, irrespective of friendship type. That is, we did not find support for the hypothesis that higher SA individuals self-disclose more to acquaintances and less to close (or best) friends than lower SA individuals.

Our finding no evidence of higher SA individuals self-disclosing less to their close friends is at odds with past findings of significant negative associations between SA and self-

disclosure within close relationships (Cuming & Rapee, 2010; Sparrevojn & Rapee, 2009). These findings also diverge from past work showing that individuals higher in SA tend to exhibit more moderate levels of self-disclosure than lower SA individuals, regardless of context (Maleshko & Alden, 1993). Instead, we found high and low SA individuals to similarly moderate self-disclosure based on their interaction partner. It is unclear why our findings on the effects of SA on self-disclosure in friendships diverged from those of previous study findings, though methodological factors (e.g., use of different measures of self-disclosure) could have played a role.

On the other hand, our results demonstrated a positive relation between self-disclosure and friendship satisfaction in both of our samples, which did not vary by the type of friendship or participants' levels of SA, and these findings were generally consistent with those of past studies (e.g., Graham et al., 2008; McCarthy et al., 2017). Although self-disclosure was an important predictor of friendship satisfaction in both our studies and past research, in the current studies self-disclosure did not emerge as a plausible mechanism for explaining discrepancies in friendship satisfaction based on SA. Nonetheless, it is still possible that self-disclosure and SA interact to influence the development and maintenance of friendships more broadly, but that the design of our studies prevented detection of such effects. Since our studies investigated friendships at already established levels of interpersonal intimacy, they may have precluded insight into ways in which self-disclosure might have previously influenced friendship development over the course of time within the everyday lives of our participants. Given that increasing self-disclosure is a reciprocal process whereby each person takes turns sharing increasingly intimate information about the self (Carpenter & Greene, 2015), it is possible that higher SA individuals might have difficulty matching a new friend's breadth and depth of

disclosure, which may thwart friendship development. In this way, differences in self-disclosure based on level of SA may be more accurately conceptualized as potential barriers to accessing deeper levels of interpersonal intimacy during new friendship development, rather than as factors contributing to decreased satisfaction within established friendships. These issues could be more closely examined within the context of future longitudinal studies.

### **Friendship maintenance behaviours**

Friendship maintenance behaviours (FMBs) encompass essentially all behaviours that keep people connected as friends (Hays, 1984; Oswald et al., 2004). The amount and intimacy of FMBs in which people engage has been shown to increase as friendships develop, and more FMBs correspond to higher friendship satisfaction (Hays, 1984, 1985; Oswald, 2016). Therefore, we tested whether level of friendship intimacy and SA predicted engagement in FMBs, and whether FMBs were positively related to friendship satisfaction.

In both samples, we found that more intimate friendships were associated with greater FMB engagement, but the effect of SA on FMBs was not significant in either study. Although there was a significant friendship intimacy by SA interaction in the prediction of FMBs among community participants (Study 2), the nature of the interaction was such that slopes of the relation between SA and FMBs were significantly different for acquaintances versus close friends, but SA was not actually a significant predictor of FMBs at any level of friendship intimacy.

However, it remains possible that, despite engaging in similar numbers of FMBs across levels of intimacy, the FMBs of high and low SA individuals differed in some other important ways. For example, consistent with past uses of the FMS, assessment of FMBs in the present study did not ask participants about who initiated each type of interaction. That is, participants

were simply asked, “*How often do you and this friend...?*” for each of the 39 scale items. As such, it is plausible that lower SA individuals took more initiative within their friendships and therefore largely determined the amount of FMB engagement, whereas low SA individuals may have been more likely to defer the task of FMB initiation to less socially anxious friends. To more fully understand these interaction patterns, not only would it be helpful to have information on who initiated each type of maintenance behaviour, but also to have additional information about the personality characteristics or interpersonal style of each of the selected friends. Because high SA individuals have previously been shown to be more submissive and more tolerant of other individuals who are interpersonally colder, and thus less likely to initiate FMBs, they might experience most success with friends who are more dominant, extraverted, and likely to initiate the behaviours necessary for building and maintaining a healthy friendship (Rodebaugh, Bielak, Vidovic, & Moscovitch, 2016). If personality characteristics of the friends were to be compared, we might find important differences in the types of friends that high and low SA individuals tend to select for studies such as this.

**FMBs predict friendship satisfaction.** Given that FMBs are central to experiences of friendship satisfaction (e.g., Oswald, 2016), we investigated to what extent FMBs related to friendship satisfaction. In both Study 1 and Study 2, FMBs significantly (positively) predicted friendship satisfaction for acquaintances, casual friends, and close (or best) friends. In the undergraduate sample, there was a marginally significant ( $p = .052$ ) FMB by SA interaction in predicting friendship satisfaction, which did not emerge in the community sample. Though marginally significant effects must be interpreted with caution, this interaction showed that low SA individuals who engaged in few FMBs were still relatively satisfied with their friends, whereas high SA individuals who engaged in few FMBs were less satisfied. In contrast, when

engagement in FMBs was high, low and high SA individuals tended to be more, and similarly, satisfied. This finding suggests that high SA individuals' friendship satisfaction ratings were more closely tied to FMB engagement than were low SA individuals' satisfaction ratings.

Although this interaction was only marginally significant, it is theoretically interesting and has the potential to become statistically significant when investigated within a larger sample.

Therefore, we advance several potential explanations for these tentative results.

First, it is possible that undergraduates with higher SA were more attuned to the lack of contact when FMBs were low, and that the increased awareness of low interpersonal engagement contributed to decreased satisfaction. This suggestion is supported by research showing that higher SA is associated with greater expectations of strict reciprocity within friendships (Fernandez & Rodebaugh, 2011), which is a focus that tends to be detrimental for feelings of satisfaction (e.g., Murstein & Azar, 1986). Second, in friendships in which FMBs were low, reasons for the low frequency of interpersonal interaction might have differed for higher versus lower SA respondents. For example, perhaps low FMB use was not by choice for most higher SA respondents, but rather due to an inability to engage in their desired level of FMBs because of skills deficits or impairing levels of anxiety. In contrast, lower FMB use among lower SA individuals might have simply been indicative of a preference for less interpersonal engagement (e.g., individual differences in interaction style). This potential discrepancy between desire and reality, which may be present for higher but not lower SA individuals, may help explain the particularly low ratings of friendship satisfaction among higher SA individuals in friendships with few FMBs.

Furthermore, higher SA undergraduates might depend on FMBs for reassurance that the friendship is in good standing. Because we know that relationship uncertainty is tied to decreased

friendship satisfaction (Fearer, 2013), and that FMBs have the potential to decrease this uncertainty and provide assurance that the friendship will continue in the future (Dainton & Aylor, 2001; Fearer, 2013), it is plausible that higher SA individuals are more prone to experiencing uncertainty within friendships and thus use FMBs as a measure of friendship security. For example, attending a social event with a friend not only provides reassurance that the social connection has not been lost (e.g., by the mere fact that the friend agreed to attend the event together), but the occasion also offers ample opportunities for interactions demonstrating warmth, affection, and desire for future interaction. Lower SA individuals, on the other hand, might experience less uncertainty within their friendships and therefore feel more comfortable with an ambiguously low level of FMBs. In this way, relationship uncertainty has the potential to help explain differences in the extent to which FMBs are important for friendship satisfaction. It is therefore recommended that future work explicitly assess the link between SA and uncertainty within friendships at different levels of interpersonal intimacy. If such a link between SA and friendship uncertainty received empirical support, it may represent a key target in treatment interventions.

Finally, the subjective experience of higher and lower SA individuals as they engage in FMBs might differ in important ways, especially as the experiences relate to enjoyment gained from the interpersonal interactions. Consider that higher SA has been linked to dampened experiences of positive emotions (Kashdan, 2007; Kashdan & Steger, 2006) and increased tendency to fear evaluation by others, including positive evaluation (Weeks et al., 2008). Therefore, it is plausible that higher SA individuals also extract less satisfaction from each interpersonal interaction with their friends, and therefore require a greater number of such

behaviours to attain a similar level of satisfaction within their friendships that lower SA individuals are able attain from engaging in fewer FMBs.

Nonetheless, the present findings indicate that FMBs are similarly important for friendship satisfaction among individuals both high and low in SA. In light of this, FMBs may represent a fruitful treatment target in interventions aimed at ultimately increasing friendship satisfaction, particularly if evidence was amassed suggesting there may be qualitative differences in how FMBs are used across the SA spectrum. In our two studies, we found that the number of FMBs in which people engaged did not differ based on trait SA; however, the consistent positive relation between FMBs and friendship satisfaction suggests that it may be important to investigate other ways in which the FMBs of higher versus lower SA individuals might potentially differ.

### **Exchange Orientation**

Exchange orientation is defined as the degree to which one is concerned with strict reciprocity within one's relationships, and it has been found to decrease as friendships develop more depth and intimacy (e.g., Addison, 2000), with lower exchange orientation linked to higher friendship satisfaction (Mustein & Azar, 1986). No prior studies to our knowledge have examined exchange orientation within the context of SA. As hypothesized, in both studies we found that exchange orientation was reduced within more intimate types of friendships and that focus on strict reciprocity within friendships increased with higher levels of SA. However, the hypothesized interaction between levels of friendship intimacy and SA on exchange orientation was not supported. That is, we did not find differences in exchange orientation for those with higher levels of SA to be relatively exaggerated within close or best friendships, compared to acquaintanceships. Thus, results from Studies 1 and 2 suggest that higher SA is associated with a

tendency to focus more on reciprocity within all types of friendships, with participants reporting that they tend to adjust their focus on reciprocity depending on the intimacy of the friendship, which was true both for people with higher and lower trait SA.

In addition, and consistent with predictions, a higher exchange orientation predicted lower satisfaction within all types of friendships. Furthermore, when exchange orientation was added to the statistical model predicting friendship satisfaction, along with type of friendship and SA, the exchange orientation variable explained a portion of the variance in friendship satisfaction that was previously attributed to SA. Consequently, with exchange orientation in the model, SA was no longer a significant predictor of friendship satisfaction in either sample. Trait SA did not, however, moderate the relation between exchange orientation and friendship satisfaction, suggesting that greater focus on strict reciprocity is an important predictor of lower friendship satisfaction regardless of the respondent's level of SA.

These results are consistent with the literature suggesting exchange orientation decreases as friendships grow more intimate (Addison, 2000), and that such changes in exchange orientation contribute to closer friendships being more satisfying. Therefore, if high SA individuals endorse both greater exchange orientation and lower friendship satisfaction, the two variables may be linked in an important way. It follows, then, that if exchange orientation and friendship satisfaction covary (as zero-order correlations suggest that they do; see Table 1 and Table 2), efforts aimed at decreasing individuals' concerns over potential inequities within relationships may also indirectly facilitate access to more satisfying friendships. This suggestion is worthy of further investigation, as all routes that show promise for increasing friendship satisfaction have potentially important implications for people's happiness and well-being.

We propose two reasons for the inverse relation between exchange orientation and friendship satisfaction, though both reasons are largely speculative at this time. First, focus on strict reciprocity within friendships has the potential to hijack attentional resources and shift mental focus away from opportunities to capitalize on positive experiences within the friendship. This shifted focus could mean paying needlessly close attention to what one might be “owed” by one’s a friend (e.g., ruminating on feelings of being underbenefitted; Stafford & Canary, 1991; Thibaut & Kelley, 1959), thereby increasing the probability of missing some other, unrelated but equally important, contributions that the friend may be making to the friendship. This may lead to decreased satisfaction for the individual high on exchange orientation, because it may fuel perceptions of being treated unfairly or not being adequately valued within the friendship. Alternatively, focus on exchange orientation could contribute to self-blame and feelings of guilt or inadequacy, if people see themselves as responsible for perceived inequalities within the friendship (e.g., if one feels overbenefitted; Stafford & Canary, 1991; Thibaut & Kelley, 1959), which could contribute to less positive perceptions of the friendship as a whole. Last, a higher focus on exchange orientation could simply detract from meaningful social engagement even if no member of the friendship dyad is “blamed.” In all cases, such internal preoccupation with social exchange processes is likely to leave fewer attentional resources dedicated to detecting spontaneous positive aspects of the interactions, and may therefore have downstream effects on behaviour in ways that compromise friendship satisfaction for either one or both parties.

Another potential explanatory process for the link between exchange orientation and friendship satisfaction is that attention to social exchange processes may be indicative of a desire for certainty regarding fairness or reciprocity in the friendship. Feelings of uncertainty about friendships has been shown to adversely affect the health of close relationships and is therefore

not a desirable state (Fearer, 2013). However, achieving a clear sense of certainty about fairness in a friendship is likely elusive. If longitudinal studies were to find that greater feelings of uncertainty within friendships contribute to increased focus on social exchange, and subsequently decreased friendships satisfaction, tolerance of uncertainty within friendships could be seen as a treatment target for individuals reporting decreased quality of close relationships.

Finally, it is noteworthy that when trait SA, self-disclosure, FMBs, and exchange orientation were all entered as simultaneous predictors of friendship satisfaction, FMB use and exchange orientation most consistently emerged as the most important predictors of friendship satisfaction, across all types of friendships and in both studies. Whereas SA was not consistently predictive of differences in FMB engagement, it was predictive of increased focus on social exchange, suggesting that helping high SA individuals decrease their exchange orientation may be an effective way of indirectly helping them increase experiences of satisfaction within various friendships.

### **Friendships and well-being**

One of the most robust findings from prior literature is that close friendship satisfaction relates to greater well-being (Dunbar, 2018). Therefore, we tested the extent to which friendship satisfaction and various aspects of well-being were linked. To test the hypothesis that it is specifically satisfaction with close friendships that contributes to greater well-being, our statistical models included acquaintance satisfaction, casual friend satisfaction, and close (or best) friend satisfaction as simultaneous predictors of each of the four components of well-being. In both studies, the four measures of well-being were significantly correlated with each other in the expected directions (as shown in Tables 1 and 2).

In both studies, results largely supported hypotheses. That is, friendship satisfaction, particularly within closer friendships, emerged as a significant predictor of almost all measures of well-being. In both studies, higher close friendship satisfaction predicted more positive affect and greater satisfaction with life ratings, as well as fewer depressive symptoms. Close friendship satisfaction also predicted less negative affect over the past week, within the community sample; however, contrary to expectations, none of the friendship satisfaction ratings predicted negative affect within the undergraduate sample. The observation that friendship satisfaction was differentially correlated with positive versus negative affect is noteworthy, as it supports the now well-established notion that positive and negative affect are not simply bipolar endpoints of a single continuum, but rather two relatively distinct constructs that can vary independently of one another (Diener & Emmons, 1984). As such, our findings support the view that increasing positive affect does not necessarily simultaneously decrease negative affect, highlighting the need for clinical interventions to deliberately target each of these aspects of well-being separately. In addition, the extent to which acquaintanceships or casual friendships contributed to well-being was more variable across the measures of well-being and across datasets. As such, our results support the notion that close friendships are most closely related to well-being.

## **Limitations**

**Online data collection.** Our results and interpretations must be considered within the context of study limitations. Most notably, data for both studies were collected entirely online, which has the potential to decrease the validity of responses due to issues such as contamination by robot responses, poor participant attention, or inadequate understanding of the study instructions. As described, we had implemented several measures to prevent inclusion of unreliable response in analyses (e.g., CAPTCHA feature, manual screening of long answer

responses, and filters based on attention scores and self-reported effort), though it remains possible that some low quality responses passed these barriers and were included in analyses.

**Self-report measures.** Another limitation of the present pair of studies is that measure consisted entirely of participants' ratings on self-report questionnaires, thus precluding insight into interaction partners' ratings of the friendship characteristics under investigation. Although this approach suffices as a first step in investigating the intimate friendship lives of socially anxious individuals, these data are also susceptible to all of the biases that are inherent in self-report assessment tools (see Stone, Bachrach, Jobe, Kurtzman, & Cain, 1999, for a review). Furthermore, the reliance on self-report assessments means that it remains unclear whether differences in responses based on trait SA reflect true differences in the qualitative characteristics of their friendships, or cognitive processes that result in differences in perceptions of friendship characteristics where no such differences exist (e.g., do higher and lower SA individuals use the same standards for judging amounts friendship characteristics and satisfaction?).

**Cross-sectional study design.** Third, the cross-sectional nature of these data preclude insight into directionality. Although data interpretation was theory-driven, it remains possible that many of the relations presented here are bidirectional. For instance, we found FMBs to relate to higher friendship satisfaction. This might mean that engagement in FMBs leads to higher satisfaction, but it also might indicate that people who are more satisfied within a certain friendship engage in more FMBs within that same friendship, or that there is a reciprocal relationship by which FMBs and friendship satisfaction continuously reinforce each other. Furthermore, since we did not follow the same sample of people over time, the data cannot

provide insight into the processes of friendship development. Instead, we can simply comment on differences among selected friends at the different levels of intimacy.

**Representativeness of the selected friends.** There are noteworthy limitations related to the friend selection aspect of our studies. For one, we do not know to what extent the three friends selected for this study were representative of participants' broader social networks. It might be the case that the study context prompted everyone to select similar types of friends, whereas in reality there might be more variability in the types of friendships that participants actually have at each level of intimacy. It is also possible that there are important differences in the quantity of friends that higher versus lower SA individuals have at each level of intimacy, even though past work has emphasized the importance of quality over quantity of friends when it comes to predicting well-being, which was of most interest to this study (e.g., Lewis et al., 2015; Dunkel Schetter, 2017).

In addition, it is important to note that we excluded individuals who did not endorse having all three types of friends. However, these excluded participants might be the most interesting to investigate in future work, as high SA individuals' greatest problem with respect to friendship may be about missed opportunities for friendship formation (e.g., Rodebaugh et al., 2016).

**Generalizability.** Finally, because our study sample was not comprised of clinical participants diagnosed with social anxiety disorder, the extent to which the present findings may be used to ultimately inform treatment interventions for socially anxious individuals is unclear and warrants further investigation.

### **Clinical implications**

Despite preliminary work suggesting that SAD is uniquely related to perceptions of lower friendship quality, even when controlling for other psychiatric diagnoses and demographic variables (Rodebaugh, 2009), current treatment protocols rarely make special reference to friendships or attempt to increase high SA individuals' well-being by specifically addressing deficits within their friendships. Although cognitive behavioural therapy (CBT), the current gold standard treatment for SAD, improves quality of life ratings even without a particular focus on friendships (Eng, Coles, Heimberg, & Safren, 2001), researchers have noted that socially anxious participants had lower quality of life ratings at post-treatment than would be expected based on quality of life ratings for other treatment completers in past studies. Therefore, people with SAD might benefit from a more formal and explicit focus on friendships within treatment protocols.

One approach to specifically targeting relational maintenance within treatment protocols for social anxiety disorder comes from Alden and Taylor (2011), who recently aimed to incorporate findings from relational and interpersonal circumplex research into gold-standard CBT treatments for social anxiety. Their protocol was motivated by the interpersonal dysfunction that is thought to be a core component of SAD, with the goal of promoting social approach and positive interpersonal relations following intervention (Alden & Taylor, 2011). The authors found that individuals with SAD who participated in the CBT group that focused on strategies to enhance interpersonal functioning (CBT-I) experienced greater increases in social approach behaviours compared to participants with SAD who were assigned to a waitlist control condition. In addition, CBT-I participants reported large increases in satisfaction with their social relationships, which were maintained at 6-month follow-up (Alden & Taylor, 2011). A subsequent study in which the outcomes of this CBT-I protocol were tested on an independent clinical sample of participants with SAD in comparison to an active control condition replicated

and extended these promising findings. This recent study showed that the CBT protocol that was augmented with a relational focus resulted in greater improvements in relationship satisfaction and symptoms of SA than an exposure-plus-applied relaxation protocol (Alden et al., 2018). These studies demonstrate the increasing interest in the field of SA research on promoting positive social functioning among individuals with SAD, and suggest that additional research on the friendship characteristics of high and low SA individuals may assist these treatment efforts. Thus, the current investigation is timely and presents a preliminary step towards increasing our understanding and treatment of SAD through careful attention to friendship processes.

Both of the present studies replicated past findings that higher SA is associated with lower friendship satisfaction, thus supporting Rodebaugh's (2009) suggestion that friendships deserve increased and special focus within the study of SA. Our findings suggest that higher exchange orientation among socially anxious individuals may contribute to feeling of lower friendship satisfaction. In addition, an interaction between FMBs and SA in predicting friendship satisfaction suggested that high SA individuals might rely more heavily on FMBs as a way to gauge friendship satisfaction. Thus, these may be fruitful areas of focus for treatment interventions.

In addition to the potential utility of addressing each of these specific elements of friendships within interventions for SA, a theme that might relate to both FMBs and exchange orientation is relationship uncertainty. As discussed above, uncertainty within friendships is typical at early stages of friendship development, but can be detrimental to friendship satisfaction if it persists (Fearer, 2013). Friendship uncertainty has the potential to motivate increased attention to FMBs as a way to evaluate the status of an established friendship, as well as increased attention to reciprocity within the friendship, both of which are likely to contribute to

decreased satisfaction. We therefore posit that interventions that promote decreases in feelings of, or preoccupation with, uncertainty within friendships may simultaneously help to boost friendship satisfaction.

### **Future directions**

To expand on this line of work, an important next step is to conduct laboratory-based studies of friend dyads, which incorporate the use of both self- and other-report questionnaires. Such an approach would allow researchers to distinguish between the relative contribution of cognitive biases leading to skewed perceptions of friendship characteristics, on one hand, and the contribution of objective behavioural differences that contribute to decreased experiences of friendship satisfaction, on the other. In addition, in-lab approaches with both members of the friendship dyad present could lend themselves to behavioural coding by objective raters, thus providing even less biased data on differences in the friendship processes among high versus low SA individuals.

In addition, there is a need for longitudinal studies that investigate the friendships of high and low SA individuals as they are initiated, developed, and maintained over time (e.g., using daily diary designs). As well, studies of friendship on clinical samples of people with SAD are needed, as the majority of work on SAD has focused on interactions with strangers. Such studies might help to reveal additional targets for treatment that have potential to enhance the well-being of high SA individuals by facilitating greater access to high quality social support.

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