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## Interpersonal sensitivity and well-being: Investigating relatedness and motivation as potential mediators

Elise A. Frickey  
Iowa State University

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**Interpersonal sensitivity and well-being: Investigating relatedness and motivation  
as potential mediators**

by

**Elise A. Frickey**

A thesis submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of  
**MASTER OF SCIENCE**

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Program of Study Committee:  
Lisa M. Larson, Major Professor  
Daniel Russell  
Meifen Wei

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2020

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## ABSTRACT

Interpersonal sensitivity is a trait characterized by a hypersensitivity to criticism and rejection. The present author aimed to conceptualize the relationship between interpersonal sensitivity and well-being through the lens of self-determination theory. It was hypothesized that relatedness variables (satisfaction, dissatisfaction, and thwarting) would mediate the relation between interpersonal sensitivity and a novel motivation construct (“motivation for relationship engagement”); it was also hypothesized that motivation would in turn mediate the relation between relatedness variables and positive and negative affect. After 343 university students responded to the online survey, parcels were created to approximate each latent variable. Data were analyzed via structural equation modeling using Mplus Version 7.4, and indices of model fit (Hu & Bentler, 1999) suggested the theoretical model offered a good fit to the data. In support of the author’s hypotheses, all direct and indirect paths in the partially mediated structural model were significant ( $p > .05$ ). Interestingly, findings suggest participants did not discriminate between relatedness dissatisfaction and relatedness thwarting, breaking from past research which had found these constructs to be distinct (e.g., Costa, Ntoumanis, & Bartholomew, 2015). Overall, the present study points to importance of relatedness and motivation as crucial and understudied mediators when it comes to researchers’ and clinicians’ understanding of interpersonal sensitivity and affective experiences.

## CHAPTER 1. INTRODUCTION

Much research has demonstrated the importance of the need for social connection as a fundamental human motivation (Baumeister & Leary, 1995; Deci & Ryan, 2000). It is a need common across cultures (e.g., Kitayama & Markus, 1994; Yang, Zhang, Liang, & Hu, 2016), as humans spontaneously form bonds with one another and are motivated to maintain such bonds. The severing or absence of these connections has been found to have important implications for long-term and short-term physical health (e.g., Baumeister & Leary, 1995; Begen & Turner-Cobb, 2012; Miller, Chen, & Cole, 2009;) and psychological health (Allen & Badcock, 2003; Baumeister & Leary, 1995; Cohen & Wills, 1985). This essential need for social contact has been investigated from a variety of perspectives: while Baumeister and Leary (1995) refer to this construct as the need to belong, of particular interest to the present author is Deci and Ryan's highly similar conception of the basic psychological need for relatedness (2000). The present author aims to expand the current understanding of this construct by investigating the specific characteristics of individuals who are lacking in social connectedness. How does a failure to meet this need for meaningful human contact maintain or exacerbate psychological difficulties? Are some individuals more affected by an unmet need for relatedness? What psychological characteristics or personality traits are associated with the perception of a lack of relatedness? Does a lack of relatedness make it more or less motivating to engage in future relational activities? The present author aims to answer these questions by consolidating literature on several constructs, while also providing a theoretical framework through which the relations between these constructs can be better understood.

Some researchers have understood the need for relatedness as a central component to their conceptualizations of well-being. For instance, embedded within belongingness theory is

the notion that self-esteem itself evolved as a gauge of social inclusion (Leary & Downs, 1995). According to this sociometer hypothesis, state self-esteem is seen as a monitor of moment-to-moment perceptions of one's belonging, and trait self-esteem is a longer-term form of that gauge (Leary, 2005). Additionally, Allen and Badcock (2003) argue that depression is an adaptive mechanism evolved to temporarily minimize the risk of social exclusion whereby a hypersensitivity to indicators of social risk helps depressed individuals avoid rejection. These studies point to a link not only between well-being and one's perceptions of belongingness, but also to unique implications of a lack of social connectedness for those who suffer psychologically (e.g., from depression or low self-esteem).

In light of this, it is unsurprising that research has found that those prone to the development of, or already suffering from, depression are differentially affected by a lack of their relatedness need being met. For instance, numerous studies point to a link between a lack of social connectedness and depressive symptoms (e.g., Cockshaw & Shochet, 2010; Hagerty, Williams, Coyne, & Early, 1996; Peeters, Nicolson, Berkhof, Delespaul, & deVries, 2003), even suicide risk (e.g., Christensen, Batterham, Mackinnon, Donker, & Soubelet, 2014; Van Orden, Witte, Gordon, Bender, & Joiner, 2008).

### **Interpersonal sensitivity and well-being**

It is intuitive that, if one's need for relatedness is left chronically unmet, whether as a result of social exclusion, rejection, or simply a lack of success in forming and maintaining caring relationships, one would feel a certain insecurity regarding one's social interactions. This resulting hypersensitivity and its relation to difficulties such as depression and anxiety have been studied from several perspectives: some researchers have focused their attention on the more narrow construct of rejection sensitivity (the hypervigilant attention to and defensiveness

towards social criticism; e.g., Gao, Assink, Cipriani, & Lin, 2017; Kawamoto, Nittono, & Ura, 2015) or the more broad construct of emotional reactivity (the extent to which one is prone to experiencing positive and negative affect; e.g., Boyes, Carmody, Clarke, & Hasking, 2017). However, of interest to the present study is the construct titled interpersonal sensitivity, defined according to the original study by Boyce and Parker (1989) as “an undue and excessive awareness of, and sensitivity to, the behavior and feelings of others” (pg. 342). According to this perspective, highly interpersonally sensitive individuals are hypervigilant about their relationships and are preoccupied with situations which might involve criticism or rejection. Nuanced views of this construct define interpersonal sensitivity from a perspective of self-esteem (Derogatis, Lipman, & Covi, 1973), or focus on the accuracy of interpersonal perception (Snodgrass, Hecht, & Ploutz-Snyder, 1998). However, for the purpose of this study, the definition of Boyce and Parker will be used.

Interpersonal sensitivity, along with the highly similar construct of rejection sensitivity, has repeatedly been found to be problematic for psychological health (e.g., Chango, McElhaney, Allen, Schad, & Marston, 2012; Chesin, Fertuck, Goodman, Lichenstein, & Stanley, 2015; Rowe, Zimmer-Gembeck, Rudolph, & Nesdale, 2015), particularly in its implications for relational functioning. For instance, individuals with this heightened sensitivity to rejection have been found to expect, readily perceive, and overreact to rejection (Downey & Feldman, 1996; Feldman & Downey, 1994). Individuals with this tendency have also been found to be more prone to both loneliness and depression (Zimmer-Gembeck, Trevaskis, Nesdale, & Downey, 2014; Cooper, Shaver, & Collins, 1998). Not only does interpersonal sensitivity thus predispose individuals to depression, but the resulting sensitivity to social rejection has a stronger impact on the well-being of depressed people (Steger & Kashdan, 2009). In other words, those in greatest

need for social connection are those most affected by their day to day social interactions. More specifically, Reichenberger and colleagues (2017) found that ill-being was associated with less positive feelings resulting from positive and neutral stimuli, but that these diminished emotional responses are not found for unpleasant stimuli (Sloan, Strauss, & Wisner, 2001). This is concerning in light of other research (Gotlib, Krasnoperova, Neubauer Yue, & Joormann, 2004) which suggests that depressed patients have an attentional bias towards negative interpersonal stimuli. Similarly, one study suggests that negative social cues will more greatly affect the self-esteem, social involvement, and relational value of those with an unmet need for relatedness, all which have implications for well-being (Tyler, Branch, & Kearns, 2016).

This research points to a strong link between depressive symptoms and a sensitization to interpersonal stimuli. Given that individuals with heightened interpersonal sensitivity are thus more likely to experience emotional reactions to negative stimuli than positive stimuli, to attend to negative interpersonal stimuli, and to be affected by negative interpersonal stimuli, it is clear how this construct could have great implications for psychological well-being. Though much of the current literature has focused on the associations between interpersonal sensitivity and a variety of psychological difficulties (e.g., Harb, Heimberg, Fresco, Schneier, & Leibowitz, 2002; Masillo et al., 2017; Mathew, Sudhir, & Mariamma, 2014; Mogi & Yoshino, 2017; Otsuka et al., 2017), the present author is interested in how this construct affects non-clinical populations. Given the demonstrated importance of the need for social contact to well-being, the previously mentioned strong links between interpersonal sensitivity and depression (e.g., Boyce & Parker, 1991), and the fact that interpersonal sensitivity has been found to predict the development and treatment of depression, interpersonal sensitivity can thus be understood as a risk factor for the

onset of depression. Thus, it is crucial to understand if and how this multifaceted construct affects non-clinical populations.

While many studies on this construct have included measures of depression or anxiety, positive and negative affect have occasionally been used as indicators of well-being in the interpersonal sensitivity literature (Smith & Zautra, 2001). Importantly, positive and negative affect can be seen as an index of well-being for a non-clinical sample, given the strong connections to a variety of disorders. Not only has depression been found to be characterized by low positive affect and high negative affect (Peeters et al., 2003), but measures of positive affect and negative affect have also been used to predict mood disorders (Cohen et al., 2017) and are associated with anxiety disorders (Watson, Gamez, & Simms, 2005). While positive affect has been related to well-being and inversely related to psychological difficulties (Beck et al., 2003; Cohen & Pressman, 2006), negative affect has been found to be inversely related to numerous indices of psychological well-being and overall health (e.g., Crawford & Henry, 2004; Beck et al., 2003). Therefore, it is assumed that positive affect and negative affect can be effectively used in the present study for the purpose of measuring the relation between well-being and constructs related to depression in a non-clinical sample.

### **Interpersonal sensitivity and perceptions of relatedness**

The above research points to associations between interpersonal sensitivity and ill-being, as well as associations between social belonging and well-being. However, it also illuminates a significant gap in the literature, in that less is understood about the relationship between interpersonal sensitivity and one's perceptions of relatedness. Although some have investigated the relationship between social rejection/exclusion and rejection sensitivity (e.g., Gao et al., 2017), the relationship between this sensitivity and one's perceptions of social connectedness has

been less studied. While one study (Costa, Ntoumanis, & Bartholomew, 2015) did find an association between perceptions of relatedness and interpersonal sensitivity, little further research has investigated how this relationship unfolds. If interpersonal sensitivity does indeed have implications for one's perceived level of social connectedness, this could explain the observed relationship between interpersonal sensitivity and depression, as a lack of belonging both precedes and exacerbates psychological ill-being. In other words, relatedness could mediate the relationship between interpersonal sensitivity and well-being.

There is reason to suspect that individual differences in interpersonal sensitivity might predict levels of perceived social connectedness, despite the lack of research in the area. Given the strong link between interpersonal sensitivity and depression, and the link between depression and a lack of social connection, some research on depression can be logically assumed to be relevant to this link between interpersonal sensitivity and relatedness as well. Much of the above research that demonstrates how interpersonally sensitive individuals are attuned to and more affected by negative interpersonal stimuli can also be construed as evidence for a link between this construct and relatedness. People suffering from depression hold negative self-views, and as a result of these, they actually prefer others who evaluated them unfavorably when compared to non-depressed counterparts, even when receiving this feedback makes them unhappy (Swann, Wenzlaff, Krull, & Pelham, 1992). Surrounding oneself with individuals who share one's negative self-views would likely prevent one from feeling a sense of belonging with others, especially given that Baumeister and Leary conceptualized that a prerequisite of meeting this need is a warm interpersonal environment (1994). Moreover, interpersonal sensitivity has been found to be correlated with loneliness, a construct highly correlated with depression (Zimmer-Gembeck et al., 2014; Cooper et al., 1998) and conceptually related to relatedness. Indeed,

research has shown that highly rejection-sensitive individuals are more likely to be rejected by their romantic partners than are their less rejection sensitive counterparts, creating a sort of self-fulfilling prophecy in which individuals who are most worried about losing their partners are those most likely to be romantically rejected (Downey, Freitas, Michaelis, & Khouri, 1998). Given the described research, it is intuitive that individuals high in interpersonal sensitivity would have a lower sense of social connectedness.

### **Attitudes about interpersonal relationships**

When attempting to understand how interpersonal sensitivity and the predicted lowered relatedness would affect individuals' future attitudes and behaviors regarding their interpersonal relationships, the literature is unclear. According to classic need to belong theory, those whose need for belonging is not met would be highly motivated to increase goal-directed activity aimed at forming relationships (Baumeister & Leary, 1994). According to this theory, individuals strive to achieve a minimum number of social contacts, and once that threshold is met, the motivation to seek out new contacts diminishes. As a sort of 'satiation' is reached, it is less satisfying to engage in these relationships, and less distressing when such relationships dissolve. Fitting with this viewpoint, research found those with the greatest need for social connectedness were more skilled at decoding social cues than the comparison group (Pickett, Gardner, & Knowles, 2004), a skill which would be adaptive for the creation of new relationships.

While need to belong theory would thus suppose that those lacking in social connectedness would be motivated to achieve more social contacts, there is also reason to suspect the opposite. If, as previously mentioned literature suggests, an individual with high levels of interpersonal sensitivity is attuned to negative interpersonal experiences, *and* more

affected by such experiences, it is also possible this would lead to a sense that one's attempts at forming social bonds are futile.

### **Self-determination theory as a theoretical framework**

Support for this second view comes from research on self-determination theory, a theory which can be used to understand how the variables of interpersonal sensitivity, relatedness, and outcome variables relate to one another. Self-determination theory (SDT; Deci & Ryan, 2000) is a theory of motivation which proposes there are three basic psychological needs which inform motivation and personality functioning: volitional autonomy, or the belief that one is in control of one's choices, perceived competence, or the belief that one is able to accomplish important tasks, and relatedness, or one's belongingness/connectedness with others. When these three needs are met, individuals are self-motivated, vital, and prone towards positive development. However, when these needs are unmet, individuals can become apathetic and unmotivated, and their well-being suffers. Recent research (e.g., Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Cordeiro, Paixão, Lens, Lacante, & Sheldon, 2016) has found a failure to meet one's needs can constitute one of two distinct processes: need dissatisfaction, which is the more passive lack of a need being met, or need thwarting, which is the more active undermining of one's needs. Because of the reported differences in outcomes between need satisfaction, dissatisfaction, and thwarting found in previous self-determination theory research (e.g., Costa et al., 2015), these will be regarded as separate constructs for the purpose of the present study.

Numerous studies across a variety of areas have found SDT to be a valid and helpful framework for understanding well-being as it relates to exogenous variables (e.g., Orkibi & Ronen, 2017; Uysal, Lin, & Knee, 2010). Indeed, Patrick, Knee, Canevello and Lonsbary in 2007 found that the satisfaction of the basic psychological need for relatedness predicted both

individual and relational well-being, with relatedness uniquely predicting relationship outcomes. While self-determination theory has not been yet utilized to understand the relationship between the variables of interest to the present study, one recent study found associations between interpersonal sensitivity and a thwarted need for volitional autonomy, perceived competence, and relatedness (Costa et al., 2015). Additionally, previous research on self-determination theory has found that psychological need fulfillment was correlated with greater relationship quality (Deci, La Guardia, Moller, Scheine, & Ryan, 2006), emotional awareness, emotional disclosure, openness (La Guardia, 2007), and willingness to rely on one's partner (Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005) in one's close relationships. These studies point to the utility of self-determination theory for understanding the associations between relational functioning, psychological needs, and well-being.

While previous research has suggested some relationship between all three basic psychological needs and interpersonal sensitivity (Costa et al., 2015; Snodgrass et al., 1998), the present study aimed to specify these findings by investigating the unique contribution of the need for relatedness. This aim is reasonable, given previous studies in the SDT literature which have investigated perceived relatedness as a unique mediator between certain variables and outcome measures (e.g., Guiffrida, Gouveia, Wall, & Seward, 2008; Sparks, Dimmock, Lonsdale, & Jackson, 2016). One important outcome relevant to well-being in the present context is motivation. According to Deci & Ryan (2000), there are several types of motivation ranging from intrinsic motivation, in which individuals spontaneously seek out novelty, challenges, and opportunities to grow, to amotivation, in which individuals lack the intention to act. Amotivation can result from the expectation that no desired outcome will come from engagement in a certain activity (Seligman, 1975). Each type of motivation, according to this theory, falls on a continuum

from more autonomous motivation, meaning more self-determined forms of motivation, to controlled motivation, meaning less self-determined forms of motivation (Sheldon, Osin, Gordeeva, Suchkov, & Sychev, 2017.) Though not directly relevant to the present study, the need for relatedness has been shown to mediate the relationship between environmental factors and motivation in several domains, such that lowered sense of perceived relatedness indicates less self-determined forms of motivation (e.g., Stults-Kolehmainen, Gilson, & Abolt, 2013).

The motivational domain of interest to the present study is titled “motivation for relationship engagement,” a construct defined by the present author as a willingness to partake in activities which lead to the formation of new friendships or deepening of current bonds. Although SDT has not yet been utilized to examine motivation for relationship engagement, if the observed pattern upholds, it would provide an alternate understanding of how the need for relatedness, in certain populations, does *not* lead to a greater quality motivation to increase goal-directed activity aimed at forming relationships. If this is the case, it could be interpreted as an indication of future attempts at forming relationships: a vicious cycle whereby interpersonal sensitivity contributes to lowered perceived relatedness, resulting in less self-determined forms of motivation to engage in relationships. Furthermore, given the relationship between self-determined motivation and positive and negative affect (e.g., Gillet, Vallerand, Lafrenière, & Bureau, 2013), it is likely that these variables would predict levels of positive and negative affect.

Interestingly, much of the motivation research in the self-determination theory literature has failed to find large effect sizes for the relationship between motivation and positive and negative affect. The present author believes this is because previous self-determination theory motivational measures (e.g., Academic Motivation Scale, Motivation for Exercise, etc.) have

been domain-specific in areas not broad enough to substantially affect psychological well-being. It is the present author's belief that the SDT literature is lacking in a measure of motivation that significantly impacts well-being; thus, it is imperative the author investigates a motivation for relationship engagement that assesses individuals' motivation (or lack thereof) to capitalize on social opportunities to form or deepen interpersonal relationships. While one measure related to this construct has recently been developed (Vanhalst, Luyckx, Stijn, & Soenens, 2018), the authors' vignette approach is rather time intensive and is less precedented in the self-determination theory literature. Thus, the present author aimed to create a measure of motivation for relationship engagement which more closely resembles other SDT measures of motivation, such as the Self-Regulation Questionnaires, etc. Additionally, it is hoped that this measure will be more closely related to well-being than previous measures.

### **Summary and Hypotheses**

In summary, the present study offers a preliminary analysis of several factors which have been previously understudied in the literature. While there is little research connecting interpersonal sensitivity to relatedness, there is reason to suspect that the effect of this personality trait on self-determined motivation would be mediated by perceived relatedness. Additionally, given the nature of motivation as described in the SDT literature, the author believed it was likely that this variable would predict positive affect and negative affect. The author proposes a structural equation model in which the relationship between interpersonal sensitivity and positive and negative affect is fully and partially mediated, respectively, by relatedness satisfaction, relatedness dissatisfaction, relatedness thwarting, and motivation for relationship engagement. The following hypotheses pertain to this model, which is shown in Figure 1.

Hypothesis 1: The hypothesized structural equation model will provide a good fit to the data.

Hypothesis 2: Interpersonal sensitivity will directly negatively predict relatedness satisfaction, but will directly positively predict negative affect, relatedness dissatisfaction, and relatedness thwarting.

Hypothesis 3: Relatedness satisfaction will directly positively predict motivation for relationship engagement. Relatedness dissatisfaction and relatedness thwarting will directly negatively predict motivation for relationship engagement.

Hypothesis 4: Motivation for relationship engagement will directly positively predict positive affect and will directly negatively predict negative affect.

Hypothesis 5: Relatedness satisfaction, dissatisfaction, and thwarting will fully mediate the relationship between interpersonal sensitivity and motivation for relationship engagement.

Hypothesis 6: Motivation for relationship engagement will fully mediate the relation between the relatedness variables (satisfaction, dissatisfaction, and thwarting) and affect variables (positive and negative).

Hypothesis 7: The relationship between interpersonal sensitivity and positive affect will be fully mediated by relatedness variables (satisfaction, dissatisfaction, and thwarting) and motivation. The relationship between interpersonal sensitivity and negative affect will be partially mediated by relatedness variables (satisfaction, dissatisfaction, and thwarting) and motivation.

## CHAPTER 2. LITERATURE REVIEW

The present literature review provides an overview of research relevant to the variables of interest. First, research on the relationship between interpersonal sensitivity and well-being will be presented. Subsequently, literature which suggests interpersonal sensitivity could have implications for relatedness will be reviewed. This discussion will be followed by a review of the studies finding links between relatedness and motivation for relationship engagement, and motivation for relationship engagement and well-being.

### **Interpersonal Sensitivity and Depression**

In Boyce and Parker's classic 1989 study, they note how research on depression frequently focuses on psychosocial and biological determinants. While personality factors could play a crucial role in the onset, course, and expression of depression, the field was lacking in a defined depression-prone personality type. They proposed that interpersonal sensitivity is a trait characterized by a sensitivity to the state of one's interpersonal relationships, indicated by a preoccupation with the mood and behaviors of others. Highly interpersonally sensitive individuals are vigilant about their interactions with other people, and react strongly to real or perceived rejection or criticism. Boyce and Parker identify several component factors which jointly constitute this construct: the first of these is interpersonal awareness, a sensitivity to the perceived impact one has on others whereby one attempt to gauge others' responses to one's behavior. The second factor, need for approval, illuminates the extent to which one desires to please others and to be liked by them. The third factor, separation anxiety, is defined as the tendency to be anxious about one's relationships and to be sensitive to any threats to one's current bonds. The fourth factor is timidity, or a tendency to be unassertive in one's interactions with others. The fifth factor is the fragile inner-self, which Boyce and Parker define as having a

core understanding of oneself as unlikeable and repugnant to others; this sense of oneself is therefore highly affected by positive or negative evaluation.

Given that interpersonal sensitivity was developed to identify a depression-prone personality type, it is necessary to establish a link between this personality construct and depressive symptoms. There are 24 studies linking interpersonal sensitivity as measured and defined by Boyce and Parker (1989) to depression. Nine of these studies assessed the relationship between depression and an exclusively clinical population (Boyce, Hickie, Parker, Mitchell, Wilhelm, & Brodaty, 1992; Davidson, Zisook, Giller, & Helms, 1989; Griens, Jonker, Spinoven, & Blom, 2002; Luty, Joyce, Mulder, Sullivan, & McKenzie, 2002; Mogi & Yoshino, 2017; Ogawa, Shigemura, Yoshino, & Nomura, 2013; Sato, Narita, Hirano, Kusunoki, Sakado, & Uehara, 2001; Vidyanidhi & Sudhir, 2009).

These studies included individuals with clinical depression or another clinical disorder, treatment resistant depression, and depressed patients currently in remission, with mean scores on the Interpersonal Sensitivity Measure (IPSM) for each sample ranging from 81.1 to 106.4. Correlations between depression and interpersonal sensitivity ranged from .27 to .58 ( $p$  values all  $< .01$ .) Some of these studies compared scores on the IPSM for participants with different subtypes of depression (melancholic depression, non-melancholic depression, treatment resistant depression, and depression in remission), or compared participants who did or did not meet thresholds of a different DSMV disorder (i.e., at risk mental state for psychosis). For these group comparisons, significant differences were found, such that participants more clinically at risk had significantly higher scores than participants less clinically at risk, with Cohen's  $d$  ranging from .24 to 1.05.

The remaining 14 studies (Boyce et al., 1991; Dunn, Whelton, & Sharpe, 2012; Giardinelli, Paionni, Zucchi, Viviani, & Cabras, 1999; Hamann, Wonderlich-Tierney, & Vander Wal, 2009; Luterek, Harb, Heimberg, & Marx, 2004; Masillo et al., 2012; Mathew et al., 2014; Matthey, Barnett, Ungerer, & Waters, 2000; McCabe, Blankstein, & Mills, 1999; Otsuka et al., 2017; Rizzo, Dalry, & Gunerson, 2006; Rossetti et al., 2017; Sakado et al., 1999; Wilhelm, Boyce, & Brownhill, 2004) investigated either nonclinical *and* clinical populations, or exclusively nonclinical populations. Correlations between interpersonal sensitivity and depression in nonclinical samples (which included patients who were not depressed, patients not having endured childhood sexual abuse, and patients not clinically at risk for psychosis) ranged from .22 to .56 ( $ps$  all  $< .01$ ) and from .34 to .56 ( $ps$  all  $< .01$ ) for clinical samples (which included clinically depressed patients, patients enduring childhood sexual abuse, and patients at clinical risk for psychosis).

It is worth noting once again that the clinical samples in the ten previous studies were found to have correlations between .27 to .58 ( $ps$  all  $< .01$ ), a range quite similar to both clinical and non-clinical samples in these 14 studies. One of these studies (Rossetti et al., 2017) found strong, but nonsignificant, correlations between interpersonal sensitivity and depression for those with (.73) and without (.73) a history of suicide attempt. Mean scores on the IPSM for each sample ranged from 60.8 and 90.62 for the non-clinical samples and from 68.1 to 108.4 for the clinical samples. For those studies that compared clinical and nonclinical samples, significant differences between groups were found, such that clinical samples had higher scores than the nonclinical samples, with Cohen's  $d$  ranging from .49 to 1.12. This second group of studies is particularly important to the present study because it demonstrates the utility of the interpersonal

sensitivity measure for assessment in a non-clinical sample, such as the one which was used in the present study.

While these links to depression are taken as sufficient to establish a relationship between interpersonal sensitivity and well-being, this construct has also been related to a variety of pathological concerns, such as anxiety (e.g.  $r = .55, p < .01$ ; Rowe et al., 2015), suicide (e.g., Kim & Cincchetti, 2010), and bulimia (e.g.,  $r_s = .38, .31, .43, p_s \text{ all } < .001$ ; Hamann et al., 2009). It is also worth noting research on rejection sensitivity, a construct which is highly similar to and included in the definition of interpersonal sensitivity, as rejection sensitive individuals expect, readily perceive, and overreact to rejection (Downey & Feldman, 1996). Rejection sensitivity has also been related to a variety of mental health concerns. For instance, in Downey and Feldman's famous study (1996), they observed that rejection sensitivity predicted negativity of participants' reactions to a rejection situation ( $r = .52, p < .02$ ); they also found an association between rejection sensitivity and the increase in rejected mood following such rejection situations ( $r = .71, p < .001$ ), even when controlling for pre-manipulation rejected mood. Moreover, in 2017, Gao and colleagues performed a meta-analysis of 75 studies to investigate the relationship between rejection sensitivity and mental health outcomes. Their results found moderate associations between rejection sensitivity and depression (pooled  $r = 0.332; p < 0.001$ ), anxiety (pooled  $r = 0.407; p < 0.001$ ), loneliness (pooled  $r = 0.386; p < 0.001$ ), borderline personality disorder (pooled  $r = 0.413; p < 0.001$ ), and body dysmorphic disorder (pooled  $r = 0.428; p < 0.001$ ). Importantly for the present study, the findings were similar in clinical and nonclinical samples.

### **Interpersonal Sensitivity and Positive and Negative Affect**

The above research points to a strong link between interpersonal sensitivity and well-being. However, remarkably little research has associated this personality trait with positive and negative affect. Crucially, positive and negative affect can be used as an index of well-being for a nonclinical sample, given its strong connections to a variety of disorders. According to Watson, Clark and Tellegan (1988), while positive affect (PA) reflects the feeling of being alert, active, and enthusiastic, negative affect (NA) represents the feeling of distress or aversive mood states like anger, fear, guilt, etc. The absence of one mood factor is not equivalent to the presence of the other: the absence of positive affect is characterized by sadness and lethargy, while the absence of negative affect is considered to be a state of serenity and calmness. Watson and colleagues report how negative affect is related to stress, poor coping, health complaints, and the frequency of unpleasant events, while positive affect is related to social activity, satisfaction, and the frequency of pleasant events.

Since this scale's development, positive affect has continually been related to well-being and inversely related to psychological difficulties with medium to strong effects, and negative affect has been found to be inversely related to a variety of indices of psychological well-being and overall health, also with medium to strong effects (e.g, Beck et al., 2003; Cohen & Pressman, 2006; Crawford & Henry, 2004). For instance, Crawford and Henry (2004) found associations between affect and different measures of depression, with correlations for positive affect ranging from  $r = -.48$  to  $-.52$  and correlations for negative affect ranging from  $r = .44$  to  $.60$  ( $ps$  all  $< .01$ ). They also found scores on anxiety measures to be associated with both positive affect ( $r = -.30, -.31$ ) and negative affect ( $r = .60, .65$ ;  $ps$  all  $< .01$ ). Other research has verified that depression is characterized by low positive affect and high negative affect (Peeters et al.,

2003; Watson et al., 2005), and has also found higher levels of negative affect to be indicative of a more severe ( $\beta = .03$ ,  $SE = .01$ ,  $z = 3.20$ ,  $p < .01$ ) and longer duration ( $\beta = .01$ ,  $SE = .004$ ,  $z = 3.00$ ,  $p < .01$ ) depression. Measures of positive and negative affect have also been used to predict mood disorders more generally (e.g. Cohen et al., 2017) and are associated with suicidal ideation ( $r = -.26$ ,  $.50$ ), insomnia, ( $r = -.18$ ,  $.27$ ), social anxiety ( $-.35$ ,  $.59$ ) and other indicators of well-being, respectively ( $p$  values all  $< .05$ ; Watson et al., 2005). Therefore, it was assumed that positive and negative affect could be effectively used in the present study for the purpose of measuring well-being in a normal sample.

Only one study to date has investigated the relationship between positive and negative affect and interpersonal sensitivity: Smith and Zautra (2001) found that interpersonal sensitivity was related to both positive affect ( $r = -.34$ ,  $p < .05$ ) and negative affect ( $r = .37$ ,  $p < .05$ ). Given the strong links between interpersonal sensitivity and mental health difficulties, and these same difficulties and positive affect and negative affect, the present author believed that interpersonal sensitivity would be related to these indicators of well-being. However, given the specific connections of this trait to indicators of *ill-being*, the author hypothesized that interpersonal sensitivity would have stronger ties to negative affect than to positive affect. Due to this research, the author included a direct path in an otherwise fully-mediated model between interpersonal sensitivity and negative affect.

### **Interpersonal Sensitivity and Relatedness**

In much of the literature on interpersonal sensitivity and rejection sensitivity, correlations have consistently been found between these constructs and loneliness (e.g.,  $r = .39$ , Gao et al., 2017;  $r = .39$ ,  $p < .01$ , Rowe et al., 2015;  $r = .42$ ,  $p < .05$ , Zimmer-Gembeck et al., 2014). Loneliness, a construct strongly correlated with depression (e.g.,  $r = .57$ ,  $p < .01$ , Zimmer-

Gembeck et al., 2014), is also conceptually linked to relatedness. Indeed, loneliness and relatedness both pertain to perceptions of one's level of social connection: loneliness is defined as an unpleasant reaction to a perceived disparity between one's desired and existing social relationships (Perlman, 2004), while relatedness is defined as the need to feel belongingness and connectedness with others (Ryan & Deci, 2000). In support of this notion, Zlomke, Jeter and Cook (2016) found loneliness to be correlated with relatedness ( $r = .35, p < .01$ ). Because the link between loneliness and rejection sensitivity/interpersonal sensitivity is well-established in the literature, and because of the author's specific interest in need satisfaction, dissatisfaction and thwarting, the author chose to proceed using relatedness variables as the sole indicators of social connectedness.

Despite the clear conceptual link between one's need for meaningful social contact and one's sensitivity to social interactions, and the consistent associations between loneliness and interpersonal sensitivity, there is a surprising lack of research linking interpersonal sensitivity to the basic psychological need for relatedness. The first and only study to date which has linked the variables of interpersonal sensitivity as defined by Boyce and Parker (1989) and relatedness as defined by self-determination theory (Deci & Ryan, 2000) was performed in 2015 by Costa, Ntoumanis, and Bartholomew. These researchers investigated the relationship between psychological need satisfaction, dissatisfaction, and thwarting/frustration, noting how previous literature has assumed dissatisfaction and thwarting to be synonymous. Their analyses found support for the separation of need dissatisfaction—which is defined as a lack of the relatedness need being met—and need thwarting—which is more of an active undermining of this need—as well as for the notion that self-determination theory can be used to understand interpersonal sensitivity. Combining measures of perceived levels of autonomy, competence, and relatedness

into a single construct of basic psychological need satisfaction (meaning, not assessing the three needs individually), they found significant correlations between interpersonal sensitivity and their combined measure of basic psychological need thwarting ( $r = .66, p < .001$ ), need dissatisfaction ( $r = .39, p < .001$ ), and need satisfaction ( $r = -.18, p < .01$ ). Because the researchers did not report satisfaction, dissatisfaction, and thwarting of each need individually, further research is necessary to understand the unique contribution of relatedness.

### **Relatedness and Motivation for Relationship Engagement**

In the self-determination theory literature, there is robust support for the relationship between the basic psychological needs and self-determined forms of motivation. For relatedness specifically, several studies in a variety of domains have linked relatedness to different forms of motivation, including intrinsic motivation (e.g.,  $r = .56$ , Jang, Reeve, Ryan, & Kim, 2009;  $r = .53$ , Marinet, Guillet-Descas, & Moiret, 2015;  $r = .45$ , Tripathi & Samantaray, 2011), identified motivation (e.g.,  $r = .40$ , Marinet et al., 2015;  $r = .40$ , Tripathi & Samantaray, 2011), external motivation ( $r = -.31$ , Marinet et al., 2015;  $r = -.15$ , Tripathi & Samantaray, 2011), and amotivation (e.g.,  $r = -.42$ , Marinet et al., 2015), with  $p$  values all less than .05.

However, less studied is the relationship between relatedness and motivation specific for relational activities. Indeed, much of previous motivation literature has focused on motivation for activities related to domains like academics (e.g., Faye & Sharpe, 2008), work (e.g., Olafsen, Deci, & Halvari, 2017), or exercise/sport (e.g., Wilson, Mack, & Grattan, 2008). The present study is interested in motivation pertaining to interpersonal relationships. While few studies have investigated this motivational domain, even fewer have studied the link between this motivational construct and the basic psychological need for relatedness. For instance, Kindelberge and Tsao (2014) and Gaine and La Guardia (2009) developed scales for motivation

in romantic relationships and motivation for relational activities respectively. However, not only are both measures limited to social activities within the context of a romantic relationship, but the authors also failed to assess psychological need satisfaction. Similarly, Okada (2007) investigated motivation for friendships (meaning, one's reasons for engaging in pre-existing relationships), but did not assess autonomy, competence, or relatedness need satisfaction. However, two studies known to the present author did make such associations (Hadden, Rodriguez, Knee, & Porter, 2015; Patrick et al., 2007), finding correlations between relatedness and relational motivation ranging from .51 to .70. These studies suggest the relationship between relatedness need satisfaction and motivation for engaging in relationships is large, but understudied. Moreover, previous measures for motivation in relationships, such as the Friendship Scale (Okada, 2005) or the Couples Motivation Questionnaire (Blais, Sabourin, Boucher, & Vallerand, 1990), have focused on the different reasons one engages in current relationships.

Until quite recently, there were no scales known to the present author assessing motivation for engagement in social opportunities which could lead to the formation of new friendships, or strengthening of current bonds. In January of 2018, Valhalst, Luyckx, Stijn, and Soenens investigated whether chronically lonely adolescents would be more or less likely to engage in social contact when opportunities which could potentially lead to social inclusion presented themselves, compared to their less lonely counterparts. To answer this question, they developed a measure of motivation which required participants to respond to hypothetical vignettes portraying situations of social inclusion and exclusion. When asked whether they would accept the invitation, they were also given five possible motives for doing so derived from self-determined forms of motivation. Using this newly developed measure, they found loneliness

to be correlated with intrinsic motivation ( $r = -.30, p < .001$ ), introjected regulation ( $r = .26, p < .001$ ), external regulation ( $r = .28, p < .001$ ), and amotivation ( $r = .38, p < .001$ ) for accepting the invitation following the social inclusion condition. In other words, when the participants had the opportunity to engage in positive social contact, greater loneliness was associated with more controlled forms of motivation and amotivation for social engagement. While their dependent variable was loneliness, rather than Ryan and Deci's (2000) construct of relatedness, this measure is the closest approximation to the motivational domain of interest to the present study.

### **Relatedness and Well-Being**

There are several studies which link relatedness to a variety of measures of psychological well-being. For instance, León and Liew (2017) found relatedness to one's peers was correlated with three forms of psychological well-being: vitality ( $r = .27, p < .001$ ), self-esteem ( $r = .26, p < .001$ ), and life satisfaction ( $r = .28, p < .001$ ). Relatedness with one's teammates in a team sport context has been studied in relation to subjective vitality, with correlation coefficients ranging from .13, a coefficient which was not statistically significant, to .40 ( $p < .01$ ) (e.g., Reinboth & Duda, 2006). Relatedness has also been negatively correlated with depression (e.g.,  $r = -.61$ , Vansteenkiste, Lens, Soenes, & Luyckx, 2006), and positively correlated with subjective vitality (e.g.,  $r = .60, p < .001$ , Vansteenkiste et al., 2006) and psychological well-being more generally (e.g.,  $r = .68$ , Jiang, Zeng, Zhang, & Wang, 2016;  $r = .60, p < .001$ , Vansteenkiste et al., 2006).

While some studies have associated positive affect and negative affect with psychological need satisfaction more generally (e.g., Unanue, Dittmar, Vignoles, & Vansteenkiste, 2014), 15 studies have linked positive and/or negative affect and relatedness specifically, with small to large effects (Church et al., 2013; Farholm, Hallgeir, Niemiec, Williams, & Deci, 2017; Gunnell, Crocker, Mack, Wilson, & Zumbo, 2014; Jang et al., 2009; Landry et al., 2016; McDonough &

Crocker, 2007; Patrick et al., 2007; Podlog, Lochbaum, & Stevens, 2010; Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017; Sheldon & Filak, 2008; Sheldon & Schüler, 2011; Standage, Duda & Ntoumanis, 2005; Stebbings, Taylor, & Spray, 2011; Vandercammen, Hofmans, & Theuns, 2014; Véronneau et al., 2005).

Given the variability in these scores, it is worth noting certain important differences in the method of these studies, which vary both in how they measure relatedness need satisfaction as well as whether they measure relatedness need satisfaction more globally or specific to a certain domain. In several of the aforementioned studies, relatedness need satisfaction has been associated with positive affect, with correlations ranging from .24 to .40 in adults ( $ps$  all  $< .01$ , Landry et al., 2016; Sheldon & Schüler, 2011; Vandercammen et al., 2014) and .39 to .43 in children ( $ps$  all  $< .01$ , Véronneau, Koestner, & Abela, 2005). Relatedness need satisfaction has been associated with negative affect with a correlation of  $-.22$  in adults ( $p < .01$ , Vandercammen et al., 2014) and  $-.18$  to  $-.33$  in children ( $ps < .05$ , Véronneau et al., 2005). In one of these studies (Sheldon & Filak, 2008), *support* for relatedness need satisfaction was both manipulated and measured, finding correlations to positive affect ( $r = .31$ ,  $p < .01$ ) and negative affect ( $r = -.32$ ,  $p < .01$ ). Some of these studies (Gunnell et al., 2014; Podlog et al., 2010; Stebbings et al., 2011) measured relatedness satisfaction specific to the domain of team sport or exercising. These correlations for positive affect ranged from .08 (non-significant) to .35 ( $p < .05$ ), and for negative affect from  $-.07$  (non-significant) to  $-.17$  ( $p < .05$ ). Given the more specific nature of this exercise relatedness measure, it is logical that its effects on well-being would be less significant.

Alternatively, another study (Jang et al., 2009) reported correlations linking relatedness need satisfaction to positive affect ( $r = .27$ ,  $p < .01$ ) and low relatedness need satisfaction to negative

affect ( $r = .34, p < .01$ ); these researchers also found that relatedness overall was correlated with a proneness to negative affect ( $r = -.15, p < .05$ ).

Church and colleagues in 2013 investigated need satisfaction and positive and negative affect across eight cultures. Correlations to positive affect range from .12 (non-significant) to .48 ( $p < .01$ ), while those to negative affect range from -.08 (non-significant) to -.40,  $p < .01$ .

Interestingly, research in the United States, as well as several other countries, found medium effect sizes between relatedness and positive affect ( $r = .32, p < .01$ ) and negative affect ( $r = -.40, p < .01$ ), and found stronger associations between positive affect and negative affect and relatedness than for positive affect and negative affect and volitional autonomy or perceived competence. One study (Rocchi et al., 2017) investigated need satisfaction in relationships specifically, and also examined differences between need support and need thwarting. They found that relatedness need thwarting was correlated to positive affect with correlations ranging from -.33 to -.46, and to negative affect with correlations ranging from .41 to .45 ( $ps < .001$ ). Relatedness support was found to be correlated with positive affect with correlations ranging from .52 to .54, and to negative affect with correlations ranging from -.32 to -.41 ( $ps < .001$ ). Given that the present study is primarily interested in relationships, the research of Rocchi and colleagues is particularly relevant, and medium effect sizes are expected in the present study.

### **Motivation for Relationship Engagement and Well-Being**

Like relatedness, previous research on self-determination theory has linked motivation to engage in a variety of activities to various indices of well-being. However, limited only to studies that use positive affect and negative affect as indices of psychological well-being, there are 14 studies associating more autonomous forms of motivation with positive affect, and more controlled forms of motivation with negative affect. Importantly, these motivation measures are

each domain-specific. While some of these researchers (Andersson et al., 2016; Gillet et al., 2013; Sheldon & Filak, 2008; Vandercammen et al., 2014) assessed various forms of situational motivation (motivation to engage in an experimental task at a specific point in time), others assessed motivation to engage in learning (Jang et al., 2009; Bonneville-Roussy, Evans, Verner-Filion, Vallerand, & Bouffard, 2017), motivation to engage in smart phone use (Ohly & Latour, 2014), work motivation (Gillet, Becker, Lafreniere, Huart & Fouquereau, 2017), motivation for exercise/sport/physical activity (Bagøien, Halvari, & Nesheim, 2010; Edmunds, Ntoumanis, & Duda, 2008; Gaudreau & Braaten, 2016; McDonough & Crocker, 2007; Rocchi et al., 2017; Tripathi & Samantaray, 2011), and motivation for social values (Ferssizidis et al., 2010).

These studies found that more autonomous forms of motivation were associated with positive affect with small to large effect sizes, and that more controlled forms of motivation were associated with negative affect with small to large effect sizes. The variability in this relationship is thought to be due in part to the differing domains of motivation assessed, given that domains (e.g., exercise, Bagøien et al., 2010; Tripathi & Samantary, 2011) which are more conceptually tied to well-being had stronger correlations than those less conceptually related (e.g., smart phone use, Ohly & Latour, 2014). Additionally, researchers who recently developed and validated a measure titled the comprehensive relative autonomy index (C-RAI, Sheldon et al., 2017) found more consistent correlations to positive affect ( $r = .29, p < .001$ ) and negative affect ( $r = -.31, p < .001$ ), correlations representing multiple samples in a variety of domains (motivation to take responsibility, motivation to attend class, and motivation to study a major). Therefore, this measure of relative autonomy will be used in the present study, and will be discussed in further detail.

### **Interpersonal Sensitivity and Motivation for Relationship Engagement**

To date, there is no research of which the present author is aware which links interpersonal sensitivity to any form of motivation. However, given that the present study will assess a type of motivation specific to relationships, similar to that recently measured by Vanhalst and colleagues (2018), it is hypothesized that interpersonal sensitivity will be significantly indirectly related to motivation for relationship engagement through relatedness.

### **Self-Determination Theory as a Theoretical Framework**

Discussed above are findings supporting the hypothesized links between interpersonal sensitivity, perceived relatedness, motivation for relationship engagement, and well-being. However, these associations are not believed to exist in isolation: indeed, the present hypotheses were formulated with a larger theoretical framework in mind. Self-determination theory, as previously noted, has been used to understand the relationship between exogenous variables, psychological needs, motivation for relationship engagement, and well-being, with both basic psychological needs and motivation for relationship engagement acting as mediators. Before examining the utility of this mediational model for the variables of the present study, it is first necessary to more richly examine these constructs as they are defined by Deci and Ryan (2000), as well as to assess the utility of this model for the present research question.

Self-determination theory regards needs as “essential nutrients” for growth and well-being, as psychological rather than physiological, and as innate organismic necessities rather than acquired motives (Deci & Ryan, 2000). The theory rests on the assumption that human beings are prone to vitality and actualization, so long as the needs of autonomy, competence, and relatedness are attainable; however, any threat to or deprivation of these nutrients will yield non-optimal outcomes for psychological well-being. The theory also assumes that each of the three

needs are important, and that the satisfaction of even two of the three is not sufficient for optimal development.

While the various scales have been developed and validated to measure the satisfaction of volitional autonomy, perceived competence, and relatedness, recent research points to previously untapped facets of basic psychological need satisfaction. Research in the self-determination theory literature notes, first, that need satisfaction is not a unidimensional construct consisting of need satisfaction and reverse coded need dissatisfaction (Neubar & Voss, 2016); and second, that need frustration/thwarting is not the equivalent of need dissatisfaction, or “the extreme pole of the need satisfaction continuum” (pg. 51, Cordeiro et al., 2016). Several other authors (Bartholomew et al., 2011; Cheval, Aï Chalabaev, Quested, Courvoiser, & Sarrazin, 2017; Longo, Gunz, Curtis, & Farsides, 2016; Cordiero, Paixão, Lens, Lacante, & Luyckx, 2016; Chen et al., 2015) have recently followed suit in separating dissatisfaction of needs, understood as the more passive lack of a need being met, and thwarting/frustration of needs, conceptualized as a more active undermining of one’s needs, both from each other and from need satisfaction. These studies have consistently found need thwarting—a previously unmeasured facet of the basic psychological needs—to be detrimental to important outcomes, even resulting in more impoverished functioning than need dissatisfaction (Ryan & Deci, 2017). Because of this research, and the precedent it has set, the present author measured and treated relatedness need satisfaction, dissatisfaction, and thwarting as psychometrically distinct.

Self-determination theory (Deci & Ryan, 2000) also identifies different types of motivation, each which has specific implications for behavioral regulation and well-being. In one mini-theory of their broader SDT, titled “cognitive evaluation theory,” intrinsic motivation is described as behaviors engaged in out of interest without the necessity of an associated positive

consequence. This motivation, in which the behaviors are satisfying in and of themselves, is facilitated by conditions conducive to the satisfaction of the psychological needs. Intrinsic motivation has also been associated with well-being and other positive outcomes (e.g., Benware & Deci, 1981, Valas & Sovik, 1993). Though in the original literature, volitional autonomy and perceived competence are seen as more closely tied to self-determined motivation than relatedness, there is indeed reason to suspect a link between relatedness and more self-determined forms of motivation (especially when the motivational domain is engagement in relationships).

A second mini-theory, titled “organismic integration theory,” accounts for behaviors which are not intrinsically motivated, but which are important in one’s sociocultural context. Extrinsic motivation is described as instrumental behavior—that is, behavior aimed at some contingency or consequence external to the behavior itself. Though this is thus a more controlled form of motivation, Ryan and colleagues (1985) note how individuals can sometimes internalize socially-sanctioned values in order to be self-determined when performing externally regulated activities. This process of internalization involves the identification with and accepting of social values as one’s own to become more integrated both on the societal and intra-psychic level. The extent to which this process is completed represents external, introjected, and identified forms of motivation.

External regulation is when one’s behavior is controlled by external consequences to that behavior; this type of motivation is controlling and undermining of intrinsic motivation, and leads to behaviors which dissipate when contingencies are withdrawn. With introjected regulation, the behavior is still performed for a contingency external to the behavior itself; however, the contingencies which maintain the behavior are administered by the individuals

themselves. Though not self-determined, these regulations are partially internalized, and thus remain more stable over time. Just as introjected regulation is more integrated than external regulation, identified regulation is an even more integrated form of motivation. According to Deci and Ryan (2000), identification is the process through which individuals accept the value of a behavior as their own. Though still instrumental (performed to achieve some external contingency), this is a more self-determined form of regulation. Self-determination theory's conception of motivation also includes a state titled amotivation, in which individuals lack the intention to act entirely.

Self-determination theory also hypothesizes that each of these types of motivation exists on a continuum called the relative autonomy continuum (RAC). The index which measures a person's place on this continuum, called the relative autonomy index (RAI), provides an overall measure by giving positive weights to autonomous forms of motivation (intrinsic, identified, and introjected) and negative weights to controlled forms of motivation (external and amotivation). This model was justified largely on the work of Ryan and Connell (1989), who found a perfect simplex pattern of correlations among each type of motivation in which the highest correlations were found for adjacent motivation types on the continuum.

Given this conceptualization, as well as findings discussed in former sections, scores on the RAI for relationship engagement were hypothesized to impact the present study's measure of positive and negative affect: greater self-determined motivation should be associated with higher positive affect and lower negative affect, while greater controlled motivation should be associated with lower positive affect and higher negative affect.

### **Self-Determination Theory's Mediational Model in the Present Context**

As previously mentioned, these variables of interpersonal sensitivity, relatedness, motivation for relationship engagement, and well-being were hypothesized to exist within the larger framework of mediation, based on past support for similar models. While the present author found no studies to date which address mediation of personality factors and motivation specific for relationship engagement by basic psychological needs, there is robust support for need satisfaction mediating the relationship between exogenous variables and motivation more broadly. Faye & Sharpe (2008) tested two models pertaining to the relationship between need satisfaction, psychosocial development, and academic motivation: the first posited that need satisfaction would predict identity/intimacy, which would then predict academic motivation. The second, derived from self-determination theory, was that identity/intimacy would predict academic motivation, and that this relationship would be mediated by the three needs. The author found support for this latter model, which supports the present hypothesis of mediation by relatedness for the relationship between interpersonal sensitivity and motivation for relationship engagement.

In previous SDT literature, motivation has repeatedly been used as an outcome measure, in which need satisfaction mediates the relationship between environmental factors and motivation (e.g., Riley & Smith, 2011), but also as a mediator (e.g., Álvarez, Balaguer, Castillo & Duda, 2009; Leptokaridou, Vlachopoulos, Papjoannuo, 2015). For instance, Podlog and colleagues in 2015 found that intrinsic motivation, identified regulation, and amotivation mediated the relationship between relatedness need satisfaction and engagement in athletics. More relevant to the present study is the work of McDonough and Crocker (2007), who found that external, introjected, identified, and intrinsic motivation to engage in an exercise activity

(titled “dragon boating”) partially mediated the relationship between relatedness need satisfaction and positive affect and negative affect. These findings are important to the present study, as motivation will serve the purpose of both an outcome variable (in the hypothesized full mediation by relatedness between interpersonal sensitivity and motivation for relationship engagement), and a mediator (between need satisfaction and positive and negative affect).

These theoretical underpinnings and the findings that accompany them are taken as evidence that the current mediational model, in which a personality trait (interpersonal sensitivity) which is believed to inhibit one’s ability to meet one’s need for relatedness is fully mediated by perceived relatedness (satisfaction, dissatisfaction, and thwarting) in its relationship with motivation for relationship engagement, which then fully mediates the relationship between relatedness (satisfaction, dissatisfaction, and thwarting) and well-being (positive affect and negative affect). This model is depicted in Figure 1. However, a review of the original self-determination theory writings illuminates two nuanced differences between the present study and previous research in the area. First, much of the traditional literature includes environmental supports or barriers to the satisfaction of psychological needs. In other words, in our mediational model, some previous researchers would put an environmental factor, such as a friendly university environment, in place of our first variable in the model, interpersonal sensitivity. Second, Ryan and Deci write that volitional autonomy, perceived competence, and relatedness are *each* crucial to well-being; though they offer no prescription that every future study must include a measurement of all three needs, it is implied that the fullest measure of need satisfaction would include volitional autonomy and perceived competence in addition to relatedness.

Addressing this first point, the present author references previous self-determination theory research relating psychological need satisfaction to interpersonal sensitivity (i.e., Costa et al., 2015), as well as previous findings that basic psychological needs mediate relations between a personal, rather than environmental, variable (e.g., “identity”) and motivation (Faye & Sharpe, 2008). Moreover, the present author believed that restricting self-determination theory to the mediation of solely environmental factors and outcome variables unnecessarily limits the scope of the theory’s explanatory power. Indeed, Deci and Ryan describe one such factor which hinders organismic processes as a context which is excessively rejecting (pg. 229, Deci & Ryan, 2000). Given that interpersonal sensitivity is a personality trait which sensitizes individuals to rejection, sometimes resulting in the perception of rejection where none objectively exists, this trait very much fits with the definition of circumstances which act as barriers to psychological need satisfaction. Additionally, Deci and Ryan note how individuals exposed to such non-supportive contexts will develop a defensive or self-protective attitude to cope in these circumstances. Interpersonal sensitivity can be seen as such a defensive and self-protective trait, which according to this theory, would develop out of previously rejection. Given that rejection sensitivity has indeed been found to be linked to childhood maltreatment (e.g., Kim & Cicchetti, 2010; Lansford et al., 2002; Wolfe, Wekerle, Scott, Straatman, & Grasley, 2004), it is thus believed that interpersonal sensitivity fits well into the theoretical framework of self-determination theory, not only as a context which precludes individuals from relatedness need satisfaction, but also as a response to previously unfulfilled needs.

Addressing the second point, the present study was designed to better understand the need for relatedness specifically in the context of interpersonal relationships. Indeed, there is precedence for understanding the unique contribution of a single need, as opposed to measuring

autonomy, competence, *and* relatedness, as it applies to specific circumstances (e.g., Radel, Pelletier, Sarrazin, & Milayavskaya, 2001). Additionally, as previously mentioned, Church and colleagues' (2013) metanalytic study found that relatedness had the strongest association with positive affect and negative affect of the three needs in the United States and several other countries. Thus, the present author believed it was justifiable to include only a measure relatedness in the present study, given its unique relevance to the other variables of interest.

## CHAPTER 3: METHODS

### **Design**

The study design is a cross-sectional correlational design. The predictor variables are interpersonal sensitivity, relatedness satisfaction, relatedness dissatisfaction, relatedness thwarting, and motivation for relationship engagement. The main criterion variables of interest are positive affect and negative affect; the mediator variables are relatedness satisfaction, relatedness dissatisfaction, relatedness thwarting. Motivation for relationship engagement serves as a full mediator between relatedness variables and positive affect, and as a partial mediator between relatedness variables and negative affect. Figure 1 shows the predicted relationships between these variables.

### **Participants**

The target population for this study was undergraduate college students. Data were collected in the fall semester of 2018 from a sample of college students enrolled in introductory psychology courses at Iowa State University. These participants were coordinated via an online research sign-up system and received 1 point of extra credit for taking part in the online 30-minute survey.

The number of parameters can be a helpful gauge of an adequate sample size in structural equation modeling (Jackson, 2003). For structural equation modeling (Figure 1) with 9 paths, 21 parcel/indicator loadings, and 4 correlations among variables, the minimum sample size needed for the present study is 170, according to the standards set by Bentler and Chou (1987) of a 5:1 ratio for sample size to number of parameters. However, given that we expected 50% participation, we planned to sample at least 340 participants. Given that we ceased data

collection at 373 participants, the author concluded they had adequate statistical power for the main analyses.

## Measures

**Interpersonal sensitivity.** Interpersonal Sensitivity was measured using the Interpersonal Sensitivity Measure (IPSM) developed by Boyce and Parker in 1989. The measure consists of 36 four-point Likert items with instructions to rate each item as “very like you,” “moderately like you,” “moderately unlike you,” or “very unlike you,” where higher scores indicate higher levels of interpersonal sensitivity. The IPSM contains five subscales: interpersonal awareness (e.g., “I worry about what others think of me”), need for approval (e.g., “I always notice if someone doesn’t respond to me”), separation anxiety (e.g., “I worry about losing someone close to me”), timidity (e.g., “I avoid saying what I think for fear of being rejected”), and fragile inner-self (e.g., “If people knew what I am really like, they would think less of me”).

In previous research, internal consistency of the measure was estimated for two samples: general practitioner attenders (.86) and for a group of students (.85). In the sample of general practitioner attenders, correlations between the five subscales ranged from .26 to .47 ( $p < .001$ ), with one non-significant relationship between need for approval and fragile inner self ( $r = .08, p > .05$ ). Additionally, the two-week test retest reliability estimate for the overall score ( $r = .70, p < .001$ ) was similar to estimates for neuroticism, a personality measure which is conceptually related to interpersonal sensitivity (Boyce & Parker, 1989). Convergent validity estimates revealed positive associations between interpersonal sensitivity and neuroticism ( $r = .66, p < .001$ ), as well as low self-esteem ( $r = .39, p < .001$ ), though not a strong enough association to suggest these are the same construct. Validity was also assessed for the clinical sample by correlating these individuals scores on the IPSM with clinical judgement, and these two

measures were highly related ( $r = .72, p < .001$ ). This questionnaire can be found in Appendix A. In the present sample, the internal consistency was an alpha of .88 for the overall score of the Interpersonal Sensitivity Measure.

**Relatedness satisfaction.** Perceived relatedness satisfaction, or the extent to which participants feel their need for connectedness and is met, was measured using relatedness items from the modified version of the Basic Psychological Needs Satisfaction Scale—General Version (BPNS-general version; Ilardi, Leone, Kasser, & Ryan, 1993) used by Costa and colleagues (2015). Costa and colleagues' need satisfaction scale included items for autonomy, competence, and relatedness, but used only the 12 positively worded items from the scale of Ilardi and colleagues (1993). This was because the negatively worded items on that original scale contained a mix between dissatisfaction and thwarting of the psychological needs. For these 12 items making up the autonomy, competence, and relatedness need satisfaction scale of Costa and colleagues (2015), participants responded on a 7-point Likert scale ranging from 1 (“not true at all”) to 7 (“very true”). Higher scores on this measure indicate a greater level of perceived need satisfaction. A confirmatory factor analysis indicated good model fit [ $\chi^2(51) = 219.07; p < .001$ , S-B  $\chi^2(51) = 134.64, p < .001$ ; CFI = .95; RMSEA = .06 (90 % CI = .05–.07)] and all items demonstrated satisfactory factor loadings. However, only the 5 items measuring relatedness satisfaction were taken from this 12-item scale for use in the present study. These five items can be found in Appendix B, an example of which is, “People in my life care about me.” In the present sample, the internal consistency of the relatedness satisfaction subscale was an alpha of .83.

**Relatedness dissatisfaction.** Relatedness dissatisfaction, or the extent to which participants feel their need for belongingness/connectedness is unmet, was measured using the

relatedness items from a scale developed by Costa and colleagues (2015). They developed the 15 items of this scale (measuring need dissatisfaction for autonomy, competence, and relatedness) by re-writing six items from the BPNS-modified version of Ilardi et al., 2013 (e.g., “I generally feel free to express my ideas and opinions” was re-written as “I usually feel like I have to keep my ideas and opinions to myself”) as well as creating nine new items that measured the construct of interest. Participants responded on a 7-point Likert scale ranging from 1 (“not true at all”) to 7 (“very true”), where higher scores on this measure indicate a greater level of perceived need dissatisfaction. A confirmatory factor analysis indicated acceptable model fit [ $\chi^2(87) = 501.41, p < .001$ ; CFI = .93; RMSEA = .08 (90 % CI = .07–.09)], and all items demonstrated satisfactory factor loadings. Of this 15-item scale measuring dissatisfaction of all three needs, only the 5 items measuring relatedness was used in the present study. An example of a relatedness dissatisfaction item is “I don’t usually have a lot of opportunity to interact with other people.” These items can be found in Appendix C. In the present sample, the internal consistency of the relatedness dissatisfaction subscale was an alpha of .83.

**Relatedness thwarting.** Psychological need thwarting, or the extent to which participants feel their need for belongingness/connectedness is actively undermined, was measured using Costa and colleagues’ (2015) adapted version of the 12-item Psychological Need Thwarting Scale (PNTS; Bartholomew et al., 2011), a scale developed to assess thwarting of the three needs in sport. The stems of this scale were modified by Costa and colleagues to tap life experiences of thwarting, as opposed to experiences limited to sport. A confirmatory factor analysis indicated good model fit [ $\chi^2(51) = 226.46, p < .001$ ; S-B  $\chi^2(51) = 154.78; p < .001$ , CFI=.95; RMSEA = .07 (90% C I= .06 – .08)] and all items demonstrated satisfactory factor loadings. Of these 12 items measuring thwarting of all three needs, only the four relatedness need thwarting items was

used in the present study, and example of which is “I feel I am rejected by those around me.” These items can be found in Appendix D.

It is worth noting that there are other scales which separate need frustration, satisfaction and dissatisfaction, and could be used for the purposes of the present study (Chen et al., 2015). However, of particular interest to the present author is the research of Costa and colleagues (2015), given that they found a relation between these constructs and interpersonal sensitivity. The measures of Costa and colleagues (2015) and Chen and colleagues (2015) are highly similar; both were developed in 2015 to measure the understudied construct of need thwarting, as it is called by Costa and colleagues, and need frustration, as it is called by Chen and colleagues. Besides slight wording differences on the items themselves, the main difference between these measures is that the scale of Chen and colleagues contains measures only for need satisfaction and need frustration, while that of Costa and colleagues also contains measures specific to need dissatisfaction, which is assumed to be different from reverse-coded need satisfaction. Given recent arguments mentioned above that need satisfaction and dissatisfaction are distinct constructs, as well as the fact that responses to the measure of Costa and colleagues has been significantly related to interpersonal sensitivity, the present author used the measure of Costa, Ntomanis, and Bartholomew (2015). In the present sample, the internal consistency of the relatedness thwarting subscale was an alpha of .89.

**Motivation for Relationship Engagement.** Motivation for relationship engagement, understood by the present author as motivation to form or deepen relationships with others, was measured in the present context using a modified version of the Comprehensive Relative Autonomy Index (C-RAI, Sheldon, et al., 2017). The C-RAI was developed by consulting all existing relative autonomy index scales currently published (e.g., The Academic Self-Regulation

Questionnaire, Exercise Self-Regulation Questionnaire, etc.) and performing hierarchical cluster analysis to establish a set of items representing different facets of motivation. The result of these analyses were 24 seven-point items, which participants rate how true the items are for them (1 = not at all true; 7 = very true), where higher scores on each subscale indicate greater adherence to that motivation type, and higher combined RAI scores indicate more self-determined forms of motivation.

The scale presented by Sheldon and colleagues (2017) includes only generic question/item stems, and is meant to be modified to be used in a variety of domains. Each item represents a possible answer to a general question, originally “Why do you do X,” but modified for the present purposes to be, “Why do you seek out close friendships.” The items, modified to a novel relational domain for the present study, fall on six factors which range on a continuum from most to least self-determined: intrinsic motivation (e.g., “Because I enjoy seeking out friendships”), identified regulation (e.g., “Because I strongly value having close friendships”), positive introjection (e.g., “Because having friends I am close to boosts my self-esteem”), negative introjection (e.g., “Because I would feel guilty if I didn’t have any friends”), external regulation (e.g., “Because people will like me better if I have close friends”), and amotivation (e.g., “Honestly, I don’t know why I would try to seek out close friendships”). The full scale can be found in Appendix E.

Sheldon and colleagues (2017) calculated reliability estimates for each of these six subscales for four samples ranging from .87 to .89 for intrinsic motivation, from .73 to .86 for identified regulation, from .68 to .82 for positive introjection, from .77 to .86 for negative introjection, from .61 to .88 for external regulation, and from .80 to .91 for amotivation. Given that Sheldon and colleagues found the aggregate unweighted relative autonomy index to be the

most efficient indicator of motivational quality, the relative autonomy index for participants was calculated by adding/subtracting mean scores for each subscale in the following way: Intrinsic + Identified + Positive Introjection - Negative Introjection - External - Amotivation. Additionally, the confidence intervals for items from adjacent scales on the continuum (e.g., intrinsic and identified regulation items) did not overlap, confirming discriminant validity of the subscales for different motivation types.

This scale was chosen despite recent questioning of the relative autonomy continuum (e.g., Chemolli & Gagné, 2014), due to the comprehensive analyses performed which validate and reaffirm the continuum structure of motivation which places more self-determined (autonomous) forms of motivation on one end of the spectrum, and non-self-determined (controlled) forms of motivation on the other. It was also chosen due to its generic structure, which can then be modified to be applied to different domains (one of which, according to Sheldon and colleagues, is relationships). Additionally, Sheldon and colleagues found that the aggregate C-RAI score was a superior predictor of well-being: raw aggregate scores on the C-RAI were found to be correlated with positive affect ( $r = .29, p < .001$ ) and with negative affect ( $r = -.31, p < .001$ ). These values were substantially higher than correlations to well-being for the individual subscales, with coefficients ranging from  $-.22$  to  $.28$  ( $p$  values all  $< .001$ ) for positive affect and from  $-.16$  to  $.24$  for negative affect ( $p$  values all  $< .001$ ). However, several of the subscales had non-significant correlations to positive and negative affect, as low as  $r = .00$ . This suggests that the aggregate unweighted relative autonomy index is the most unbiased and efficient tool for use in the present study. The C-RAI for motivation for relationship engagement in the present sample was estimated to have an internal consistency of  $.84$ .

**Positive affect and negative affect.** Positive affect (PA) and negative affect (NA) were measured using the Positive and Negative Affect Schedule questionnaire (PANAS; Watson et al., 1988). The scale is composed of 10 PA items (e.g., attentive, alert, excited) and 10 NA items (e.g., distressed, irritable, nervous). The general format of the scale was administered, which asks participants, “To what extent do you generally feel this way.” Participants respond by rating each affective state on a 5-point scale from 1 (Very slightly or not at all) to 5 (Extremely). Thus, higher scores on this scale indicate more reported positive or negative affect.

These 20 items were selected by Watson and colleagues after choosing the purest markers of each primary mood factor of a large number of items (57-65). Internal consistency estimates for PA and NA in a sample of 663 was .88 for PA and .87 for NA when asked about how their affective states in general. Similar estimates were found for 164 employees who rated how they felt in the past few weeks, with alphas of .86 for PA and .87 for NA. Though the sample size was small ( $N = 61$ ), they also assessed the reliability of these scales for a psychiatric population, finding alphas of .85 for PA and .91 for NA. Additionally, these psychiatric patients retook the measure after one week, yielding high test-retest reliabilities of .81 for NA and .79 for PA. These items can be found in Appendix F. In the present sample, items on the PANAS pertaining to PA were found to have an internal consistency of .88, while those pertaining to NA were found to have an internal consistency of .84.

**Center for Epidemiologic Studies Depression scale-Revised.** The Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977) was created to measure depression in the general population. A highly cited revised form of the CES-D was created by Eaton, Smith, Ybarra, Muntaner, and Tien (2004) with the goal of more reliably reflecting general dysphoria as well as the primary symptoms of a major depressive episode according to

the DSM-IV. The revised form contains 20 items, an example of which is, “I lost interest in my usual activities.” Generally, these revisions included removal of items which are now conceptualized as irrelevant to conceptualizations of depression, while items were added to reflect the experience of anhedonia, psychomotor agitation/retardation, and suicidal ideation. They also added an additional option for frequency, “Every day for the last two weeks.”

While Eaton and colleagues (2004) found this to be a reliable and valid measure, more recently, Van Dam and Earleywine (2011) assessed the validity of this measure in a large community sample ( $N = 7389$ ) and an undergraduate college student sample ( $N = 245$ ). Internal validity of the scale in community and student samples was very strong, with alphas of .92 and .93, respectively. To establish convergent validity, Van Dam and Earleywin assessed whether the CESD-R would positively correlate with a measure of anxiety which has been shown to be highly correlated with depression (State-Trait Inventory for Cognitive and Somatic Anxiety; Gröss et al., 2007), and a measure of schizotypal personality (Schizotypal Personality Questionnaire—Brief; Raine & Benishay, 1995). In both samples, the authors found large positive correlations between CESD-R and anxiety ( $r_s = .74, .65$ ) and moderate positive correlations between CESD-R and schizotypal personality ( $r_s = .44, .43$ ). Additionally, the author established divergent validity by assessing the relationship between scores on the positive affect subscale of the PANAS with CESD-R in the second sample, finding moderate negative correlation between these two variables ( $r = -.26$ ). Additionally, an algorithmic scheme identified a base rate for depression which was very similar to the largest known epidemiological study of depression (Hasin et al., 2005). The scale can be found in Appendix G. In the present study, the internal validity of the CESD-R was an alpha of .93.

**Demographics.** The demographic measures included age, sex, ethnicity, year in school, relational status, and family support, as shown in Appendix H.

### **Procedure**

Iowa State University's Institutional Review Board approval was obtained (Appendix J) prior to the dissemination of the study to participants, who were recruited through SONA, the Department of Psychology's online system for participation in research projects. The 373 undergraduate students participating in the study received one research credit for their participation in the study. Through the online survey platform, Qualtrics, students were presented with an informed consent document (see Appendix I), followed by the survey containing demographic questions, the Interpersonal Sensitivity Measure, the modified BPNS relatedness satisfaction subscale, the modified BPNS relatedness dissatisfaction subscale, the modified PNTS relatedness thwarting subscale, the adapted C-RAI for relationship engagement, and the PANAS, all of which are discussed above and presented in the corresponding appendices. Following their completion of these measures, participants were debriefed regarding the purpose and hypotheses of the study and thanked for their participation.

### **Hypotheses**

The following hypotheses pertain to Figure 1. See Table 1 for measures used to operationalize these constructs.

Hypothesis 1: The hypothesized structural equation model will provide a good fit to the data.

Hypothesis 2: Interpersonal sensitivity will directly negatively predict relatedness satisfaction, but will directly positively predict negative affect, relatedness dissatisfaction, and relatedness thwarting.

Hypothesis 3: Relatedness satisfaction will directly positively predict motivation for relationship engagement. Relatedness dissatisfaction and relatedness thwarting will directly negatively predict motivation for relationship engagement.

Hypothesis 4: Motivation for relationship engagement will directly positively predict positive affect and will directly negatively predict negative affect.

Hypothesis 5: Relatedness satisfaction, dissatisfaction, and thwarting will fully mediate the relationship between interpersonal sensitivity and motivation for relationship engagement.

Hypothesis 6: Motivation for relationship engagement will fully mediate the relation between the relatedness variables (satisfaction, dissatisfaction, and thwarting) and affect variables (positive and negative).

Hypothesis 7: The relationship between interpersonal sensitivity and positive affect will be fully mediated by relatedness variables (satisfaction, dissatisfaction, and thwarting) and motivation. The relationship between interpersonal sensitivity and negative affect will be partially mediated by relatedness variables (satisfaction, dissatisfaction, and thwarting) and motivation.

## CHAPTER 4: RESULTS

**Preliminary Analyses**

**Missing data.** First, items which had 20% or more of data missing were omitted. No items met this criteria. Of the 373 participants that started the study, participants who did not complete at least 80% of the items were dropped: 21 met this criteria. Additionally, one item was included at the end of the study which informed participants that the researchers wished to only analyze data from participants who had actively paid attention to the study (rather than marking random responses or knowingly responding with incorrect information). This item asked participants if the researchers should use their data in analyses, or if they were not answering to the best of their ability and their responses should be excluded. Seven participants responded that their data should not be used for analyses, although several of these would have been removed anyway due to not meeting other criteria. Additionally, SPSS was used to calculate Mahalanobis distances for the variables, and 6 multivariate outliers were subsequently removed. Finally, 2 univariate outliers were removed ( $n = 1$  for negative affect,  $n = 1$  for relatedness satisfaction).

After missing data and outlying responses had been removed, mean scores of all scales were computed when more than 50% of the items had been completed. No participant failed to complete more than 50% of the items on a scale, and thus all mean scores were computed. Because of this fact, Little's missing completely at random test was not computed using mean scores. For individual items on these measures, missing data ranged from 0% to .3% for responses to the PANAS, from 0% to 1% for responses to the CESD, from 0% to .5% for responses to the C-RAI for relationship engagement, from 0% to .5% for responses to the IPSM, from 0% to .3% for response to the relatedness satisfaction subscale, from 0% to .3% for responses to the relatedness dissatisfaction subscale, and from 0% to 1% for responses to the

relatedness thwarting subscale. On all subscales, the overwhelming majority of items had zero missing cases.

Because Mplus would be utilizing parcels for analyses, missing data were also assessed for individual parcels (the calculation of these parcels will be described below). Parcels were created when participants answered at least 50% of the items on that parcel. The vast majority of parcels had 0 missing cases, but there were a few exceptions: Relatedness Thwarting Parcel 2 had two missing cases, Relatedness Thwarting Parcel 3 had one missing case. It is logical that the relatedness parcels would have greater incidences of missing cases than the mean score of relatedness variables due to the low number of items in the subscales. For instance, because the scale for relatedness thwarting has 4 items, two of the thwarting parcels only contain one item, meaning that if that item was unanswered, the parcel would be coded as missing. Altogether, the extremely low percentage of missing data leads the author to conclude that missing data are not problematic for the present sample. For main analyses, full information maximum likelihood was utilized to estimate parameters based on complete data and implied values of missing data (Schlomer, Bauman, & Card, 2010).

**Descriptive Statistics and Correlations.** First, descriptive statistics on demographic variables were assessed to ensure that all variables were in range. Then, means, standard deviations and correlations among variables of interest were calculated (Table 2). As seen in Table 2, all variables in the study were significantly correlated with all other variables at a level of  $p < .001$ .

Interpersonal sensitivity had moderate positive correlations with relatedness dissatisfaction, relatedness thwarting and negative affect ( $r_s = .37, .44, .46$ ). Relatedness satisfaction had a strong negative correlation with relatedness dissatisfaction and thwarting ( $r_s =$

-.63, -.61) and a strong positive correlation with motivation ( $r = .59$ ). Relatedness satisfaction had a moderate positive correlation with positive affect ( $r = .44$ ) and a moderate negative correlation with negative affect and depression ( $r_s = -.36, -.34$ ). Relatedness dissatisfaction had a strong positive correlation with relatedness thwarting ( $r = .74$ ), and had a strong negative correlation with motivation and positive affect ( $r = -.59, -.48$ ). Relatedness dissatisfaction also had a moderate positive correlation with depression and with negative affect ( $r_s = .45, .51$ ). Relatedness thwarting had a strong negative correlation to motivation ( $r = -.51$ ), and moderate negative relationship with positive affect ( $r = -.39$ ); it had moderate to strong positive correlations with negative affect and depression ( $r_s = .54, .47$ ).

Motivation for relationship engagement had a moderate positive correlation with positive affect ( $r = .39$ ) and a moderate negative relationship with negative affect and depression ( $r_s = -.39, -.33$ ). Positive affect had moderate negative correlations with negative affect and depression ( $r_s = -.34, -.48$ ). Depression had a strong positive correlation with negative affect ( $r = .61$ ).

Interestingly, while the author expected similar but distinct relationships between relatedness dissatisfaction and thwarting and other variables of interest, the correlations suggest quite similar relationships between these relatedness variables and other variables of interest. For example, previous literature in interpersonal sensitivity suggested that the experience of relatedness thwarting would be uniquely relevant to individuals with this personality trait (Costa et al., 2015); thus, the author was expecting a stronger negative correlation between relatedness thwarting and interpersonal sensitivity than between relatedness dissatisfaction and interpersonal sensitivity. While it was true that scores on the correlation between thwarting and IPS was numerically higher than that between dissatisfaction and IPS ( $r_s = .44$  and  $.37$ , respectively;  $Z = -1.99, p = .02$ ), this was one of few differences between the correlations. Indeed, dissatisfaction

and thwarting were not only very strongly correlated at a level of  $r = .74$ , but they also had nearly identical correlations to negative affect ( $r_s = .51, .54$ ), depression ( $r_s = .45, .47$ ), and relatedness satisfaction ( $r_s = -.63, -.61$ ).

**Gender differences.** Correlations were examined using a z-test for significance of difference between the correlations for men vs. women. To control for Type I error, a Bonferonni correction of  $p < .007$  was utilized. No differences in correlations were found to be significant ( $p < .007$ ). Mean differences on all variables of interest for males and females were also assessed via independent samples *t*-tests. Using a Bonferonni correction of  $p < .007$  to control for Type I error, no mean scores were found to be significantly different. Because of this, the author concludes that there were no meaningful differences between male and female samples.

**Differences by relationship status.** Correlations were also examined using a z-test for significance of difference for participants who listed their relational status as single ( $n = 192$ ) or partnered, which included responses “In a relationship,” “engaged,” or “married” ( $n = 141$ ). Because perceptions of one’s current relatedness, as well as one’s desire to seek out future social connections, might have been impacted by relationship status, the author wished to ensure there were not differences for these groups on variables of interest. No differences in correlations were found to be significant. Mean differences on all variables of interest for single and partnered participants were also assessed via independent samples *t*-tests. Using a Bonferonni correction of  $p < .007$  to control for Type I error, no mean differences were found to be significant. Thus, it was concluded that there were no meaningful differences between participants who were single or involved in a romantic relationship.

**Normative comparisons.** The author was interested in whether demographic characteristics of the present sample were consistent with those of the University more broadly,

as well as other studies published in this area. According to Iowa State University's report of fall enrollment in 2018, 43% of University students are women and 57% are men. 14% of students identify as racial/ethnic minorities. The present study contained 72.3% females and 26.8% males, 85.4% White/Caucasian students, and 14% racial/ethnic minority students. While the racial and ethnic makeup is the same percentage as that of the overall population of students at ISU, women appear to be overrepresented in the sample. A chi square difference test on these percentile differences for women in the present sample and at ISU (which is equal to 29.3%) was significant:  $\chi^2(1) = 115.16, p < .001, 95\% \text{ CI } [24.28, 33.83]$ .

Additionally, the author was interested in comparing mean scores on the measures utilized in the present study to scores in similar samples. To be considered a meaningful clinical difference, Cohen's  $d$  greater than or equal to .5 was used as the criterion defined by Cohen (1988) as a medium effect. One study which recently collected data on positive affect and negative affect in a similar sample of 294 undergraduate college students from a large midwestern university was Novakovic and Gnilka (2015). With a sample size of 294, the mean of PA reported by Novakovic and Gnilka was 37.83, with a standard deviation of 5.81. This was significantly different ( $p < .001$ ) from the present sample's mean (35.13,  $SD = 6.76$ ). However, the difference was not meaningful (Cohen's  $d = .43$ ). In this same comparative sample, the mean of negative affect was 20.85, with a standard deviation of 6.26. Although it was significantly different ( $p = .002$ ) from the present sample ( $M = 22.44, SD = 6.90$ ), once again, the difference was not meaningful (Cohen's  $d = .24$ ).

Two studies which administered Boyce and Parker's (1989) IPSM were deemed to be the most demographically similar to the present sample. The first (Hamann, Wonderlich-Tierney, & VanderWall, 2008) reported subscale means (rather than a total sum score) of the IPSM on a

sample of female undergraduate college students in the Midwest. When comparing the subscale means to those of females in the present study, three of the means were not significantly different (Interpersonal awareness:  $p = .39$ ; Need for approval:  $p = .08$ ; Timidity:  $p = .94$ ). The scores for separation anxiety were significantly different ( $p < .01$ ;  $M = 18.16$ ,  $SD = 4.84$ ) from those of the present study ( $M = 20.08$ ,  $SD = 4.73$ ), although it was less than a medium effect and thus not meaningful (Cohen's  $d = .40$ ). Additionally, the mean for fragile inner self was significantly different ( $p = .01$ ,  $M = 9.04$ ,  $SD = 3.29$ ) from that of the present study ( $M = 10.04$ ,  $SD = 3.78$ ). Once again, Cohen's  $d$  suggests this difference is not meaningful (Cohen's  $d = .28$ ). Because this sample only included females, the present study was also compared to McCabe and colleagues (1999), who tested interpersonal sensitivity in 133 male and female English-speaking undergraduate students in Toronto. Their reported mean ( $94.22$ ,  $SD = 14.26$ ) was more similar to that of the present study ( $M = 98.12$ ,  $SD = 14.89$ ); although significantly different ( $p = .01$ ), Cohen's  $d$  suggests that such is not a meaningful difference (Cohen's  $d = .27$ ).

There was not a significant difference ( $p = .48$ ) between the present samples scores on the C-RAI—motivation for relationship engagement ( $M = 5.68$ ,  $SD = 2.85$ ) and another recent study conducted on undergraduate students at a large midwestern university who utilized the C-RAI in a different domain (C-RAI—motivation for studying abroad;  $M = 5.90$ ,  $SD = 3.10$ ; Yang, Zhang, & Sheldon, 2018).

Costa and colleagues (2015) utilized the exact subscales used in the present study for relatedness variables, although the sample for which these scales were used did not solely consist of college students. Their participants, who were recruited for an online study via Mechanical Turk, did have significantly ( $p < .001$ ) and meaningfully different scores for relatedness satisfaction ( $M = 4.97$ ,  $SD = 1.09$ ; Cohen's  $d = .77$ ), dissatisfaction ( $M = 3.69$ ,  $SD = 1.36$ ; Cohen's

$d = .62$ ), and thwarting ( $M = 3.81$ ,  $SD = 1.41$ ; Cohen's  $d = .67$ ) from those of the present study ( $M = 5.73$ ,  $SD = .98$ ;  $M = 2.88$ ,  $SD = 1.23$ ;  $M = 2.86$ ,  $SD = 1.41$ , respectively). This suggests that participants in the present study were reporting greater levels of satisfaction and lower levels of dissatisfaction and thwarting in their relationships than participants in Costa and colleagues' study.

Due to these differences, studies were located which included more demographically similar samples to the present study, although these studies did not contain the exact subscales for dissatisfaction and thwarting. For instance, Cho and colleagues (2015) investigated basic psychological relatedness satisfaction (although not dissatisfaction and thwarting) in undergraduate college students from a large midwestern university. These author found nearly identical results ( $M = 5.74$ ,  $SD = .93$ ) to the present study ( $M = 5.73$ ,  $SD = .98$ ) which did not constitute a significant or meaningful difference ( $p = .90$ ; Cohen's  $d = .01$ ). Thus, it is believed that the current findings of relatedness fit with other studies of undergraduate college students, although the novelty of the specific measure of relatedness used by the present author prevents a more direct comparison.

For the measure of CESD used in the present study, one similar study was conducted on Midwestern undergraduate college students by Hamann and colleagues in 2008. Their mean CESD score ( $M = 16.48$ ,  $SD = 10.80$ ) was not significantly different ( $p = .20$ ) from that of the present study ( $M = 13.75$ ,  $SD = 11.72$ ).

### **Main Analyses**

Hypothesized relations between variables can be seen in Figure 1. Structural equation modeling was utilized to assess the hypothesized model using Mplus version 7.4 (Muthén & Muthén, 2012). The first step of Anderson and Gerbin's (1988) established two-step method

involves performing a confirmatory factor analysis to assess whether a measurement model is an acceptable fit to the data. To determine model fit, the author used the standards of Hu and Bentler (1999) of a comparative fit index (CFI) of .95 or greater, a root-mean-square error of approximation (RMSEA) of .06 or less, and a standardized root-mean-square residual (SRMR) of .08 or less.

*Measurement issues.* Prior to performing main analyses, the author wished to address some concerns regarding measurement of the constructs of interest. The author noted a strong positive correlation between relatedness dissatisfaction and relatedness thwarting ( $r = .74$ ), and also noticed similar mean scores between the two ( $M = 2.89, SD = 1.24; M = 2.86, SD = 1.41$ ) as well as other constructs correlating similarly with relatedness dissatisfaction and relatedness thwarting as described above. Because of this, the author was concerned that participants may not have differentiated between their responses for relatedness dissatisfaction items (e.g., “I tend to feel distant from other people”) and relatedness thwarting items (e.g., “I feel I am rejected by those around me”). Thus, the author ran several exploratory oblique and orthogonal factor analyses via the principal axis factoring extraction method (i.e., without specifying the number of factors, specifying 3 factors, 2 factors, and a unitary factor) on the relatedness items. After discovering that the two factors were correlated with one another ( $r = .59$ ), the author moved forward with a Promax rotation. These analyses suggested that a two-factor solution was the best fit to the data, as only the first and second factor had scree values greater than 1. As shown by Table 10 and 11 which present the pattern and structure matrices, respectively, the items loaded on two correlated factors (satisfaction and dissatisfaction/thwarting). There was no evidence for a third factor.

Despite theoretical reasons, as well as previous research, which led the author to suspect that relatedness dissatisfaction and thwarting would be distinct constructs (e.g., Costa et al., 2015; Chen et al., 2015), the author decided to treat the dissatisfaction and thwarting of relatedness as one overall construct representing individual's perception of feeling distant from and rejected by others. When combining the five items on the relatedness dissatisfaction and the four items from the relatedness thwarting subscales, the internal consistency estimate of .91 provided additional evidence for this decision. Thus, the analyses proceeded to utilize this "relatedness dissatisfaction/thwarting" construct instead of the two separate subscales. This revised hypothesized model is shown in Figure 2.

The author also had to determine how best to approximate the latent variables of Interpersonal Sensitivity, Relatedness Satisfaction, Relatedness Dissatisfaction, Relatedness Thwarting, Motivation for Relationship Engagement, Positive Affect, and Negative Affect. One method of doing so is to use subscales of a broader scale as "indicators" of the latent construct. Given that two of the scales in the present study (i.e., the Interpersonal Sensitivity Measure of Boyce and Parker, 1989; the C-RAI for Relationship Engagement of Sheldon and colleagues, 2017) are composed of subscales, the author considered using such as indicators for the corresponding latent constructs. However, a measurement model which used indicators for interpersonal sensitivity and motivation for relationship engagement was a poor fit to the data ( $\chi^2(215, N = 343) = 1179.35, p < .001, CFI = .77, RMSEA = .11, SRMR = .15$ ). Thus, the author chose to move forward with a model which used parceling for all latent constructs, which proved to be a good fit to the data ( $\chi^2(120, N = 343) = 231.17, p < .001, CFI = .97, RMSEA = .05, SRMR = .05$ ).

**Measurement model.** Prior to testing a measurement model with the changes discussed above (i.e., treating relatedness dissatisfaction and relatedness thwarting as single constructs and utilizing parcels for all latent constructs), these “parcels” first had to be created in SPSS version 24. A common form of creating such parcels is outlined by Russell, Kahn, Spoth, and Altmaier (1998) and has become common practice in SEM research. Although this method does have some conceptual drawbacks (Little, Cunningham, Sbhahar, & Widaman, 2002), there is general support even among critics. Creating three parcels as observed indicators of each latent construct avoids having to use each individual item on a scale as an indicator, which would require an enormous amount of parameters to be calculated (and thus, participants to be sampled). Additionally, the procedure utilized in the present study allows for approximately equal factor loadings for each parcel.

Using the procedure outlined by Russell and colleagues (1998), factor analysis was performed extracting a single factor via the maximum likelihood method. With the factor loadings rank-ordered by their absolute value, the items were assigned to three parcels such that each parcels’ average loading would be approximately equal. In this way, three parcels were created for Interpersonal Sensitivity, Motivation for Relationship Engagement, Relatedness Satisfaction, Relatedness Dissatisfaction/Thwarting, Positive Affect, and Negative Affect.

Once these parcels were established, the author proceeded with the main analyses in SEM. Confirmatory factor analysis of the measurement model was undertaken in Mplus 7.4, comparing fit statistics to the aforementioned standards of Hu and Bentler (1999) of a comparative fit index (CFI) of .95 or greater, a root-mean-square error of approximation (RMSEA) of .06 or less, and a standardized root-mean-square residual (SRMR) of .08 or less.

The measurement model was estimated to be a good fit to the data ( $\chi^2(120, N = 343) = 231.17, p$

< .001, CFI = .97, RMSEA = .05, SRMR = .05). The exception to this good fit was the fact that the chi square was high and the  $p$  value significant. However, such is unsurprising due to the large sample size of the present study, which has been found to influence the chi square value (e.g., Byrne, 2001; Kline, 2011; Bergen, 2015). Thus, significant chi square values in subsequent models were regarded as unsurprising and unproblematic by the present author.

**Structural Model.** Thus, the author proceeded to the second step of structural equation modeling, which tests a structural model between the latent factors. The hypothesized partially mediated structural model is shown in Figure 2. When this model was assessed, it yielded a good fit to the data ( $\chi^2(126, N = 343) = 290.72, p < .001, CFI = .96, RMSEA = .06, SRMR = .08$ ). The Satorra Bentler corrected chi square statistic factor was  $\chi^2(126, N = 343) = 324.13, p < .001$ . Figure 3 depicts the standardized beta coefficients, with statistically significant parameters indicated by solid lines ( $p < .05$ ).

The first three hypotheses were addressed by examining the structural model shown in Figure 3. Note that the only change to the original hypotheses is that relatedness dissatisfaction and thwarting are combined into one construct.

*Hypothesis 1: The hypothesized structural equation model will provide a good fit to the data.*

This hypothesis was supported. As previous stated, the hypothesized structural model provided a good fit to the data ( $\chi^2(126, N = 343) = 290.72, p < .001, CFI = .96, RMSEA = .06, SRMR = .08$ ).

*Hypothesis 2: Interpersonal sensitivity will directly negatively predict relatedness satisfaction. Interpersonal sensitivity will directly positively predict relatedness dissatisfaction/thwarting and negative affect.*

This hypothesis was supported. Interpersonal sensitivity was significantly negatively predictive of relatedness satisfaction ( $\beta = -.23$ ), and significantly positively predictive of relatedness dissatisfaction/thwarting ( $\beta = .50$ ) and negative affect ( $\beta = .41$ ).

*Hypothesis 3: Relatedness satisfaction will directly positively predict motivation for relationship engagement, while relatedness dissatisfaction/thwarting will directly negatively predict motivation for relationship engagement.*

This hypothesis was supported. Relatedness satisfaction was directly positively predictive of motivation for relationship engagement ( $\beta = .42$ ), while relatedness dissatisfaction/thwarting was directly negatively predictive motivation for relationship engagement ( $\beta = -.35$ ).

*Hypothesis 4: Motivation for relationship engagement will directly positively predict positive affect and will directly negatively predict negative affect.*

This hypothesis was supported. Motivation for relationship engagement was directly positively predictive of positive affect ( $\beta = .47$ ) and was directly negatively predictive of negative affect ( $\beta = -.37$ ).

To address the last two hypotheses, author proceeded with the structural model using bootstrapping for indirect effects. As previously stated, this procedure repeats the calculation of the indirect effects on 1,000 different samples to yield parameter estimates for total and specific indirect effects. A significant ( $p < .05$ ) mean indirect effect across the samples is indicated by a bias-corrected 95% confidence interval not containing zero. Bootstrapping is an ideal method for estimating magnitude and significance of the indirect effects due to the greater power the procedure provides, as well as the fact that it does not make assumptions regarding multivariate normality (Preacher & Hayes, 2008).

As seen in Table 8, all indirect effects were significant: The indirect effect from interpersonal sensitivity through relatedness satisfaction and motivation for relationship engagement to both positive affect and negative affect was significant (paths a and b). The indirect effect from interpersonal sensitivity through relatedness dissatisfaction/thwarting and motivation for relationship engagement to both positive affect and negative affect was also significant (paths c and d). Relatedness satisfaction and relatedness dissatisfaction/thwarting both fully mediated the relationship between interpersonal sensitivity and motivation for relationship engagement (paths e and f). Motivation for relationship engagement significantly fully mediated the relations between relatedness satisfaction and both positive affect and negative affect (paths g and h). Motivation for relationship engagement also significantly fully mediated the relations between relatedness dissatisfaction/thwarting and both positive affect and negative affect (paths g and h).

*Hypothesis 5: Relatedness satisfaction and dissatisfaction/thwarting will fully mediate the relationship between interpersonal sensitivity and motivation for relationship engagement.*

This hypothesis was supported. Relatedness satisfaction and dissatisfaction/thwarting both significantly and fully mediated the relationship between interpersonal sensitivity and motivation for relationship engagement. See Table 8 for bootstrap analysis for magnitude and significance of indirect effects.

*Hypothesis 6: Motivation for relationship engagement will fully mediate the relation between the relatedness variables (satisfaction and dissatisfaction/thwarting) and affect variables (positive and negative).*

This hypothesis was supported. Motivation served as a significant mediator for relatedness variables and affect variables. See Table 8 for bootstrap analysis for magnitude and significance of indirect effects.

*Hypothesis 7: The relationship between interpersonal sensitivity and positive affect will be fully mediated by relatedness variables (satisfaction, and dissatisfaction/thwarting) and motivation. The relationship between interpersonal sensitivity and negative affect will be partially mediated by relatedness variables (satisfaction and dissatisfaction/thwarting) and motivation.*

This hypothesis was supported. Relatedness satisfaction, dissatisfaction/thwarting, and motivation significantly fully mediated the relations between interpersonal sensitivity and positive affect and significantly partially mediated the relations between interpersonal sensitivity and negative affect. See Table 8 for bootstrap analysis for magnitude and significance of indirect effects.

### **Additional Analyses.**

**Measurement of motivation and interpersonal sensitivity.** As noted above in the main analyses, three parcels were created to measure motivation and interpersonal sensitivity in the model since using the six and five subscales (respectively) as indicators yielded a poor fit. However, the author also explored other options for measuring motivation in the additional analyses. One concern was illuminated when assessing the intercorrelations of subscales of the Comprehensive Relative Autonomy Index—Motivation for Relationship Engagement. In examining the correlations among these motivation subscales, depicted in Table 3, the author noticed that correlations among subscales ranged from virtually no relationship ( $r < .00$  between negative introjection and identified regulation) to such strong relationships that it may be

measuring the same construct ( $r = .78$  between intrinsic motivation and identified regulation). Moreover, the author found strong correlations between subscales that were theoretically representing more autonomous forms of motivation (e.g., positive introjection) and more controlled forms of motivation (e.g., negative introjection). These mean scores are subtracted from one another in the C-RAI overall score calculation, but were strongly positively correlated ( $r = .63$ ).

Similarly, the author noted that not all subscales of the IPSM were significantly correlated with one another, as seen in Table 4. For instance, the only non-significant relationship was between need for approval and fragile inner self ( $r = -.03$ ), while the strongest relationships were between separation anxiety and interpersonal awareness and between separation anxiety and fragile inner self ( $r = .66$ ). However, importantly, these inter-correlations were highly consistent with prior studies using the IPSM. For instance, Harb and colleagues' (2002) sample reported very similar correlations, with once again the only non-significant relationship being between need for approval and fragile inner self ( $r = .09$ ), and the strongest relationship being between separation anxiety and interpersonal awareness ( $r = .74$ ) and separation anxiety and fragile inner self ( $r = .66$ ). Thus, the author concluded that the intercorrelations for the IPSM subscales were consistent with prior research.

Despite this fact, however, the author anticipated that a latent structural model using all six subscales of the C-RAI as indicators of the latent construct Motivation, and using all five subscales of Interpersonal sensitivity might yield a poor fit to the data. When running this measurement model, the author found it was indeed a poor fit to the data ( $\chi^2(215, N = 343) = 1179.35, p < .001, CFI = .77, RMSEA = .11, SRMR = .15$ ). Thus, the author considered alternate methods for approximating motivation and interpersonal sensitivity as latent constructs.

Given that the only past structural equation modeling (Dunn et al., 2012) located by the author had used parceling to approximate interpersonal sensitivity, the author believed that such was the most obvious solution for approximating this latent construct. As the above analyses reveal, that was the path chosen for the purpose of this thesis. However, given that motivation for relationship engagement consists of more “positive” qualities of motivation (intrinsic motivation, identified regulation, and positive introjection) and more “negative” qualities (negative introjection, external regulation, and amotivation), the author also explored other possibilities for measurement. First, the author conducted an exploratory factor analysis on the subscales of the C-RAI to see how the subscales hung together. When performing such analyses in SPSS using varimax rotation and not specifying the number of factors, rotated factor loading results suggested that the subscales were loading on to two factors: the first factor was represented by Intrinsic Motivation (.89), Identified Regulation (.87), and Amotivation (-.61). The second factor was represented by Negative Introjection (.91), External Regulation (.74), and Positive Introjection (.71). The subscales also minimally loaded on the other factor with those loadings ranging from -.03 to -.27.

When assessing these loadings, it became clear that the first factor represented the most self-determined form of motivation, as identified regulation and intrinsic motivation are highly correlated ( $r = .78$ ), and the reverse of Amotivation represents a desire to seek out friendships. These are the furthest ends of the SDT continuum of motivation which represent desire to seek out friendships because such is enjoyable or important to them. Thus, for the purpose of additional analyses, the author titled this construct, “Self-Determined Motivation.” Contrarily, the second construct represented the more externally regulated forms of motivation for relationship engagement, in which individuals report seeking out friendships in order to gain

approval of others (external regulation), to gain pride in oneself (positive introjection) and avoid shame of oneself (negative introjection). Thus, the author entitled this construct “Controlled Motivation.”

Based on this exploratory factor analysis, the author determined that they could proceed in measuring motivation by: 1. using two distinct latent constructs of motivation (self-determined and controlled motivation), each with the three corresponding subscales as indicators, or 2. continuing with one latent motivation construct approximated by two indicators comprising the mean scores of the corresponding three subscales. The author wished to test these models because they would provide important information regarding the nature of motivation as measured by the comprehensive relative autonomy index (Sheldon et al., 2017). While parceling across all motivation items was chosen in order to answer the research questions of the present study, by so doing, the multifaceted nature of motivation in the main analyses was lost. Thus, the subsequent two models were examined in order to further explore such nature of motivation.

**Self-determined and controlled motivation as separate latent constructs.** To proceed with the first option, structural equation modeling was performed with the latent construct of self-determined motivation being indicated by scores on intrinsic motivation, identified regulation, and amotivation; the latent construct of controlled motivation was indicated by subscales of external regulation, positive introjection, and negative introjection. All other latent constructs were measured utilizing parceling to parallel the main analyses. This was done to test whether treating these two factors of motivation as separate constructs would provide a better fit to the data.

This measurement model was estimated to just below the standards of good model fit ( $\chi^2$  [168] = 412.56,  $p < .001$ ; CFI = .95, RMSEA = .07, SRMR = .08). Thus, the structural model

was also not a good fit to the data ( $\chi^2 [175] = 538.07, p < .001$ ; CFI = .93, RMSEA = .08, SRMR = .11). This model can be seen in Figure 4.

**Self-determined and controlled motivation as indicators of motivation as a single construct.** To test the second alternate model, which utilized a single latent construct of motivation measured by two indicators (self-determined motivation and controlled motivation mean scores), the author created two new variables in SPSS version 24. These constituted adding (and, in the case of amotivation which was the only loading to be negative, subtracting) mean scores on the three subscales corresponding to self-determined motivation (intrinsic motivation, identified regulation, and amotivation) and controlled motivation (positive introjection, negative introjection, and external regulation). This measurement model was estimated to be just below the standards of good fit ( $\chi^2 [104] = 282.64, p < .001$ ; CFI = .95, RMSEA = .07, SRMR = .07). The structural model was also not a good fit ( $\chi^2 [110] = 302.80, p < .001$ ; CFI = .94, RMSEA = .07, SRMR = .07). This model can be seen in Figure 5.

**Choice of parceling.** As previously stated, after carefully considering these two alternate forms of motivation in terms of measurement for these two latent variables, the author chose to move forward with parceling (both for interpersonal sensitivity and motivation for relationship engagement). Conceptually, while the use of subscales as indicators would provide some information regarding the multifaceted nature of the latent constructs (Little et al., 2002), such was not essential to answer the present research questions. On a methodological note, although the internal consistency estimates for the broader scales (i.e., the IPSM and the C-RAI for Relationship Engagement) were both good (alphas = .89, .93), the correlations between subscales and aggregate scores were problematic. The author did not wish to introduce this error into the model when there was a viable alternative (namely, parceling).

Moreover, using five indicators for the IPSM and six indicators for the C-RAI for Relationship Engagement was perceived to be an unnecessary increase in the number of parameters to be estimated in the model. Indeed, there is precedence for utilizing parcels (instead of available subscales as indicators) for latent structural analysis: in assessing the social risk hypothesis and its relation to depression and interpersonal sensitivity, Dunn and colleagues (2012) formulated three parcels using the same method of the present study to approximate the latent variable measured by Boyce and Parker's Interpersonal Sensitivity Measure (1989). For these reasons, parceling was utilized not only for the latent constructs of Interpersonal Sensitivity and Motivation for Relationship Engagement, but also for Relatedness Satisfaction, Relatedness Dissatisfaction, Relatedness Thwarting, (eventually, Relatedness Dissatisfaction/Thwarting) Positive Affect, and Negative Affect.

**Relatedness as a single construct.** Although the aforementioned factor analysis suggested that relatedness was loading onto two factors (relatedness satisfaction and dissatisfaction/thwarting), the author was aware that it could be reasonably argued that relatedness was loading on a single construct, given that the two factors correlated  $-.71$  in the promax rotation. Although the author believed that past research which argued for the distinction between relatedness satisfaction and dissatisfaction/thwarting was more compelling, she also tested a model in which all relatedness items were parceled to approximate a single latent construct. Parcels for this construct were created via the same procedure of prior analyses: exploratory factor analysis on all relatedness items was performed, with items rank-ordered by their absolute value. After the satisfaction items were reverse coded (as these items loaded negatively on the construct), items were distributed to three factors such that their average loading would be approximately equal. This relatedness construct, because satisfaction items

were reverse coded, constituted a “negative” construct of relatedness. To avoid confusion with other relatedness constructs, this single, negative relatedness construct will be henceforth referred to as “relatedness frustration.”

After parcels were created for relatedness frustration, a measurement model was tested in Mplus which was otherwise identical to the hypothesized model. This measurement model was found to be a good fit to the data ( $\chi^2 [80] = 186.31, p < .001$ ; CFI = .97, RMSEA = .06, SRMR = .05). However, when the structural model was run, it was found to be just below a good model fit ( $\chi^2 [84] = 266.44, p < .001$ ; CFI = .95, RMSEA = .08, SRMR = .08). The model is shown in Figure 6. These results suggest that it is also reasonable to treat relatedness as a single construct; however, an assessment of correlations for relatedness satisfaction and dissatisfaction/thwarting and other variables of interest demonstrate some differences.

**Theoretical alternative model.** The author wished to determine whether the hypothesized theoretical model would provide a superior fit to a model which was ungrounded in theory. The model chosen as this competing alternate model treated relatedness variables as constructs representing individual differences, and thus exogenous variables. This model presupposes that the extent to which individuals feel their need for relatedness is satisfied or dissatisfied/thwarted will predict the extent to which they experience an interpersonally sensitive personality. For instance, this model assumes that an individual who feels very distant from and rejected by people in their daily lives will be much more likely to anticipate and over-react to rejection, rather than the other way around. When testing this structural model, it was found to be a poor fit to the data ( $\chi^2 [127] = 454.32, p < .001$ ; CFI = .91, RMSEA = .09, SRMR = .19). The model is shown in Figure 7. Thus, the author concluded that the hypothesized model fits this data better than the alternative model. This conclusion is important due to some limitations in cross-

sectional mediation which prevent the author from being able to determine causation. By testing a plausible but theoretically ungrounded alternate model, the author has established that the present hypothesized model provides the better fit to and explanation for the data.

**Depression as the outcome.** Given that Boyce and Parker's (1989) measure of interpersonal sensitivity was developed as a depression-prone personality trait, the author thought it important to assess whether these variables also predicted depression as an outcome (in place of positive and negative affect). This measurement model was found to be a good fit to the data ( $\chi^2 [80] = 146.29, p < .001; CFI = .98, RMSEA = .05, SRMR = .05$ ). The structural model, too, was found to be a good fit to the data ( $\chi^2 [83] = 164.33, p < .001; CFI = .98, RMSEA = .05, SRMR = .06$ ). As seen in Figure 8, all paths were found to be significant and explained 27.7% of the variance in depression. Additionally, all indirect paths were found to be significant as shown in Table 9. That is, the relationship between interpersonal sensitivity and depression was significantly partially mediated by relatedness satisfaction and motivation; it was also significantly partially mediated by relatedness dissatisfaction/thwarting and motivation. Relatedness satisfaction as well as relatedness dissatisfaction/thwarting also significantly fully mediated the relationship between interpersonal sensitivity and motivation. Motivation significantly fully mediated the relationship between both relatedness satisfaction and relatedness dissatisfaction/thwarting and depression. This good fit of this model suggests that the constructs of interest not only explain the variance in positive and negative affect, but also in depression in a nonclinical population.

## CHAPTER 5: DISCUSSION

In summary, the present study offers important and novel findings regarding the relationship between interpersonal sensitivity, the basic psychological need for relatedness, and well-being. While interpersonal sensitivity was rarely linked to positive and negative affect (Smith and Zautra, 2007) and relatedness (Costa et al., 2015) in the previous literature, the results from this study present a compelling narrative that these constructs are significantly related to one another. Moreover, a construct measuring self-determined and controlled motivation to seek out and engage in relationships (meaning, to seek out new social contacts or deepen current relationships) had never been studied. The present author not only used a novel motivation domain by extending the Comprehensive Relative Autonomy Index (Sheldon et al., 2017) to this area, but also found support that motivation for relationship engagement was strongly linked to relatedness constructs but had medium effects on their experience of positive and negative affect.

While all the variables of interest were significantly correlated with one another (see Table 7), these relationships were hypothesized to exist within a larger framework of self-determination theory (Ryan & Deci, 1985). Because SDT posits that basic psychological needs should mediate the relationship between exogenous variables and motivation (e.g., Riley & Smith, 2011), and because it also suggests that motivation should contribute to overall wellbeing (e.g., McDonough & Crocker, 2007), the author proposed that the relationship between interpersonal sensitivity and positive and negative affect should go through both relatedness variables and motivation for relationship engagement. Moreover, relatedness should significantly fully mediate the relationship between interpersonal sensitivity and motivation for relationship engagement, while motivation for relationship engagement should significantly mediate the

relation between relatedness and affect. All of these hypotheses were supported, thus demonstrating the importance of the theoretical framework provided by self-determination theory in the present context.

### **Hypotheses**

In support of the first hypothesis, the structural model yielded a good fit to the data ( $\chi^2(126, N = 343) = 290.72, p < .001, CFI = .96, RMSEA = .06, SRMR = .08$ ). Given that there were so many novel elements to this model, both in the relationships between variables (e.g., Interpersonal Sensitivity's relationship to relatedness, motivation, and positive and negative affect), and the variables themselves (e.g., the novel construct of motivation for relationship engagement), this in and of itself was an important finding. Hypothesis 2, suggesting direct relations between interpersonal sensitivity and relatedness satisfaction ( $-.23$ ), relatedness dissatisfaction/thwarting ( $.50$ ), and negative affect ( $.41$ ), was also supported. These paths fit within the broader research that has found rejection sensitivity, a construct conceptually similar to interpersonal sensitivity, is linked with loneliness (Rowe et al., 2015; Zimmer-Gembeck et al., 2014). In a recent meta-analysis, Gao and colleagues (2017) found loneliness to be moderately correlated with rejection sensitivity ( $r = .39$ ). Given that Zlomke and colleagues (2016) found loneliness to be correlated with relatedness ( $r = .35, p < .01$ ), it is intuitive that a similar correlation would be found between interpersonal sensitivity and relatedness dissatisfaction/thwarting in the present study ( $r = .43$ ).

Only one previous study investigated relatedness and interpersonal sensitivity (Costa et al., 2015), finding interpersonal sensitivity was more strongly related to relatedness thwarting than to relatedness satisfaction. This was also true in the present study, as interpersonal sensitivity was a stronger predictor of relatedness dissatisfaction/thwarting ( $.50$ ) than of

relatedness satisfaction (-.23) . Thus, it is also intuitive that this personality trait would explain a greater proportion of variance in relatedness dissatisfaction/thwarting (24%) than satisfaction (5%). One key departure with past literature is that participants in the present study were not distinguishing between relatedness dissatisfaction and thwarting items, a fact which does not fit with findings suggesting that basic psychological need dissatisfaction is distinct from need thwarting or frustration (e.g., Cordeiro et al., 2016; Bartholomew et al., 2011; Cheval et al., 2017; Longo et al., 2016)). Particularly, Costa and colleagues (2015) found the exact items used in the present study to approximate relatedness dissatisfaction and relatedness thwarting to be correlated at a level of .32, a relationship much lower than the present study's correlation of .74 between these constructs.

What about the present sample led to such a strong relationship between relatedness dissatisfaction and thwarting? One possible explanation comes from demographic differences between the two samples. The sample of Costa and colleagues (2015) was comprised of an adult population ( $M$  age = 29.04;  $SD$  = 9.18) sampled via an online survey platform, mechanical turk. They might have responded differently than the younger sample of college students in the present study. When considering the possible differences between these two samples, one likely difference is the expectations regarding the level of social connections. Not only do college students live in an environment designed to promote peer relatedness, but emerging adults are also prone to vulnerability to perceived loneliness (Brennan, 1982; Ponzetti, 1990). Moreover, this age group often engages in social media to a greater extent than more mature populations, as studies suggest that 90% of emerging adults use social media every day (Perrin, 2015). Thus, it is possible that young adults like the students in the present study have an unrealistic perception of how “socially involved” their peers are. Perhaps college students are less likely to distinguish

between the feeling that this need for relatedness is simply dissatisfied or actively undermined; if they feel they are less related than their peers, whether that be due to dissatisfaction or thwarting, they may respond with similar experiences of negative affect.

In contrast, working adults may expect a certain level of loneliness/relatedness dissatisfaction, given that often individuals assume that loneliness increases with age (Yang & Victor, 2011). Because they may not see relatedness dissatisfaction as an abnormality for their age group, they might display greater distinctions between relatedness dissatisfaction and a more extreme lack of relatedness that is thwarting. While some research supports the notion that, generally speaking, loneliness does increase with age (e.g., Yang & Victor, 2011), other findings suggest that young adulthood has unique risk factors which might lead to heightened experience of loneliness (e.g., Luhmann & Hawkley, 2016). Future research must consider these questions more fully, as the differences between the present findings and those of Costa and colleagues (2015) are perplexing.

Addressing the path between interpersonal sensitivity and negative affect, given that this personality trait was developed to predict depression, it is consistent with Boyce and Parker's (1989) intent for the IPSM that it would directly predict negative affect. Although only one previous study investigated the link between interpersonal sensitivity and negative affect (Smith and Zautra, 2001), there is robust support for the relationship between interpersonal sensitivity and depression (e.g., Boyce et al., 1992; Davidson et al., 1989; Griens et al., 2002; Luty et al., 2002; Mogi & Yoshino, 2017). There are also several studies linking negative affect and depression (Cohen et al., 2017, Crawford & Henry, 2004; Peeters et al., 2003; Watson et al., 2005). Because of these links, the present author had reason to suspect a strong relationship

between interpersonal sensitivity and well-being; however, finding this relationship in a nonclinical sample of college students does fill a significant gap in the current literature.

Hypothesis 3 regarded the direct relations between relatedness satisfaction and relatedness dissatisfaction/thwarting and motivation for relationship engagement. Given that both relatedness variables significantly predicted motivation for relationship engagement, this hypothesis was supported. These findings fit with SDT in that prior research (Jang et al., 2009; Marin et al., 2015) has found relatedness satisfaction to be positively predictive of motivation in other domains, such as academics (e.g., Faye & Sharpe, 2008), work (e.g., Olafsen et al., 2017), or exercise/sport (e.g., Wilson et al., 2008). However, not all research on social connection and motivation suggest a positive relationship between the two. Specifically, need to belong theory (Baumeister & Leary, 1994) suggests that individuals who have an unmet need to belong will be highly motivated to meet that need, and this has been supported by some prior research (e.g., Pickett et al., 2004). In the present study, however, relatedness dissatisfaction/thwarting negatively predicted motivation for relationship engagement, a finding consistent with hypotheses and SDT, but contrary to need to belong theory. This finding provides preliminary support for the notion that individuals in need of social support often experience difficulty in obtaining such support: as highly interpersonally sensitive individuals are more likely to feel dissatisfied and thwarted in their relatedness, they are also less likely to engage in future relationships. This suggests it is possible that prior negative social experiences contribute to the sense that future attempts to seek out relationships will be futile.

Importantly, this particular domain for motivation was approximated for the first time by the present study. While some prior literature has investigated similar constructs of motivation, such as Okada (2007) who investigated motivation for engaging in a specific, pre-existing

relationship, only two studies known to the present author linked relatedness to motivation in a relational domain (Hadden et al., 2015; Patrick et al., 2007). Because the present motivation construct does not ask participants about a specific relationship in their life (e.g., their romantic partner or a close friend), but rather a general motivation to seek out and deepen several close relationships, this represents a significant contribution to the literature.

Hypothesis 4 was also supported in that motivation for relationship engagement directly predicted both positive and negative affect. Prior studies have found relations between positive and negative affect and motivation in different domains, such as motivation to engage in learning (Bonneville-Roussy et al., 2017; Jang et al., 2009), motivation to engage in smart phone use (Ohly & Latour, 2014), and work motivation (Gillet et al., 2017). However, these studies were inconsistent in terms of magnitude of this relationship, with effect sizes ranging from small to large. The author believes that this variation is due to the variety in motivational domains, some of which are more conceptually tied to well-being (e.g., motivation for relationship engagement) than others (e.g., motivation for smart phone use). Because the C-RAI measure of motivation which was modified for use in the present study had previously consistent correlations to positive affect ( $r = .29, p < .001$ ) and negative affect ( $r = -.31, p < .001$ ), the present findings fit with and also extend the most closely related literature.

The fact that the predictions regarding mediation (Hypotheses 5-7) were entirely supported by the hypothesized model (meaning, all indirect paths were statistically significant) provides strong support for self-determination theory in a novel area. It is a salient finding that the relationship between interpersonal sensitivity and positive and negative affect—a relationship studied only once in prior research (Smith & Zautra, 2007)—was significantly mediated by relatedness satisfaction, dissatisfaction/thwarting, and motivation for relationship engagement.

The scarcity of prior research linking these constructs leads the present author to conclude that this mediational model constitutes an important extension to the literature. Especially because no prior studies had investigated the link between interpersonal sensitivity and motivation, these mediational findings are quite novel and suggest that future research may also investigate the utility of SDT in understanding individual differences.

Given that prior SDT research has treated motivation as both an outcome variable (e.g., Riley & Smith, 2011), the present study's finding that relatedness significantly mediated the link between interpersonal sensitivity and motivation fits with previous SDT research in which need satisfaction mediates the relationship between exogenous variables and motivation (e.g., Riley & Smith, 2011). Additionally, the fact that motivation also served as a significant mediator in the relationship between relatedness and affect variables fits with other research which has treated motivation as a mediator between need satisfaction and other important outcomes (e.g., Álvarez et al., 2009; Leptokaridou et al., 2015). Because interpersonal sensitivity's link to motivation was fully mediated by relatedness satisfaction and relatedness dissatisfaction/thwarting, this suggests that SDT possesses a strong explanatory power that can be extended beyond understanding the impact of strictly environmental factors. The present study offers support for a more comprehensive view of the relationship between exogenous variables, relatedness, motivation, and well-being.

### **Implications for Research**

These findings have several implications for our understanding of interpersonal sensitivity, the need for relatedness, motivation to engage in relationships, and well-being. The proportion of variance explained by these variables speaks to the substantial relations between constructs which have been previously understudied. Because past research has suggested that

interpersonal sensitivity is more strongly related to basic psychological need thwarting than to need satisfaction (i.e., Costa et al., 2015), it is intuitive that interpersonal sensitivity would explain more variance in relatedness dissatisfaction/thwarting ( $R^2 = 24.5\%$ ) than relatedness satisfaction ( $R^2 = 5\%$ ). Critically, relatedness variables explained over half of the variance in motivation for relationship engagement ( $R^2 = 53.2\%$ ); given that this was a construct created for the purpose of the present study, future research would do well to continue to study such motivation in the relational domain.

While past research (Riley & Smith, 2011) has often addressed mediation by basic psychological needs for the relationship between an *environmental* factor and well-being, the present study's exogenous variable was a personality trait. Although certainly novel (as SDT is not traditionally utilized in personality research, and because no prior studies investigated the relationship between interpersonal sensitivity and motivation), the findings do fit with scant literature in the area. For instance, Faye & Sharpe (2008) found basic psychological needs to mediate relations between psychosocial development and academic motivation. Moreover, as previously discussed, Deci and Ryan describe how some important environmental factors that are excessively rejecting will hinder organismic processes (pg. 229, Deci & Ryan, 2000). As interpersonal sensitivity, according to Boyce and Parker (1989) and prior research (Downey & Feldman, 1996; Feldman & Downey, 1994), contributes to a greater frequency of and reaction to perceptions of rejection, the present study extends self-determination theory's understanding of the barriers to psychological need satisfaction. The present author argues that barriers constitute more than environmental contexts which fail to support (and sometimes actively undermine) psychological needs. Instead, barriers may also encompass individual differences on traits which

render a great difficulty in perceiving oneself as autonomous, competent, and related to other people.

Moreover, the alternate theoretical model (which reversed the order of interpersonal sensitivity and relatedness variables) provides an important extension to the current literature by supporting a self-determined theoretical framework in this area. Self-determination theory's construct of relatedness breaks from other similar constructs (e.g., need to belong) in that the focus of this need is the extent to which is it satisfied or dissatisfied by environmental surroundings (Deci & Ryan, 2000). Variation in relatedness, like volitional autonomy and perceived competence, are interpreted in SDT not through the lens of individual differences, but rather as a result of differentially supportive environments. For instance, if a student feels dissatisfied in their need for relatedness at school, there are two possible interpretations of that need dissatisfaction: the first, which is grounded in SDT and posited by the present author, is that this student experiences her school environment as unsupportive of developing warm connections with her peers. The second interpretation of this student's relatedness dissatisfaction is that such is tapping into unique characteristics about this student individually; perhaps she lacks social skills, perhaps she experiences social anxiety, or perhaps she has unrealistically high expectations for the number of friends she should have.

This latter line of thinking is supported by research on the need to belong (Baumeister & Leary, 1994), which has often investigated individual differences in the level of belongingness which different people require to feel they do, in fact, belong. Researchers (e.g., Baumeister & Leary; Hartung & Renner, 2014) have called this difference a "high" versus "low" need to belong, as it represents not an extent of need satisfaction, but individual differences in the extent of belongingness required for that person to feel they belong. The present author believed that a

self-determined perspective on the need for relatedness was the most backed by research in the area; however, it is also reasonable to suspect personality differences to contribute to the extent to which individuals feel their need for relatedness is met. Indeed, prior research has explored individual differences within psychological need satisfaction and well-being without treating these needs as individual difference variables in and of themselves (Taylor & Stebbings, 2012). Interpersonal sensitivity was chosen as an exogenous variable because prior research on this construct and the similar construct of rejection sensitivity suggests that this trait would foster a unique perception of social stimuli, characterized by a sensitivity to the effect one has on other people, a sensitivity to rejection/criticism, and a strong affective response to negative interpersonal interactions (e.g., Boyce & Parker, 1989; Downey & Feldman, 1996).

Importantly, the present author believed that interpersonal sensitivity not only captures individual differences that might contribute to relatedness, but also perceptions of the environment. This is because this particular personality trait, which is characterized by a hypervigilance about social contacts and sensitivity to rejection, causes individuals higher on this trait to perceive their environments quite differently from those lower on the trait. Individuals high in interpersonal sensitivity perceive their social environment as fragile, as a source of anxiety, and as a place in which they can expect to be rejected. The present author hypothesized that endorsing the uneasiness and insecurity which is captured by the interpersonal sensitivity measure (Boyce & Parker, 1989) would indicate a perception of one's environment as less supportive of one's need for relatedness.

The fact that the findings from the present study supported the hypothesized model while finding the theoretically reversed model to provide a poor fit is crucial evidence in favor of SDT in this area. The reverse model, which treated relatedness variables as the exogenous/individual

difference variables which would predict interpersonal sensitivity, was not found to be a good fit to the data. It was important to rule this possibility out, however, due to the reasonable expectation that greater frequency of perceived negative social interactions (which in this case, would be tapped by strong endorsement of relatedness dissatisfaction and thwarting) would predict sensitivity to and expectation of future rejection. Especially because some related literature suggests that childhood maltreatment predicts rejection sensitivity (Kim & Cincchetti, 2010; Lansford et al., 2002; Wolfe et al., 2004), it was a significant finding that a model in which needs predicted interpersonal sensitivity was a poor fit to the data. Because of this, the present study found support for the power of self-determination theory to not only explain the relationship between personality traits and well-being, but also that this theory is superior to alternate plausible explanations. The implication for future research is thus that SDT can be further applied to other personality traits.

Additionally, the additional analyses in the present study regarding both relatedness and motivation constructs opens the door for future research in this area. In examining multiple different avenues by which relatedness and motivation could be measured, the present study did not provide clear evidence for the underlying structure of these constructs. Although recent research in SDT has suggested that basic psychological need satisfaction is distinct from dissatisfaction and thwarting/frustration, this was not supported in the present study. Exploratory factor analyses suggested a two-factor solution was the best fit for the data, and because of this, the author combined relatedness dissatisfaction and thwarting into a single construct. Although the scree value for this second factor (dissatisfaction/thwarting) was greater than 1, the author also tested a model in which relatedness was treated as a single construct. The structural model

in this case was just below a good model fit. Further research must be tested in this area to determine the psychometric nature of basic psychological needs in SDT.

Moreover, the author tested a variety of ways to measure motivation for relationship engagement. It is clear from this study that the subscales from the C-RAI (Sheldon et al., 2017) may not be behaving as a unidimensional construct. Although the additional analyses suggest that the two factors of motivation subscales do interact differently with other variables, the alternate structural models tested were not a good fit to the data. Future research must continue to explore this scale in a variety of domains to ensure its validity as a measure.

### **Implications for Clinical Practice**

In the present study, a nonclinical sample of college students was assessed on a trait which has been found to predict depression, anxiety, and a variety of other clinical disorders (e.g., Dunn et al., 2012; Hamann et al., 2009; Kim & Cincchetti, 2010; Rowe et al., 2015). The fact that the author found a good fitting model when predicting not only positive and negative affect, but also depression, was a significant finding. Interpersonal sensitivity's relationship with depression was partially mediated by students' relatedness and motivation for relationship engagement. This fact has implications for clinicians in treating individuals with depression as a presenting concern. Given that interpersonal sensitivity is accompanied by the aforementioned tendency to anticipate and overreact to rejection, as well as insecurity and uneasiness in social relationships, depressed individuals may benefit from assistance in challenging their cognitive processes and attributions regarding their relationships. Interventions in cognitive-behavioral therapy, for instance, may help individuals reality test some of their assumptions about relationships. Given that relatedness fully mediated the link between this personality trait and motivation for relationship engagement, it is also important for clinicians to help foster

behavioral changes in their clients which allow for more relationally-supportive environments (e.g., by encouraging participation in extracurricular activities). Motivation for relationship engagement was also significantly predictive of positive affect, negative affect, and, in an alternate model, depression. Thus, clinicians should also be attentive to the level of motivation their clients are experiencing when coping with depressive symptoms.

### **Limitations and Future Directions**

Although the present author asserts the importance of the findings, there were also several limitations to the study which must be acknowledged. Demographically, the sample contained a majority of white participants and exclusively college students sampled from a large public university. Future research would do well to replicate and extend these findings with more diverse adult populations. Additionally, the sample contained a majority of women. Although the author tested for and did not find significant gender differences for means and correlations, some past studies (e.g., Nystrom et al., 2018) have found interpersonal sensitivity to be more impactful for women. Future research could outline what specific differences, if any, are found between samples of men and women. Moreover, the high percentage of white individuals in the sample raises questions regarding cultural differences in social interactions. Not only are there cultural differences between European-American and minority racial and ethnic identities, but it is also reasonable to expect that the Midwestern location of the present sample has unique cultural considerations.

Recently in the social sciences, there has been comprehensive research surrounding personality differences across geographic regions of the United States. One such study, published by Rentfrow, Gosling and Potter in 2008, contained state-level estimates of the Big Five inventory. Their results suggest that there is a larger proportion of agreeableness,

conscientiousness, and extraversion, but lower openness and neuroticism, in Midwestern states. Although the Midwestern university in which the present study was implemented also contains a diverse population of international students and racially/ethnically diverse individuals, it is possible that these findings are more specific to the Midwestern culture in which the study was implemented. How might the higher levels of conscientiousness in the Midwest interact with interpersonal sensitivity? Would interpersonal sensitivity be more impactful for geographic regions higher in neuroticism? Future research can uncover how personality and cultural differences across the geographic regions impact the relationship between interpersonal sensitivity and well-being.

Additionally, the present study found preliminary evidence for the relationship between a single personality trait and indices of well-being. Although the findings were salient in a non-clinical population, there are admittedly a variety of other personality traits and environmental factors that may be more universally impactful. For instance, future research can assess how openness, conscientiousness, agreeableness, extraversion, and neuroticism are related to relatedness and motivation for relationship engagement. Additionally, in line with more traditional self-determination theory models, future research could also investigate the impact of environmental characteristics of college campuses which may be supportive or unsupportive of student's need for relatedness. For instance, the present study obtained no data on how supportive classroom environments, residential living situations, or opportunity to engage in extra-curricular activities on college campuses relate to students sense of connectedness to other individuals. Future research can address these questions.

Additionally, while the measurement of relatedness alone was of interest to the present author, the exclusion of competence and autonomy in the present study does raise questions

about the potential contribution of those needs to the relationship between these constructs. For example, it is reasonable to suggest that a sense of perceived competence to successfully form close relationships with other people would predict motivation to engage in relationships, but this question was not answered by the present study.

The cross-sectional design of the present study also limits the extent to which the author can interpret the present findings (Maxwell & Cole, 2007; Maxwell, Cole, & Mitchell, 2011). Cross-sectional mediation prevents the author from being able to determine causality and directionality of the findings. One attempt to address this issue was in the inclusion of a theoretically reversed model; the fact that this model was a poor fit to the data supports the proposed interpretation of these findings, but is not sufficient to outweigh all limitations of the research design. An additional attempt to address this limitation was in choosing a model which was steeped in theory and backed by robust research in the area. As previously mentioned, there is substantial literature finding that exogenous variables predict need satisfaction, which then mediates the relationship between those exogenous variables and motivation and/or well-being. There is also support for the full mediation by motivation between need satisfaction and well-being. Thus, while the author recognizes the limitations of cross sectional mediation, it is also believed that the present study has followed recommended procedure to avoid overstating the findings.

One area in which the present author was interested was the distinction between relatedness satisfaction, dissatisfaction, and thwarting. Much of the recent research in this area has begun to not only separate need satisfaction from need dissatisfaction, but also to consider need thwarting or frustration as an additional construct with important and unique implications (e.g., Chen et al., 2015; Cheval et al., 2017; Cordiero et al., 2016; Longo et al., 2016).

Conceptually, not only did it seem logical that these constructs would be distinct, but also that the particular sensitivity to rejection in interpersonally sensitive individuals would contribute to a strong relationship between this personality trait and relatedness thwarting in particular. This prediction was backed by previous literature (e.g, Costa et al., 2015), but was not supported in the present study. When looking at the correlations between these constructs, it was true that there was a numerically stronger correlation between interpersonal sensitivity and relatedness thwarting than relatedness dissatisfaction and relatedness satisfaction; however, this difference was not statistically significant ( $p > .05$ ). Moreover, relatedness dissatisfaction and relatedness thwarting were so strongly correlated ( $r = .74$ ) that it became clear to the author that participants were not distinguishing between these constructs. This fact was also evidenced by similar mean scores for the two, as well as a factor analysis on all relatedness items which had the items loading clearly onto two factors: satisfaction and dissatisfaction/thwarting.

While the internal consistency of the combined measure of dissatisfaction and thwarting was good (.91), combining two theoretically distinct constructs into one does raise concerns in the interpretation of the findings related to that construct. Is this dissatisfaction/thwarting construct more similar to dissatisfaction, or to thwarting? Why was the correlation between scores on these subscales so much stronger in the present study than in previous research (Costa et al., 2015)? These are questions which the present author cannot answer in their entirety. While additional research is surely needed to tease apart differences between relatedness satisfaction, dissatisfaction, and thwarting, the fact remains that the present study provides support for the importance of relatedness to understanding the relationship between interpersonal sensitivity, motivation, and well-being. This limitation should not overshadow the importance of the finding that relatedness satisfaction was distinct from relatedness dissatisfaction. Especially because

prior research often treated these constructs as two ends of the same continuum (Deci & Ryan, 2000), the present study provides support for the notion that the dissatisfaction of the basic psychological need for relatedness is not simply reverse-coded satisfaction.

Additionally, the construct of motivation for relationship engagement had some surprising intercorrelations between subscales. There was evidence to suggest that the two factors on which motivation was loading, namely self-determined and controlled motivation, were behaving quite differently. However, this difference was not captured in parceling all items of motivation to approximate the latent construct. Although using parcels does limit the study's findings in terms of multidimensionality of latent constructs, this decision was chosen for several reasons: 1., the internal consistency of the items as a whole was very good (with an alpha of .93); 2., the research question of the present study was interested in the overall quality of motivation (not the individual subscales or factors) and how this might relate to other variables in the model; 3., the model including parceling of all variables provided a good fit to the data; and 4., no alternate method of motivation measurement which the author tested provided a sufficiently good fit to the structural model. Thus, while future research is needed on this measure, the author argues that the multifaceted nature of motivation was not essential to answering the present research question.

Interpersonal sensitivity might also be linked to other important outcomes, such as social anxiety. Alternatively, researchers might assess how this construct affects individuals in which the anticipation of rejection is more grounded in reality. In order to avoid over-pathologizing individuals with minority identities, it is important to study this construct in light of multicultural and socio-contextual factors. For instance, if members of the LGBTQIA+ community, people of color, individuals with disabilities, and/or larger-bodied individuals expect to be rejected because

of past experience of discrimination, their scores on the interpersonal sensitivity measure should not be interpreted as an “overreaction” to rejection. Protective cognitive processes based on past trauma must not be considered by therapists as problematic or the cause of underprivileged individuals’ presenting concerns.

Finally, future research could disentangle the differences between a variety of similar constructs related to the current findings. For instance, how are the conceptually similar constructs of need to belong, loneliness, and relatedness similar to and different from one another? What outcomes do they uniquely predict? Additionally, how is well-being differentially related to interpersonal sensitivity, rejection sensitivity, and emotional reactivity? Which of these three is the strongest predictors of depression? Future research can continue to explore these and other questions.

## **Conclusions**

Considering the above findings, implications, and limitations of the present study, the author concludes that this study fills a gap in the current literature. By extending self-determination theory to understanding the link between a depression-prone personality trait and well-being, the findings outline a possible sequence for this relationship, even in a non-clinical population. While causality cannot be determined by cross-sectional mediation analyses, the findings do provide preliminary evidence that interpersonal sensitivity predicts individuals’ perceptions of relatedness, which in turn contributes to more or less motivation to engage in relationships. The fact that this novel motivation construct predicted positive and negative affect, especially when prior research has found inconsistent effect sizes for this relationship, suggests avenues for future research and clinicians alike.

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Table 1. *Constructs and Associated Measures, Hypotheses, and Model Paths*

Construct	Measure/Subscale	Hypotheses	Paths in Figure 2
Interpersonal Sensitivity	Interpersonal Sensitivity Measure (IPSM)	1, 4, 7	a, b, g
Relatedness Satisfaction	Basic Psychological Need Satisfaction subscale—General Version	1, 2, 4, 5, 7	a, c
Relatedness Dissatisfaction/Thwarting	Basic Psychological Need Satisfaction subscale—General Version; Basic Psychological Need Thwarting subscale (Modified)	1, 2, 4, 5, 7	b, d
Motivation for Relationship Engagement	Comprehensive Relative Autonomy Index—Relationship Engagement (Adapted)	2, 3, 4, 5, 7	c, d, e, f
Positive Affect	Positive and Negative Affect Schedule (PANAS) Positive affect subscale	3, 5, 7	e
Negative Affect	Positive and Negative Affect Schedule (PANAS) Negative affect subscale	1, 3, 5, 7	f, g

*Note.* Paths pertain to Figure 2.

Table 2. Means, Standard Deviations, and Intercorrelations Among Variables of Interest.

	1.	2.	3.	4.	5.	6.	7.	8.
1. Interpersonal Sensitivity	-							
2. Relatedness Satisfaction	-.17	-						
3. Relatedness Dissatisfaction	.37	-.63	-					
4. Relatedness Thwarting	.44	-.61	.74	-				
5. Motivation for Relationship Engagement	-.19	.59	-.59	-.51	-			
6. Positive Affect	-.27	.44	-.48	-.39	.39	-		
7. Negative Affect	.46	-.36	.51	.54	-.39	-.34	-	
8. Depression	.39	-.34	.45	.47	-.33	-.48	.61	-
Means (Sums for 1 and 8)	<b>98.12</b>	<b>5.72</b>	<b>2.89</b>	<b>2.86</b>	<b>5.66</b>	<b>3.51</b>	<b>2.25</b>	<b>13.83</b>
Standard Deviation	<b>14.89</b>	<b>.97</b>	<b>1.24</b>	<b>1.41</b>	<b>2.86</b>	<b>.68</b>	<b>.69</b>	<b>11.72</b>

Note.  $N = 343$ . All correlations are significant at a level of  $p < .001$ .

Table 3. *Intercorrelations Among Motivation Comprehensive Score and Subscales*

	1.	2.	3.	4.	5.	6.	7.
1. C-RAI	-						
2. Intrinsic Motivation	.79**	-					
3. Identified Regulation	.75**	.78**	-				
4. Positive Introjection	.06	.11*	.20**	-			
5. Negative Introjection	-.44**	-.11*	.00	.64**	-		
6. External Regulation	-.60**	-.24**	-.18**	.47**	.70**	-	
7. Amotivation	-.73**	-.55**	-.50**	.03	.20**	.33**	-

Note.  $N = 343$ . \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 4. *Intercorrelations Among Interpersonal Sensitivity Sum and Subscales*

	1.	2.	3.	4.	5.	6.
1. Sum IPSM	-					
2. Interpersonal Awareness	.89	-				
3. Need for Approval	.47	.35	-			
4. Separation Anxiety	.81	.66	.15	-		
5. Timidity	.71	.59	.39	.34	-	
6. Fragile Inner Self	.68	.54	-.03	.66	.23	-

Note.  $N = 343$ . \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 5. *Factor Loadings for the Measurement Model*

Measure and Variable	<i>Unstandardized factor loading</i>	<i>S Z Score E</i>	<i>Standardized factor loading</i>
<b>Interpersonal Sensitivity</b>			
Interpersonal Sensitivity Parcel 1	1.00	.00	.90
Interpersonal Sensitivity Parcel 2	.99	.04	.89
Interpersonal Sensitivity Parcel 3	.95	.04	.88
<b>Relatedness Satisfaction</b>			
Relatedness Satisfaction Parcel 1	1.00	.00	.89
Relatedness Satisfaction Parcel 2	.87	.07	.77
Relatedness Satisfaction Parcel 3	1.13	.08	.72
<b>Relatedness Dissatisfaction/Thwarting</b>			
Relatedness D/T Parcel 1	1.00	.00	.90
Relatedness D/T Parcel 2	1.07	.04	.80
Relatedness D/T Parcel 3	1.12	.06	.88
<b>Motivation for Rel. Engagement</b>			
Motivation Parcel 1	1.00	.00	.90
Motivation Parcel 2	.78	.04	.80
Motivation Parcel 3	1.07	.05	.88
<b>Positive Affect</b>			
Positive Affect Parcel 1	1.00	.00	.84
Positive Affect Parcel 2	1.17	.07	.80
Positive Affect Parcel 3	1.17	.07	.88
<b>Negative Affect</b>			
Negative Affect Parcel 1	1.00	.00	.81
Negative Affect Parcel 2	1.21	.07	.87
Negative Affect Parcel 3	1.22	.08	.81

*Note.*  $N = 343$ .

Table 6. *Internal Consistency Estimates of all Scales and Subscales.*

Scale or Subscale Name	Alpha
Positive Affect	.88
Negative Affect	.86
Interpersonal Sensitivity Measure	.89
<i>Interpersonal Awareness</i>	.81
<i>Need for Approval</i>	.60
<i>Separation Anxiety</i>	.79
<i>Timidity</i>	.74
<i>Fragile Inner Self</i>	.76
Motivation for relationship Engagement	.93
<i>Intrinsic Motivation</i>	.82
<i>Identified Regulation</i>	.89
<i>Positive Introjection</i>	.88
<i>Negative Introjection</i>	.89
<i>External Regulation</i>	.84
<i>Amotivation</i>	.85
Relatedness	
<i>Satisfaction</i>	.83
<i>Dissatisfaction</i>	.83
<i>Thwarting</i>	.89
<i>Dissatisfaction/Thwarting</i>	.91

Note.  $N = 343$ . Subscale names and alphas are italicized.

*Table 7. Means, Standard Deviations, and Intercorrelations of Variables, Including New Constructs of Relatedness Dissatisfaction/Thwarting, Self-Determined Motivation, and Controlled Motivation*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Interpersonal Sensitivity	-										
2. Relatedness Satisfaction	-.17	-									
3. Relatedness Dissatisfaction	.37	-.63	-								
4. Relatedness Thwarting	.44	-.61	.74	-							
5. Motivation for Relationship Engagement	-.19	.59	-.59	-.51	-						
6. Positive Affect	-.27	.44	-.48	-.39	.39	-					
7. Negative Affect	.46	-.36	.51	.54	-.39	-.34	-				
8. Depression	.39	-.34	.45	.47	-.33	-.48	.61	-			
9. Relatedness Dissatisfaction/Thwarting	.43	-.67	.94	.92	-.60	-.47	.56	.49	-		
10. Self-Determined Motivation	-.04	.59	-.56	-.42	.88	.36	-.30	-.28	-.52	-	
11. Controlled Motivation	.48	-.24	.30	.36	-.36	-.13	.37	.28	.36	-.10	-
<i>Means (Sums for 1, 8, 10, and 11)</i>	<b>98.12</b>	<b>5.72</b>	<b>2.89</b>	<b>2.86</b>	<b>5.66</b>	<b>3.51</b>	<b>2.25</b>	<b>13.83</b>	<b>2.86</b>	<b>6.93</b>	<b>7.08</b>
<i>Standard Deviation</i>	<b>14.89</b>	<b>.97</b>	<b>1.24</b>	<b>1.41</b>	<b>2.86</b>	<b>.68</b>	<b>.69</b>	<b>11.72</b>	<b>1.22</b>	<b>2.02</b>	<b>2.57</b>

Table 8.

*Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects for Hypothesized Model*

Indirect Effects		B and Product		Mean Indirect Effect	SE of Mean	95% BC CI Lower, Upper <sup>a</sup>	
a. Interpersonal Sensitivity	Relatedness Satisfaction	Motivation	Positive Affect	$-.23 \times .43 \times .47 = -.05$	-.06	.03	-.13, -.02*
b. Interpersonal Sensitivity	Relatedness Satisfaction	Motivation	Negative Affect	$-.23 \times .43 \times -.37 = -.03$	.05	.02	.01, .10*
c. Interpersonal Sensitivity	Relatedness Dissatisfaction /Thwarting	Motivation	Positive Affect	$.50 \times -.35 \times .47 = -.08$	-.11	.04	-.20, -.04*
d. Interpersonal Sensitivity	Relatedness Dissatisfaction /Thwarting	Motivation	Negative Affect	$.50 \times -.35 \times -.37 = .06$	.09	.03	.04, .16*
e. Interpersonal Sensitivity	Relatedness Satisfaction	Motivation		$-.23 \times .43 = -.10$	-.11	.04	-.21, -.0
f. Interpersonal Sensitivity	Relatedness Dissatisfaction /Thwarting	Motivation		$.50 \times -.35 = -.18$	-.19	.06	-.31, -.0
g. Relatedness Satisfaction		Motivation	Positive Affect	$.43 \times .47 = .20$	.12	.03	.06, .19*
h. Relatedness Satisfaction		Motivation	Negative Affect	$.43 \times -.37 = -.16$	-.10	.03	-.16, -.04*
i. Relatedness Dissatisfaction /Thwarting		Motivation	Positive Affect	$-.35 \times .47 = -.16$	-.09	.03	-.14, -.04*
j. Relatedness Dissatisfaction /Thwarting		Motivation	Negative Affect	$-.35 \times -.37 = .13$	.07	.02	.03, .11*

Note.  $N= 343$ . BC CI = Bias-Corrected Confidence Interval. <sup>a</sup>These values are based on the unstandardized path coefficients. \*95% Confidence interval does not include zero and therefore is significant at  $p < .05$ .

Table 9.

*Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects for Alternate Model with Depression as Outcome*

	Indirect Effects			B and Product	Mean Indirect Effect	SE of Mean	95% BC CI Lower, Upper <sup>a</sup>
a. Interpersonal Sensitivity	Relatedness Satisfaction	Motivation	Depression	$-.24 \times .42 \times -.30 = .03$	.04	.02	.01, .09
b. Interpersonal Sensitivity	Relatedness Dissatisfaction /Thwarting	Motivation	Depression	$.50 \times -.34 \times -.30 = .05$	.07	.03	.02, .13
c. Interpersonal Sensitivity	Relatedness Satisfaction	Motivation		$-.24 \times .42 = -.10$	-.11	.04	-.21, -.04
d. Interpersonal Sensitivity	Relatedness Dissatisfaction /Thwarting	Motivation		$.50 \times -.34 = -.17$	-.19	.06	-.30, -.08
	e. Relatedness Satisfaction	Motivation	Depression	$.42 \times -.30 = -.13$	-.08	.03	-.14, -.04
	f. Relatedness Dissatisfaction /Thwarting	Motivation	Depression	$-.34 \times -.30 = .10$	.05	.02	.02, .10

Note.  $N= 343$ . BC CI = Bias-Corrected Confidence Interval. <sup>a</sup>These values are based on the unstandardized path coefficients.

\*95% Confidence interval does not include zero and therefore is significant at  $p < .05$ .

Table 10.

*Exploratory Factor Analysis for Relatedness Items: Promax Structure Matrix*

Item	Factor 1	Factor 2
Thwarting Item 2: I feel I am rejected by those around me	.88	-.62
Thwarting Item 3: I feel others can be dismissive of me	.83	-.60
Dissatisfaction Item 5: I tend to feel distant from other people	.81	-.64
Dissatisfaction Item 4: I usually feel uneasy around other people	.77	-.53
Thwarting Item 4: I feel other people dislike me	.77	-.61
Thwarting Item 1: There are situations where I am made to feel inadequate	.71	-.43
Dissatisfaction Item 2: I feel like I can't really trust the people around me	.66	-.58
Dissatisfaction Item 1: I usually try to avoid interacting with the other people in my life	.59	-.43
Dissatisfaction Item 3: I don't usually have a lot of opportunity to interact with other people	.56	-.47
Satisfaction Item 1: I really like the people I interact with	-.53	.69
Satisfaction Item 5: People are generally pretty friendly towards me	-.57	.77
Satisfaction Item 3: I consider the people I regularly interact with to be my friends	-.48	.74
Satisfaction Item 2: I get along with people I come into contact with	-.52	.69
Satisfaction Item 4: People in my life care about me	-.59	.66

Table 11.

*Exploratory Factor Analysis for Relatedness Items: Promax Pattern Matrix*

Item	Factor 1	Factor 2
Thwarting Item 2: I feel I am rejected by those around me	.88	.00
Thwarting Item 1: There are situations where I am made to feel inadequate	.82	.15
Thwarting Item 3: I feel others can be dismissive of me	.80	-.04
Dissatisfaction Item 4: I usually feel uneasy around other people	.80	.03
Dissatisfaction Item 5: I tend to feel distant from other people	.73	-.12
Thwarting Item 4: I feel other people dislike me	.68	-.14
Dissatisfaction Item 1: I usually try to avoid interacting with the other people in my life	.57	-.03
Dissatisfaction Item 2: I feel like I can't really trust the people around me	.50	-.23
Dissatisfaction Item 3: I don't usually have a lot of opportunity to interact with other people	.46	-.14
Satisfaction Item 1: I really like the people I interact with	.05	.82
Satisfaction Item 3: I consider the people I regularly interact with to be my friends	.07	.79
Satisfaction Item 5: People are generally pretty friendly towards me	-.06	.73
Satisfaction Item 2: I get along with people I come into contact with	-.07	.64
Satisfaction Item 4: People in my life care about me	-.25	.49

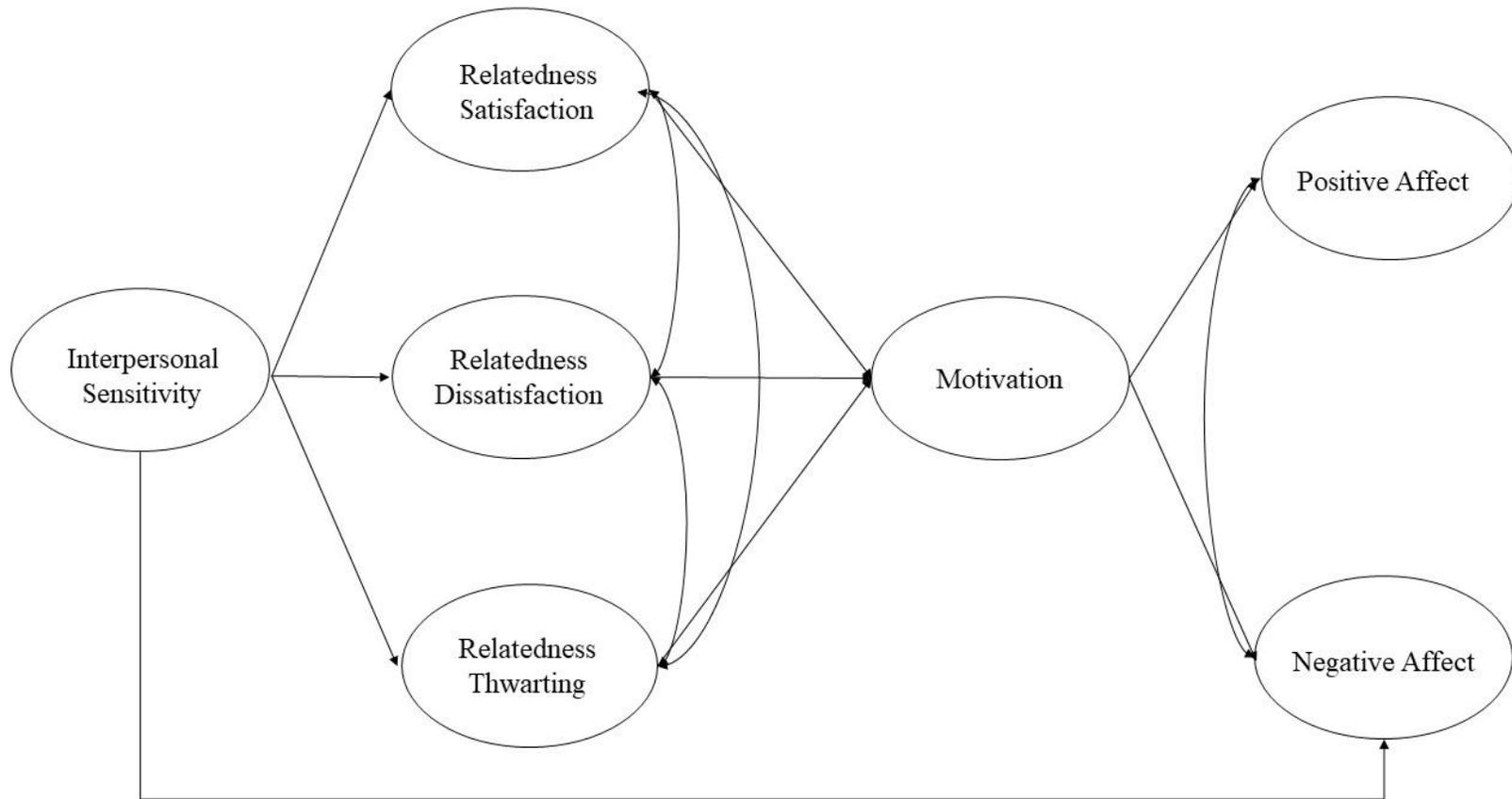


Figure 1. *Original Hypothesized Partially Mediated Model*  
 Note. Parcel loadings for latent variables are not included for visual clarity.

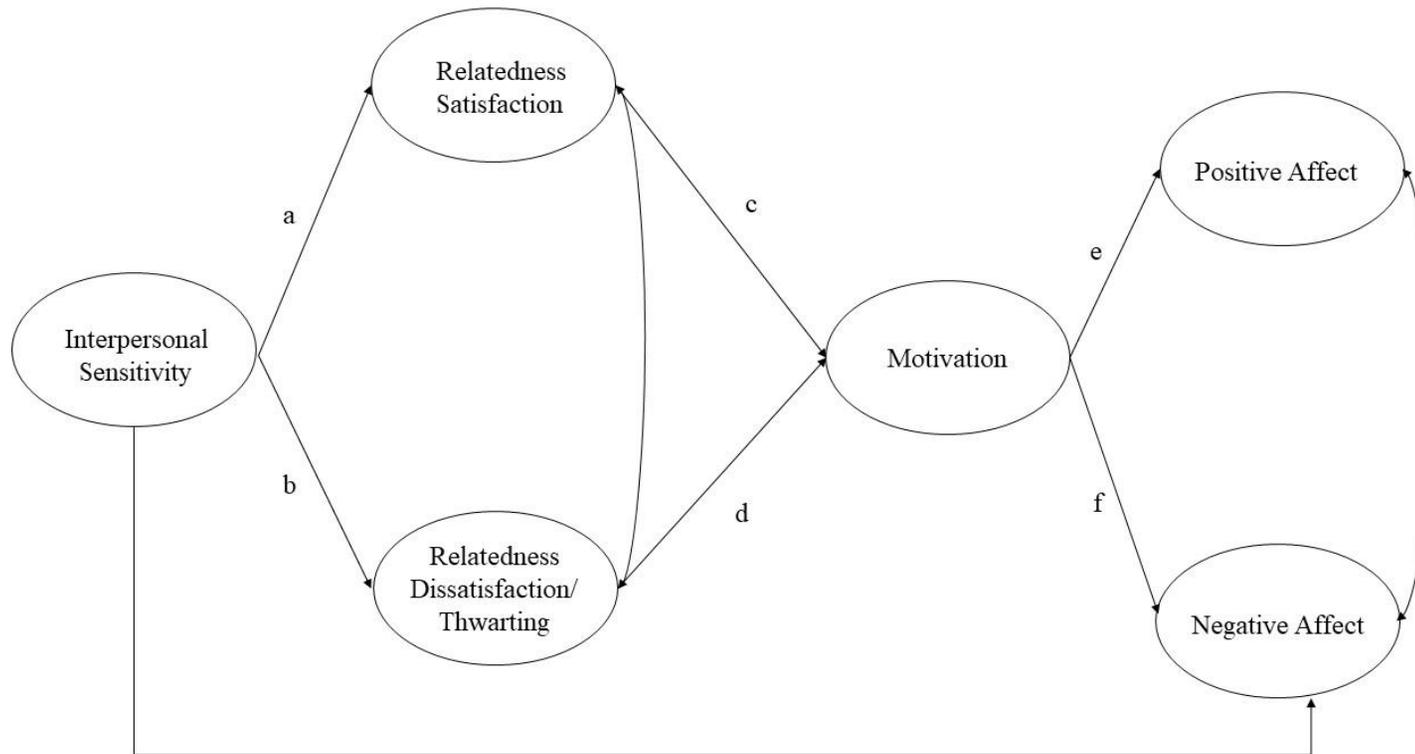


Figure 2. *Final Hypothesized Partially Mediated Model*

Note. Parcel loadings for latent variables are not included for visual clarity.

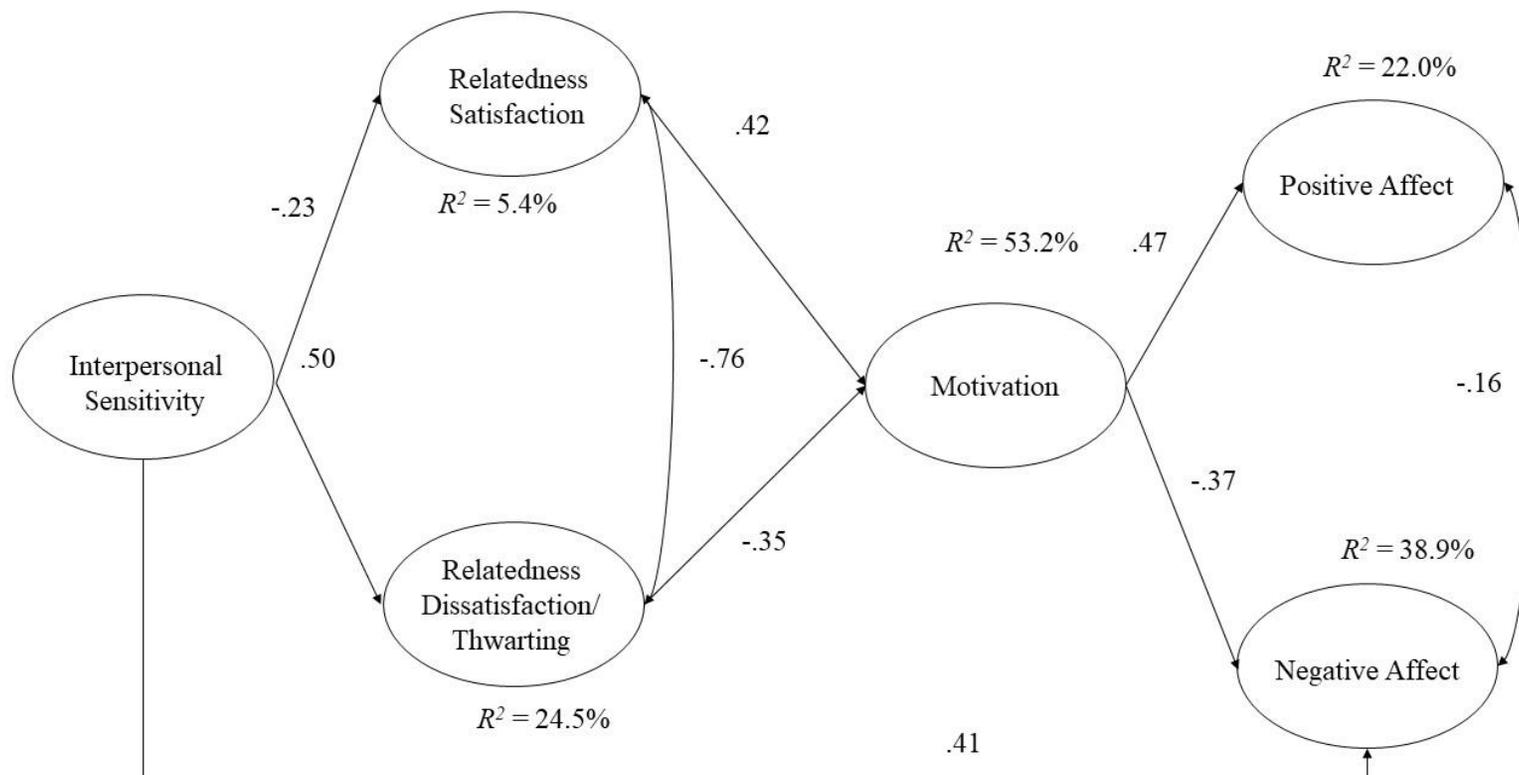


Figure 3. *Final Hypothesized Partially Mediated Model Results*

Note. Parcel loadings for latent variables are not included for visual clarity. All paths are significant at a level of  $p < .001$ .

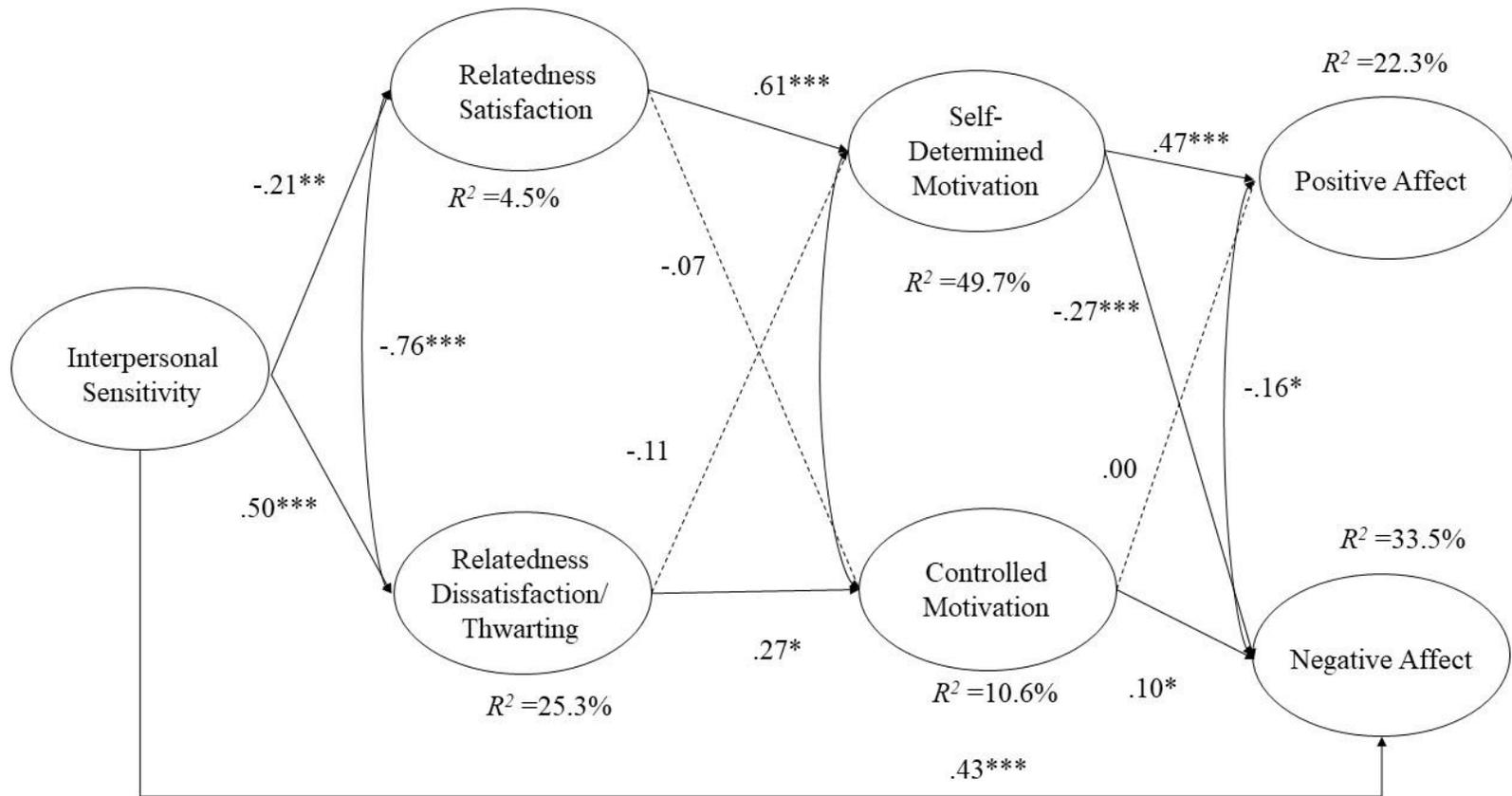


Figure 4. *Alternate Model Results: Motivation as Two Separate Construct*

Note. Parcel loadings for latent variables are not included for visual clarity. Dotted lines indicate non-significant paths. Solid lines indicate paths significant at a level of  $p < .05^*$ ,  $p < .01^{**}$ ,  $p < .0001^{***}$ .

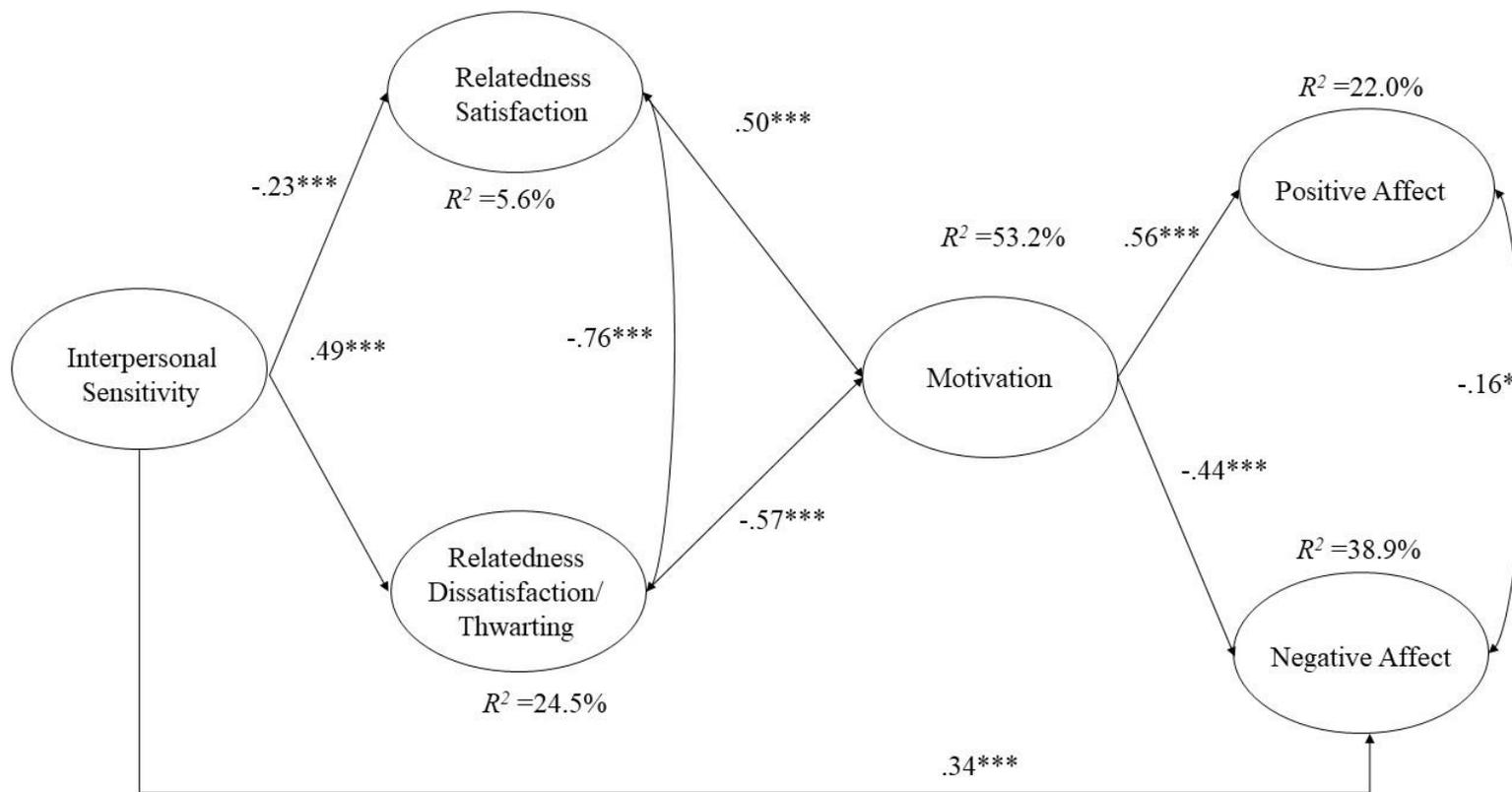


Figure 5. *Alternate Model Results: Motivation Indicated by Self-Determined and Controlled Motivation*

Note. Parcel loadings for latent variables are not included for visual clarity. All paths are significant at a level of  $p < .001$ .

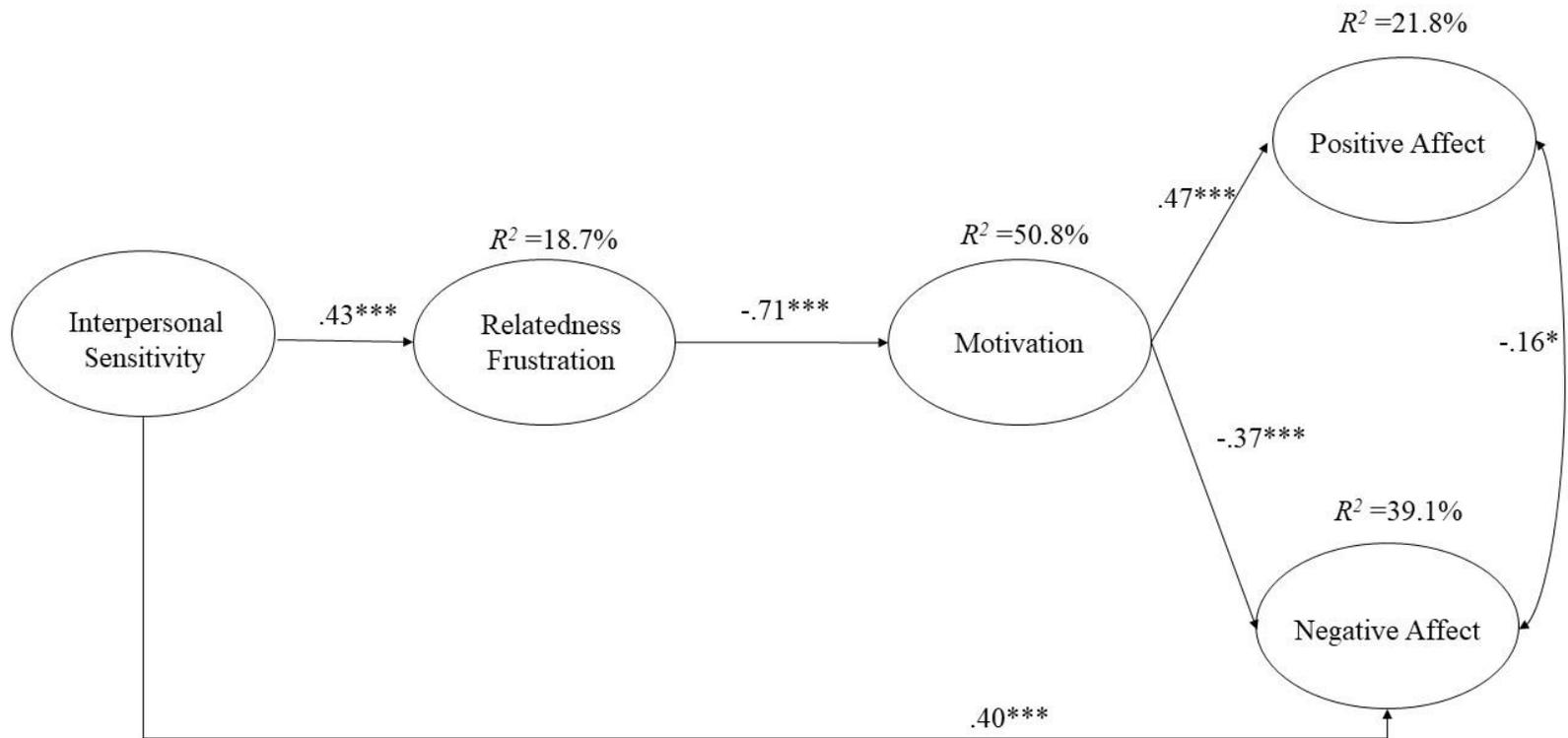


Figure 6. Model Results with Relatedness as a Single Construct

Note. Parcel loadings for latent variables are not included for visual clarity. Solid lines indicate paths significant at a level of  $p < .05^*$ ,  $p < .01^{**}$ ,  $p < .0001^{***}$

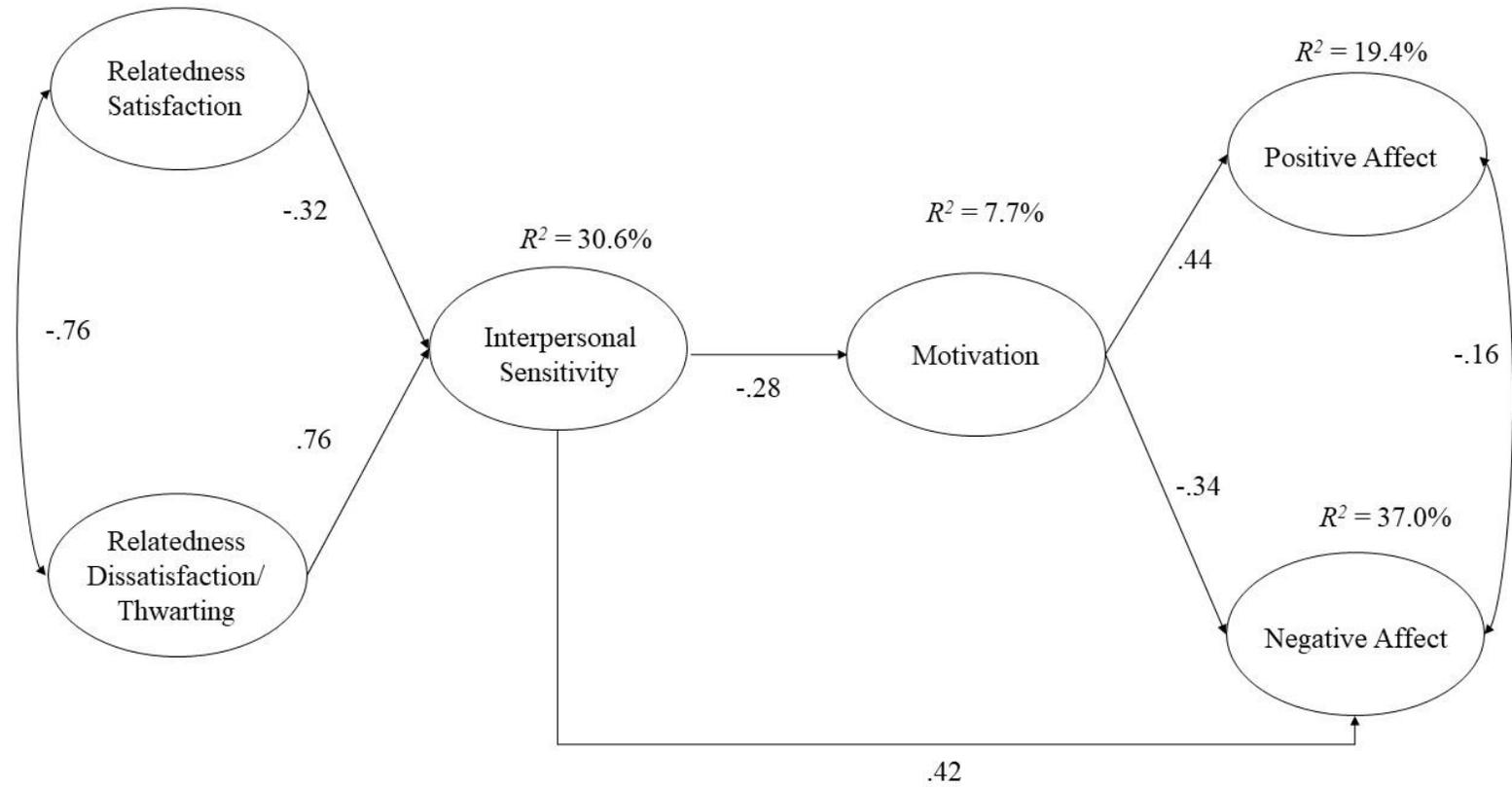


Figure 7. *Reversed Theoretical Model Results*

Note. Parcel loadings for latent variables are not included for visual clarity. All paths are significant at a level of  $p < .001$ .

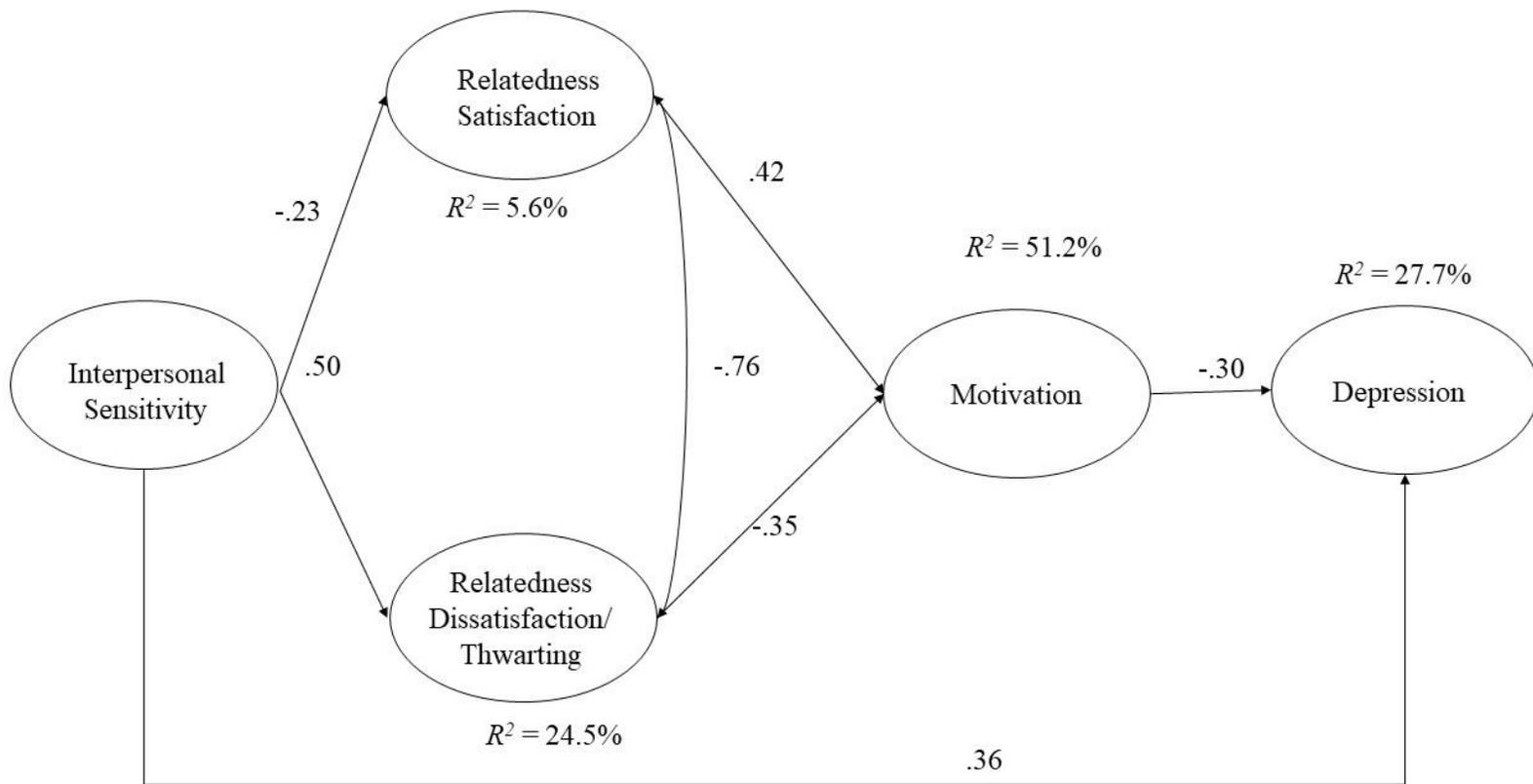


Figure 8. Model Results with Depression as the Outcome

Note. Parcel loadings for latent variables are not included for visual clarity. All paths are significant at a level of  $p < .001$ .

## APPENDIX A. INTERPERSONAL SENSITIVITY

(Boyce & Parker, 1989)

A number of statements are listed below which relate to how you might feel about yourself and other people in your life. Please indicate with a tick in the appropriate place how each one applies to you - i.e. whether it is 'very like you', 'moderately like you,' 'moderately unlike you,' or 'very unlike you.' Respond to the statement in terms of how you are GENERALLY and not necessarily just at present. There are no right or wrong answers.

**1** = Very unlike you   **2** = Moderately unlike you   **3** = Moderately like you   **4** = Very like you

1. I feel insecure when I say goodbye to people
2. I worry about the effect I have on other people
3. I avoid saying what I think for fear of being rejected
4. I feel uneasy meeting new people
5. If others knew the real me, they would not like me
6. I feel secure when I'm in a close relationship
7. I don't get angry with people for fear that I may hurt them
8. After a fight with a friend, I feel uncomfortable until I have made peace
9. I am always aware of how other people feel
10. I worry about being criticized for things I have said or done
11. I always notice if someone doesn't respond to me
12. I worry about losing someone close to me
13. I feel that people generally like me
14. I will do something I don't want to do rather than offend or upset someone
15. I can only believe that something I have done is good when someone tells me it is

16. I will go out of my way to please someone I am close to
17. I feel anxious when I say goodbye to people
18. I feel happy when someone compliments me
19. I fear that my feelings will overwhelm people
20. I can make other people feel happy
21. I find it hard to get angry with people
22. I worry about criticizing other people
23. If someone is critical of something I do, I feel bad
24. If other people knew what I am really like, they would think less of me
25. I always expect criticism
26. I can never be really sure if someone is pleased with me
27. I don't like people to really know me
28. If someone upsets me, I am not able to put it easily out of my mind
29. I feel others do not understand me
30. I worry about what others think of me
31. don't feel happy unless people I know admire me
32. I am never rude to anyone
33. I worry about hurting the feelings of other people
34. I feel hurt when someone is angry with me
35. My value as a person depends enormously on what others think of me
36. I care about what people feel about me

**APPENDIX B. PERCEIVED RELATEDNESS SATISFACTION**  
(Costa, Ntoumanis, & Bartholomew, 2015)

Please read each of the following statements carefully, thinking about how true that statement is for you. Rate each item from 1 to 7.

Not at all True

Very True

1

2

3

4

5

6

7

1. I really like the people I interact with
2. I get along with people I come into contact with
3. I consider the people I regularly interact with to be my friends
4. People in my life care about me
5. People are generally pretty friendly towards me

**APPENDIX C. PERCEIVED RELATEDNESS DISSATISFACTION**  
(Costa, Ntoumanis, & Bartholomew, 2015)

Please read each of the following statements carefully, thinking about how true that statement is for you. Rate each item from 1 to 7.

Not at all True

Very True

1                    2                    3                    4                    5                    6                    7

1. I usually try to avoid interacting with the other people in my life
2. I feel like I can't really trust the people around me
3. I don't usually have a lot of opportunity to interact with other people
4. I usually feel uneasy around other people
5. I tend to feel distant from other people

**APPENDIX D. PERCEIVED RELATEDNESS THWARTING**  
(Costa, Ntoumanis, & Bartholomew, 2015)

Please read each of the following statements carefully, thinking about how true that statement is for you. Rate each item from 1 to 7.

Not at all True

Very True

1            2            3            4            5            6            7

1. There are situations where I am made to feel inadequate
2. I feel I am rejected by those around me
3. I feel others can be dismissive of me
4. I feel other people dislike me

## APPENDIX E. MOTIVATION FOR RELATIONSHIP ENGAGEMENT

(Modified from Sheldon et al., 2017)

Why do you seek out close friendships with your peers? Note: this includes making new friends and/or trying to get closer with current friends/people you already know.

Not at all true		Somewhat true			Very True	
1	2	3	4	5	6	7

### Amotivation Items:

I once had good reasons for trying to make new friends/become better friends with people I know, but now I don't.

Honestly, I don't know why I would try to seek out close friends.

I'm not sure whether I should continue seeking out close friendships.

I used to know why I was trying to make good friends, but I don't anymore.

### External Regulation Items:

Because people will like me better if I have close friends.

Because if I don't have close friends, others won't like me.

Because I'll be looked down upon if I don't have anyone I am close to.

I seek out friends because I feel like I have to.

### Negative Introjection Items:

Because I would feel guilty if I didn't have friends.

Because I would feel ashamed if I didn't have any friends I was close to.

Because I would feel like a failure if I didn't have friends.

Because I don't want to feel bad about myself.

### Positive Introjection Items:

Because I want to feel proud of myself.

Because I want to prove to myself that I am capable.

Because having friends I am close to boosts my self-esteem.

Because I want to feel good about myself.

### Identification Items:

Because I strongly value having close friendships.

Because having friends I am close to is personally important to me.

Because it is my personal choice to continually seek out friendships.

Because having friends is meaningful to me.

### Intrinsic Motivation Items:

Because I enjoy seeking out friendships.

Because having friends I am close to is fun.

Because it is a pleasure to make new friends or get closer with current friends.

Because spending time with close friends is interesting.



**APPENDIX G. CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION SCALE-  
REVISED.**

Eaton et al., 2004

Below is a list of ways you might have felt or behaved. Please list how often you have felt this way during the past week.

**Not at all or less than 1 day last week. One or two days last week. Three to four days last week. 5 to seven days last week. Nearly every day for two weeks.**

1. My appetite was poor.
2. I could not shake off the blues.
3. I had trouble keeping my mind on what I was doing.
4. I felt depressed.
5. My sleep was restless.
6. I felt sad.
7. I could not get going.
8. Nothing made me happy.
9. I felt like a bad person.
10. I lost interest in my usual activities.
11. I slept much more than usual.
12. I felt like I was moving too slowly.
13. I felt fidgety.
14. I wished I were dead.
15. I wanted to hurt myself.
16. I was tired all the time.
17. I did not like myself.
18. I lost a lot of weight without trying to.
19. I had a lot of trouble getting to sleep.
20. I could not focus on important things.

## APPENDIX H. DEMOGRAPHICS QUESTIONNAIRE

Age: \_\_\_\_\_

Gender:

- Male
- Female
- Other

Ethnicity:

- African American
- Asian American/Pacific Islander
- Caucasian/White
- Hispanic or Latino/a
- Native American
- Other: \_\_\_\_\_

Year in School:

- Freshman
- Sophomore
- Junior
- Senior
- Other: \_\_\_\_\_

Relationship Status:

- Single
- In a Relationship
- Engaged
- Married
- Other: \_\_\_\_\_

How close would you say you are with your family (parents/guardians, siblings, other close family member)? Rate your answer from 1 to 4 on the following scale:

1. Not close at all. We hardly ever call/text when we aren't together. I don't feel supported by them hardly at all.
2. Not very close. I call/text them sometimes, but we don't have the kind of relationship where I tell them everything.
3. Somewhat close. I think I talk to them a decent amount, and I feel somewhat supported by them.
4. Very close. We call/text a lot, and I feel very supported by them.

## APPENDIX I. INFORMED CONSENT

**Title of Study:** College Relationships  
**Investigators:** Elise Frickey, Principal Investigator  
 Lisa Larson, Ph.D., Study Supervisor

This is a research study. Please take your time in deciding if you would like to participate.

### INTRODUCTION

The purpose of this study is to learn more about undergraduate students' relationships.

### DESCRIPTION OF PROCEDURES

If you agree to participate in this study, you will be asked to fill out several questionnaires. After being asked to answer demographic questions, you will be asked to answer questions pertaining to your views about yourself in relationships, about how you feel about your current and future relationships, and about the kinds of feelings you have in general.

The study in its entirety will take about 30 minutes to complete. You will not be able to save your responses and finish at another time. If you intend to complete the survey you must finish it within a few hours of opening the survey.

### RISKS

While there are no foreseeable risks to participating in this study, should you feel uncomfortable or have questions regarding your participation in the study, please contact the primary investigator, Elise Frickey, (email: [ebyron@iastate.edu](mailto:ebyron@iastate.edu)) or the study supervisor, Lisa Larson, Ph.D. (email: [lm Larson@iastate.edu](mailto:lm Larson@iastate.edu)).

### BENEFITS

Participation in this study may not lead to any direct benefits to you personally. However, your participation could help the researchers gain greater understanding of undergraduate college student's experiences in relationships.

### COSTS AND COMPENSATION

You will receive one (1) research credit for participating, and there will be no cost to your participation. However, there are several alternatives to participating in this particular study to achieve this 1 research credit (e.g., writing a research paper, participating in other studies, etc.). These alternatives are known by your course instructor, so please consult them for more information.

### PARTICIPANT RIGHTS

Your participation in this study is entirely voluntary; this means that you may refuse to participate or leave the study at any time. If you decide not to participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled. You can skip any questions that you do not wish to answer.

## CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken:

- Once your survey responses are uploaded to our secure data file, your name will be replaced with an ID code.
- All data will be kept on a password-protected desktop computer within a locked room.
- If the results are published, your identity will remain confidential.

## QUESTIONS OR PROBLEMS

You are encouraged to contact the principal investigator with questions at any time during this survey.

- For further information about the study, contact the primary investigator, Elise Frickey (email: [ebyron@iastate.edu](mailto:ebyron@iastate.edu)) or the lab supervisor, Lisa Larson, Ph.D. (email: [lm Larson@iastate.edu](mailto:lm Larson@iastate.edu)).
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, [IRB@iastate.edu](mailto:IRB@iastate.edu), or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

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## PARTICIPANT CONSENT

By clicking the icon next to “I understand this information” you are indicating that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document, and that your questions have been satisfactorily answered. After clicking “Consent” you will be led to a page with the study information and your consent information.

I understand this information.  
Consent.

## APPENDIX J. IOWA STATE UNIVERSITY IRB APPROVAL LETTER

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

**Institutional Review Board**  
Office for Responsible Research  
Vice President for Research  
2420 Lincoln Way, Suite 202  
Ames, Iowa 50014  
515 294-4566

Date: 06/22/2018  
To: Elise Frickey Lisa Larson, Ph.D.  
From: Office for Responsible Research  
Title: College Relationships and Wellbeing  
IRB ID: 18-257  
Submission Type: Initial Submission Review Type: Expedited  
Approval Date: 06/21/2018 Date for Continuing Review: 06/20/2020

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- Use only the approved study materials in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.
- [Retain signed informed consent documents](#) for 3 years after the close of the study, when documented consent is required.
- Obtain IRB approval prior to implementing any changes to the study.
- Inform the IRB if the Principal Investigator and/or Supervising Investigator end their role or involvement with the project with sufficient time to allow an alternate PI/Supervising Investigator to assume oversight responsibility. Projects must have an [eligible PI](#) to remain open.
- Immediately inform the IRB of (1) all serious and/or unexpected [adverse experiences](#) involving risks to subjects or others; and (2) any other [unanticipated problems](#) involving risks to subjects or others.
- Stop all human subjects research activity if IRB approval lapses, unless continuation is necessary to prevent harm to research participants. Human subjects research activity can resume once IRB approval is re-established.
- Submit an application for Continuing Review at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.
- Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. Approval from other entities may also be needed. For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. IRB approval in no way implies or guarantees that permission from these other entities will be granted.
- Please be advised that your research study may be subject to [post-approval monitoring](#) by Iowa State University's Office for Responsible Research. In some cases, it may also be subject to formal audit or inspection by federal agencies and study sponsors.
- Upon completion of the project, transfer of IRB oversight to another IRB, or departure of the PI and/or Supervising Investigator, please initiate a Project Closure to officially close the project. For information on instances when a study may be closed, please refer to the [IRB Study Closure Policy](#).

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or [IRB@iastate.edu](mailto:IRB@iastate.edu).