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Social Relationships and Well-Being:
Rediscovering the Importance of Adult Friendship

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requirements for the degree Doctor of Philosophy
in Psychology

by

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ABSTRACT OF THE DISSERTATION

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Professor Benjamin R. Karney, Chair

Friendships are important sources of social connection and a valuable source of joy throughout our lives; yet modern relationship researchers have focused the majority of their attention on connections with romantic partners and/or family members. Moreover, few studies have assessed how all three of these relationships simultaneously affect individuals' lives. The aims of the following three studies are to illuminate how and why friendships are uniquely fundamental in the lives of adults, and improve upon the methodology used to assess the value adult friendships have to offer. Study 1 of this dissertation examines how satisfaction in relationships with friends, family, and spouses independently affect individuals' well-being. The findings revealed a significant, negative interaction between intimate relationship satisfaction, friendship satisfaction, and life satisfaction such that, when satisfaction with intimate partners was high, life satisfaction was high regardless of friendship quality; however, when satisfaction with intimate partners was low, those with high quality friendships had moderately high satisfaction with life.

Study 2 expands on the findings of Study 1 by asking what aspects of friendships account for their benefits and to whom are each of these aspects more or less relevant. Study 2 accomplishes this by assessing whether or not specific dimensions of friendship (closeness, enjoyment, and utility) are independently associated with individuals' well-being and happiness, and estimating whether these associations vary by gender. The results indicated that only closeness and enjoyment, not utility, were independently associated with individual well-being, and there was a significantly greater positive association between enjoyment and well-being for women than for men. Although Studies 1 and 2 both illuminate the significance of friendships in general well-being, the study of friendships remains limited by a lack of consensus around ways of measuring satisfaction with friends. Most existing friendship satisfaction scales have primarily assessed children, many are long and cumbersome, and none has exploited the most sophisticated available psychometric techniques for scale development (i.e., bi-factor modeling and item-response theory). Thus, there exists a critical need to develop an adult friendship satisfaction scale that can be widely adopted by close relationships' researchers. Study 3 of this dissertation pursued the development and psychometric validation of the unidimensional Adult Friendship Scale (AFS). The results of the first two studies and the outcome of the third study contribute to this area of research by highlighting the unique roles friendships play in well-being. They also offer a novel method by which researchers' can assess friendships to further the field's understanding of how friendships function as sources of joy, intimacy, fun, and connection in adult lives.

The dissertation of Victor Kaufman is approved.

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University of California, Los Angeles

2020

DEDICATION

To Loretta:

My wife, partner and best friend, who has given me support, wisdom, and judgment my whole adult life

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VITA

Victor Kaufman is Vice Chairman of IAC (a leading internet company). Prior to joining IAC, Mr. Kaufman had a long career in the entertainment industry, including service as the founding President and CEO of Tri-Star Pictures, and as President and CEO of Columbia Pictures Entertainment. Previously, Mr. Kaufman served as a member of the Board of Directors of Expedia, Live Nation Entertainment, Ticketmaster, Hotels.com, and Trip Advisor.

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Literature Review

Positive social relationships are one of the most important components of optimal well-being Argyle (2001); (Caunt, Franklin, Brodaty, & Brodaty, 2013; Lyubomirsky, King, & Diener, 2005; Peterson, 2006). These relationships are significantly associated with both physical and mental health (Gilbert, Quinn, Goodman, Butler, & Wallace, 2013; Verhofstadt, Buysse, Rosseel, & Peene, 2006). They put people in a good mood (Argyle, 2001) and are usually present in people reporting a high level of happiness (Bretherton, 1992; Caunt et al., 2013; E. Diener & Seligman, 2002). Yet not all relationships are equal, as people participate in many different types of social relationships during their lives. These include romantic partnerships, family relationships, friendships, relationships with co-workers, neighbors, acquaintances, and (for married people) relationships with in-laws.

Within the context of a person's entire social network, each type of relationship may affect well-being in different ways. For most relationships, what matters may be time spent together (Saphire-Bernstein & Taylor, 2013), as people tend to spend more than 50% of their time with their five most intimate relationships (Sutcliffe, Dunbar, Binder, & Arrow, 2012). These intimate relationships create closeness that fosters "love and belongingness," an important step before achieving self-actualization (Maslow, 1968). For other relationships, what matters may be the quality of the connection (Verhofstadt et al., 2006); in these cases, people who have continuous interaction with particular relationships experience higher levels of well-being than those who interact with ever-changing social networks (Baumeister, 1995). For still other relationships, what matters most may be the level of enjoyment people experience in socializing, especially when compared to participating in other activities (Sandstrom & Dunn, 2014).

The preponderance of research on relationships and well-being has focused on romantic relationships (Saphire-Bernstein & Taylor, 2013), and to a lesser extent, families and friends (Birditt & Antonucci, 2007; Fuller-Iglesias, Webster, & Antonucci, 2015; Lyubomirsky & Lepper, 1999; Walen & Lachman, 2000). While all of these relationships are important for understanding well-being (Antonucci, Ajrouch, & Birditt, 2013; Birditt & Antonucci, 2007; Litwin & Shiovitz-Ezra, 2010; H. T. Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), few have specifically analyzed why this is so, and as a result, there has been little theoretical development in this area to date (Saphire-Bernstein & Taylor, 2013). Moreover, although researchers have studied the implications of different types of social relationships separately, rarely have they studied different relationships simultaneously (Birditt & Antonucci, 2007; Chopik, 2017; Thomas, 2016).

The goal of this paper is to review the social network literature to assess similarities and differences between romantic relationships, family relationships, and friendships in order to assess their associations with well-being throughout the life span. This review will evaluate each relationship separately to explore how each is different. In pursuit of this goal, the rest of the review will be organized as follows: The first section reviews existing theory about social connections. The second section evaluates methods of addressing the associations between relationship types and well-being. The third section summarizes the results of empirical research on the associations between specific types of social relationships and well-being. The fourth section addresses moderators of these associations. The final section draws upon the review to make recommendations and set priorities for further research in this domain. Throughout this review, the terms *well-being*, *happiness*, and *life satisfaction* are used interchangeably, consistent with other researchers (Ed Diener, 2000; Lyubomirsky & Lepper, 1999).

Existing Theory about Social Relationships

Historical Perspective

Scientists believe that primates who walked the earth six million years ago lived in loosely constructed groups based on emotional bonds (R.I.M. Dunbar, 2014; Massey, 2002). These bonds emerged from primates' ability to interact with other members of the group, to find a mate, to recognize one's hierarchical position in the group, and to convert perishable goods into useful tools (Frith & Frith, 2001; Massey, 2002). Biologists, anthropologists, and psychologists ground their research on social interactions in this historical perspective when developing theories about the basis for social interaction within humans. Virtually all such theories "assign relationships a fundamental role in human development and adaptation" (H. T. Reis, 2001). Among the most prominent theories are Attachment Theory, the Self-expansion Model, the Social Brain Hypothesis, and the Belongingness Hypothesis. Each is examined below.

Attachment Theory

Attachment theory, created by John Bowlby and developed by Mary Ainsworth, suggests that the primary function of relationships is to provide security and comfort (Takahashi, 2005). For children to grow up psychologically healthy, they need to experience a "warm, intimate and continuous relationship with [their] mother (or permanent mother substitute) in which both find happiness and enjoyment" (Bretherton, 1992, p. 761). This mother-child relationship creates a secure base from which the child can explore the world and develop additional bonds that are characterized by closeness, distress in separation, joy in reuniting, and grief on loss (Bretherton, 1992). While researchers have applied Attachment Theory mostly to children, romantic partners take over for mothers as the primary attachment figure in adulthood, even though mothers and older siblings still provide supplemental levels of security (Ainsworth, 1989; Fraley & Shaver,

2000; Zeifman & Hazan, 2018). In terms of romantic partners, people “typically feel safer and more secure when their partner is nearby, accessible, and responsive” (Fraley & Shaver, 2000, p. 2).

Researchers have used Attachment Theory as the basis for defining what constitutes close relationships, with only a few types of relationships qualifying (Takahashi, 2005). Most of an adult’s attachment figures are romantic partners and family (usually parents), with friends mostly excluded, except for certain friends who are “uniquely valued person[s]” that are not interchangeable with others (Ainsworth, 1989, p. 714). These types of friends typically are “best friends” (Birditt & Antonucci, 2007; La Guardia, Ryan, Couchman, & Deci, 2000).

Attachment Theory is relevant to the links between relationships and well-being, especially when one considers that the greater the feeling of security with attachment figures, the greater association with well-being (La Guardia et al., 2000). Through the application of this theory, researchers have identified romantic relationships, especially relationships with spouses, as having the most significant association with well-being and happiness as compared to other types of relationships like family and friends (Birditt & Antonucci, 2007; Hilpert, Bodenmann, Nussbeck, & Bradbury, 2014). Parents (especially mothers) also provide security to their adult children, and these types of attachments are significantly associated with well-being as well (Antonucci, Akiyama, & Takahashi, 2004; Birditt & Antonucci, 2007; Burger & Milardo, 1995; Ratelle, Simard, & Guay, 2012).

The Self-expansion Model

The Self-expansion Model, created by A. Aron, emphasizes growth. This model posits that people are motivated to explore ways in which to expand their perspectives on life through curiosity, self-improvement, seeking greater competence, or seizing on opportunity. This is

achievable through, among other methods, the “inclusion-of other-in-the-self-principle.” What this principle means is that people can expand their own identity (i.e. who they are, how they see the environment around them, and the benefits of certain actions) through close relationships with others, when “the others resources, perspectives, and identities are experienced ... as one’s own” (Aron, Lewandowski, Mashek, & Aron, 2013, p. 2).

As (Aron et al., 2004 p. 102) elegantly states, “The other, to some extent, becomes part of the self.” One way of achieving this goal is through engagement in shared activities that are exciting, invigorating, and novel (Aron, Norman, Aron, & McKenna, 2000). These shared activities “encourage exploration and novelty-seeking behavior” (Mattingly, 2012, p. 124). When partners achieve the inclusion of another in their own sense of self, they are significantly more satisfied in their close relationships (Aron et al., 2004).

Much of the research in this area revolves around romantic partners and their relationship satisfaction (Aron et al., 2013; Aron et al., 2004; Aron, Norman, Aron, & Lewandowski, 2002; Mattingly, 2012). However, the underlying principles of self-expansion also exists in best friendships (Aron et al., 2005; Aron et al., 2004). Whether with romantic relationships or with best friends, these dyads present themselves as double beings (Aron et al., 2005). These spouses and best friends tend to participate in “enjoyable activities” together that are novel, stimulating, and exhilarating (Aron et al., 2002; Demir, Orthel-Clark, Özdemir, & Bayram Özdemir, 2015).

On a practical basis, this theory has led to the creation of the “Inclusion of Others in Self Scale.” The scale consists of seven interconnecting pairs of circles ranging from pairs that hardly overlap to pairs that overlap almost completely. Respondents select the pair of circles that best represent their relationships with a specific person (Aron, Aron, & Smollan, 1992). This visual assessment captures both the feeling of being close, as well as behaving in a close manner. Since

researcher have viewed closeness as associated with well-being, this Others in Self Scale” should be associated with people’s level of happiness (in addition to measures relating to marital satisfaction), and indeed, the higher scores on the scale correlate strongly with other measures of closeness (Aron et al., 2013).

With growth as the central dynamic of this model, people tend to grow the most through their romantic relationships and with their friends. Growth may play a less important role with family in general and parents specifically. When children become adults, they more often than not want to set their own path without the influence of their parents. To do this, many individuals will choose a romantic partner. When romantic partners merge together (typically via marriage), positive and significant associations with relationship satisfaction, and thereby life satisfaction, occur when each partner lives their partner’s experiences as their own. The same logic applies to close or best friends. People who have these types of friends may grow together in a way that gives each confidence in their independence and support in their endeavors. This type of growth may be significantly associated with well-being and happiness.

Social-Brain Hypothesis

The Social Brain hypothesis, developed by the anthropologist R.I.M. Dunbar, proposes (1) that to make actionable decisions, primates need to socially bond so they can better process and manipulate complex information, and (2) that social group size can be predicted by the size of the neocortex of the brain of particular species (R.I.M. Dunbar, 2014). Assuming the accuracy of the first hypothesis, Dunbar focused much of his research on the second. He found (based on relative neocortex size) that for monkeys and apes, their natural mean group size was 50, while for humans it was three times larger at 150. For both humans and primates, the attributes of the group members were not homogenous, insofar as they differed based on emotional closeness,

frequency of contact, and the hierarchal layers that emerged as a function of group contact (Sutcliffe et al., 2012). Dunbar found that for humans, four such layers existed, with each approximately three times as large as the preceding layer. That is, the layers for humans roughly consisted of 5, 15, 50, and 150 individuals. The layers are organized with the emotionally closest individuals in the center layer; as one proceeds outward, members of each layer decrease in emotional closeness and contact (Sutcliffe et al., 2012).

Dunbar also found that relationships with family members are stronger (i.e. more enduring) than relationships with friends, as family relationships do not depend on frequency of contact (Roberts & Dunbar, 2011). Dunbar added that relationships with family require less work, because family relationships are often better defined, since the definition of a family relationship is set historically and does not require extensive prior interactions. Consistent with this, Dunbar found that family members (including in-laws for partners) constitute a larger portion of an individual's social networks than friends do. He also found that family relationships are more interdependent (i.e., family members know each other) than friend networks (Roberts, Dunbar, Pollet, & Kuppens, 2009). These findings are consistent with outcomes observed in earlier studies (Acock & Hurlbert, 1993).

The use of name generation procedures in the Social Brain Hypothesis has revealed how the first layer usually consists of individuals to whom a person is emotionally closest and with whom a person interacts with the most. In other words, the first layer typically includes relationships with immediate family and best friends. This mirrors people's adult attachment figures. However, while Attachment Theory has been applied to associations with well-being, the Social Brain Hypothesis is only interested in the specific layers (i.e. the number of individuals in each layer) and how they interrelate with each other, it does not account for

outcomes such as well-being. That said, the layers themselves may be helpful in assessing how certain types of relationships affect life satisfaction. For example, this hypothesis may be very valuable when studying the size of people's social networks, since through its use, studies have shown that 15 individuals are the mean size of an average person's social network.

The Belongingness Hypothesis

Like each of the prior theories, the Belongingness Hypothesis (Baumeister, 1995) proposes that forming and sustaining at least a few interpersonal relationships is a fundamental motivation for all humans and is present in all cultures. Yet relationships are not permanent, as one new relationship can replace an old failed relationship. Based on these premises, the belongingness hypothesis proposes, first, that people need frequent contact with others, and second, that these interactions should be positive and pleasant, or at the very least mostly free from conflict or negativity. The hypothesis also emphasizes that stability (i.e., continuity) in relationships is important. With stability comes better understanding, stronger bonds, and predictability, all of which form a strong base for pleasant experiences.

In contrast to the specificity of the other theories previously discussed, the Belongingness Hypothesis is “a broad integrative hypothesis [that] “might help rectify what some observers have criticized as fragmentation and atomization in the conceptual underpinnings of [research on social behavior], including the application of Attachment Theory” (Baumeister, 1995, p. 498). With respect to understanding happiness and life satisfaction, Baumeister (1995) emphasized that mere affiliation with others is not adequate to support well-being, as non-supportive others do not add to life satisfaction. Strong emotional ties (e.g., with a parent) are not adequate either, as relationships without contact also do not satisfy a person's needs. Both contact and positivity are

necessary for a relationship to be satisfying (Baumeister, 1995). Social isolation, on the other hand, can be quite detrimental (McPherson, Smith-Lovin, & Brashears, 2006).

As alluded to above, the Belongingness Hypothesis is distinct from Attachment Theory, insofar as it does not emphasize security as the central basis for the association between relationships and well-being. It is also distinct from the Self Expansion Model in that it does not focus on growth and from Social Brain Theory in that it does not focus on layers. The Belongingness Hypothesis instead focuses on the individual broadly by assessing positivity and pleasantness in relationships. Researchers in this area have primarily applied the hypothesis to romantic relationships and friendships, reporting significant associations between positive affect in such relationships and well-being (Lyubomirsky et al., 2005). Researchers have not yet applied this hypothesis toward studying families, a relationship type that can have some of the highest level of conflict and stress (Fuller-Iglesias, Webster, & Antonucci, 2013; Fuller-Iglesias et al., 2015).

Based on Theory, What are Important Dimensions of Relationships?

The four theories discussed provide a strong basis for understanding the important dimensions of relationships (which overlap to a certain degree). The first dimension is *closeness*, a form of intimacy that provides security and social support. Next, *frequency of contact* is important because if a person does not interact with another on a continuous basis, it is difficult to sustain that relationship. Third, the *affective quality* of relationships is also important, as by definition, a positive affect means that people are happy. Fourth, *mutuality* can also be important, as people need others with whom they can become one. Finally, the types of *activities* that partners in relationships engage in can enhance or detract from a person's well-being. When people interact with each other, in novel ways, they experience joy. These dimensions echo the

six dimensions of interdependence identified by Harold Kelley and Jon Thibaut (H. H. Kelley & Thibaut, 1978; Thibaut & Kelley, 1959).

Methods to Study the Associations between Social Relationships and Well-Being

Research methods that assess the associations between social relationships and well-being are varied, and as such, warrant examination. Below are descriptions of the most prominent methodologies in this literature. Each has benefits and shortcomings that will be articulated and examined.

Self-Report Measures

Global evaluations. Self-report measures administered through surveys and questionnaires are used extensively by researchers to assess how different types of relationships are associated with well-being (H. T. Reis, 2001; Ryll, 1989). While self-report data are “a valuable source of information” (H. T. Reis, 2001, p. 60), this form of data collection also has shortcomings. For example, this approach to collecting data can involve an *a priori* assumption about what types of relationships are important. This approach also may seek to capture responses that are beyond a respondent’s ability to recall, such as memories of past events or experiences, and this can lead to biased responses. On the other hand, these types of self-reports are easy to collect and allow for larger samples of respondents to be gathered, a fact that allows researchers the potential to avoid Type 2 errors. Self-reporting is accordingly the most frequently used methodology to assess the association between social experiences and well-being.

Experience-sampling (i.e., daily diaries). The experience-sampling technique records feelings and activities (usually on-line) on a moment-by moment basis. This approach enables a researcher to follow a person’s general feelings as they covary with specific interactive situations and circumstances (Scollon, Kim-Prieto, & Diener, 2009) to assess “the extent to which one’s

well-being fluctuates from day-to-day and from setting to setting” (H. T. Reis et al., 2000, p.419). Researchers also use daily diaries to study within-person changes over time, rather than between-person differences (Scollon et al., 2009). This methodology studies “everyday events as they occur in natural contexts... bolstered by the recognition that experience is most accurately assessed immediately” (Reis, 2001, p. 59), and as a result, allows researchers to understand better why and how people experience events in their lives. On the downside, the samples utilized for this type of methodological approach are relatively small.

Name designation processes (i.e., number of alters named). Researchers can also use a name generation procedure in personal network interviews as a way to estimate the association between social relationships and well-being. With this approach, a researcher will ask an ego (i.e., a respondent) to list a specified number of alters (i.e., other individuals) who are important in their lives or with whom they are close. Alternatively, researchers’ ask egos to list alters with whom they have discussed important matters or with whom they have regularly had fun with during the past six to 12 months. The interviewer can also ask additional questions specifically about the relationship between the ego and each named alter as part of this approach (Acock & Hurlbert, 1993; Kearns & Leonard, 2004).

Work by Golinelli (2010) shows that egos can easily name 20 to 45 alters when asked to generate their list. This method, as compared to self-report questionnaires, does not rely on a *priori* assumption about which relationships are most important. Because the process of naming alters can be very time consuming, many researchers have opted to limit the maximum number of alters to be named and discussed by egos (Bost, Cox, Burchinal, & Payne, 2002). For example, some studies limit alters named to between four and five (Acock & Hurlbert, 1993; Thomas, 2016), while other studies predetermine the number of alters by restricting the list of

alters to specific relationship types, such as a spouse, mother, father, child and/or best friend (Birditt & Antonucci, 2007). With that said, a number of studies have relaxed these restrictions and allowed listing of between five and 10 alters (Bost et al., 2002; Fuller-Iglesias et al., 2015) or between 10 and 20 alters (Fingerman, Hay, & Birditt, 2004; Fischer & Oliner, 1983; Kearns & Leonard, 2004; Catherine H. Stein, Bush, Ross, & Ward, 1992). Sometimes, even up to 40 alters have been listed (Jackson, Kennedy, Bradbury, & Karney, 2014; Kennedy, Jackson, Green, Bradbury, & Karney, 2015).

A number of issues with the name-designated process should be noted. First, the number of alters requested shapes the sort of relationships that are named. Even though egos spend more than half of their time with their closest network relationships (Sutcliffe et al., 2012), these might not be the most impactful people to study. Second, although authors can extrapolate from theory and research findings as a way to predetermine what types of relationships are worth studying, these extrapolations can be impacted by untested assumptions about the types of relationships that matter and do not matter to well-being. For example, Birditt and Antonucci (2007) specified five types of relationships (spouse, parent, child, sibling and best friend) as the types most important to study. These designations, however, are somewhat limited and do not capture the whole constellation of potential relationships (such as close but not best friends and work friends) that may impact wellbeing (Fingerman, 2009; Fingerman et al., 2004; Granovetter, 1973; Small, 2013).

The Convoy Model. This model builds on the principles underlying attachment, roles, and organization (Antonucci et al., 2013). More specifically, the Convoy Model is a structural concept that measures a person's desire for support from others (Antonucci et al., 2013). As Antonucci, Akiyama and Takahashi (2004) state, convoy relationships (i.e. relationships that last

over time) serve to both shape and protect individuals through sharing “life experiences, challenges, successes and disappointments” (Antonucci et al., 2004, p. 353). This is because every person “travels through life with a convoy, or a network of social relationships that protect, defend, aid, and socialize [them]” (Hutchinson, 2019, p. 353). The Convoy Model recognizes this by noting how close and important relationships can be placed into three concentric circles, with each circle showing “close, closer, and closest relationships” (Antonucci et al., 2013, p. 84). This model is important to the study of the associations between specific types of social connections and well-being because it breaks out different classes of relationships in terms of closeness, quality, and structure (Antonucci et al., 2013, p. 84).

Within the Convoy Model, respondents’ (i.e., egos) see a picture with four concentric circles, with the ego (designated as “me”) in the center. The other circles represent alters who are *close and important* in a respondent’s life in terms of social support. The innermost of the three other circles is often reserved for the closest relationships; that is, those who with whom the ego could not imagine life without. Within the innermost circle, egos usually list three or four attachment figures such as a spouse, mother, father, and/or children (Antonucci et al., 2004; Fingerman et al., 2004). However, at times an ego can also list other special relationships with a caregiver or a best friend (Antonucci et al., 2013; Antonucci et al., 2004; Kahn & Antonucci, 1980). The next closest to the center circle is reserved for alters with whom the ego is close, but who do not meet the criteria for inclusion in the first circle. In this circle, egos typically name up to four alters who are mostly siblings and very close friends. The final outermost circle is reserved for other important alters in the lives of the ego, often those persons with whom they are close but not so close as to be named as part of the other two circles (Antonucci et al., 2004). Typically, a respondent names approximately ten people within the three designated circles

(Takahashi, 2005). This mapping approach is a practical way to describe an ego's social network, as it is easy to administer and it creates clear subjective distinctions.

The convoy model can be very valuable when studying specific relationship types. Through its use, researchers can ascertain the associations between different types of individuals and well-being. Variations of this model are also used, as researchers can choose to substitute other constraints into the model for "closeness," such as "intimacy." Researchers sometimes also collapse the circles into one and ask respondents to list those people "with whom you discuss important matters," or people "with whom they are emotionally close" (Campbell & Lee, 1991). In these cases, the researcher may limit the number of people that the respondent should name. Typically, those limits are between five and 10, but the upper limit may be expanded to 20 or more as necessary.

Hierarchically structured networks. Work by different authors (R.I.M. Dunbar, 1998; Roberts et al., 2009) have explored the structure of peoples' social connections via the use of a hierarchal approach that creates groups by rank order in terms of closeness. This approach has many of the same elements as the Convoy Model, with the most notable exception being the way the researcher defines closeness. Studies using hierarchically structured networks have used the mean time from last contact as synonymous with elements of emotional closeness while also taking into account geographical distance. Three groupings emerged as part of the hierarchy, with the closest group being the support clique, representing individuals with whom a respondent would seek advice and/or assistance in times of distress (R.I.M. Dunbar, 1998; Roberts et al., 2009; Zhou, Sornette, Hill, & Dunbar, 2005). The next level in the hierarchy is the sympathy group, which is a group of individuals with whom the respondent has special ties and at least monthly contact (R.I.M. Dunbar, 1998; Roberts et al., 2009; Zhou et al., 2005). Finally, there is

the clan, which is a group of individuals with whom the respondent has a personal relationship and makes at least routine efforts to remain in contact (R.I.M. Dunbar, 1998; Roberts et al., 2009; Zhou et al., 2005).

In comparison to the Convoy Model, which is used to study a person's close relationships, hierarchically structured networks study a person's broader network of relations that include both strong and weak ties. In hierarchically structured network studies, the name generation question is much broader in scope than what is used in the Convoy Model. For example, respondents in hierarchically structured network studies were asked to list all names to whom they intended to send Christmas cards, as well as to list all known relatives and non-kin with whom they had been in contact during the last 12 months (Hill & Dunbar, 2003; Roberts et al., 2009). This made sense because the focus of these studies was to assess the best methodology for defining various aspects of social networks.

Hierarchically structured network studies are not as interested in assessing associations between aspects of social networks and outcome variables. However, researchers can use hierarchal groupings as variables to assess their possible unique associations with well-being. With that said, researchers who have used a hierarchal approach have acknowledged that the first two most intimate groupings coincide with psychological research using other methodologies, such as the Convoy Model (Sutcliffe et al., 2012).

Cluster analyses. Another methodology researchers have used when studying social relationships involves examining specific types of social networks as opposed to specific relationships within a network. The underlying premise for the study of clusters is to identify groups of cases (i.e., clusters) that are relatively homogeneous within themselves and heterogeneous between groups (Yim & Ramdeen, 2015). The goal of cluster creation is to

identify distinct heterogeneous groups in which the observations within a group have low levels of variances from the centroid of a cluster (Henry, Tolan, & Gorman-Smith, 2005; Ketchen & Shook, 1996; Mirkin, 2013). Once the clusters of groups have been identified, researchers can then test those separate clusters against specified outcomes such as well-being. Thus, cluster analysis offers a way to describe the relative prevalence of several different types of relationships at once. While this may be helpful, its usefulness may also be limited, as a cluster analysis can only give an overall generalized view of a network.

Characteristics of Relationships

Relationship type. According to Sutcliffe et al. (2012), in most cases the three most prominent types of relationships a person will list are romantic relationships, families (including spouses), and friends. Sutcliffe et al. also note that these relationship types (including in-laws for spouses) constitute well over 85% of all relationships listed by individuals, with the remaining named relationships typically being acquaintances (including work colleagues), neighbors, and members of religious organizations. When asked to identify members of their close networks, people often name family more than any other types of relationship in proportions that have proven remarkably consistent across multiple studies and samples. For example, a large survey of the Detroit metropolitan area found that over 70% of a respondent's close networks consisted of family members (Ajrouch, Antonucci, & Janevic, 2001). When compared to other types of relationships, family relationships on average take up more time and are more frequently turned to in times of stress (e.g., Cheung, Gardner, & Anderson, 2015; Fuller-Iglesias et al., 2015).

Relationships vs. social interactions. While researchers study social connections in terms of types of relationships, simply articulating the types relationships a person has does not paint the entire picture as doing so does not assess social interactions over time. While some may view

relationships and social interactions as overlapping, they are not synonymous. According to Harry Reis, a *relationship* represents an “enduring association” between two individuals through a continuous connection “that ... influence each other’s thoughts, feelings, and behavior” and results in a unique bond. In contrast, *interactions* “may occur between related or unrelated individuals, and refers to a single social event” (H. T. Reis, 2001, p. 61).

Researchers typically study relationships by either using retrospective questions pertaining to life experiences or by using daily dairies to “isolate interactions from another by obtaining reports about each event, one at a time” as a way to examine “how individual events accumulate to create a more general, multifaceted entity: the relationship” (H. T. Reis, 2001, p. 61). The use of different methodologies often results in different findings. For example, the quality of a type of relationship discovered by retrospective questioning is often associated with life satisfaction (i.e., fulfilling one’s potential), while a social interaction between two people (such as engaging in exciting activities) discovered in daily diaries is more often associated with feelings of positivity and happiness.

Strong vs. weak ties. Listing techniques to date mostly have been limited to identifying relationships described as “close”, “strong”, or “important” (Bost et al., 2002; Litwin & Stoeckel, 2013). Granovetter (1973) defined the strength of a network tie as “a (probably) linear combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie” (Granovetter, 1973, p. 1361). The emphasis on strong ties reflects the widespread assumption that close networks are uniquely relevant for understanding associations between social personal relationships and well-being (Berschied, Snyder, & Omoto, 1989; Fingerman et al., 2004; Kahn & Antonucci, 1980). Yet a restricted

focus on such close relationships may be problematic because so-called “weak” relationships may affect a respondent’s well-being over and above his or her close networks.

In contrast to close relationships where a person may be able to identify relationships that he or she can rely on for support and validation, a person’s extended group of relationships may reveal greater variability, such that some people remain close to a wider network of relationships while others do not (Roberts et al., 2009). In this way, closeness to an extended group may be a superior index of sociability and social integration in terms of its associations with well-being (Berkman, Glass, Brissette, & Seeman, 2000; Booth, Edwards, & Johnson, 1991). Recognizing the potential implications of a person’s extended network (especially for spouses) has led to recent calls for direct assessments of married couples’ weaker ties (Fingerman, 2009). To date, no one has attempted to answer this call. Indeed, many researchers have tended to focus on a person’s close and intimate relationship network when assessing “who people turn to when discussing important matters”(Small, 2013 p. 470). The exception is work done by Small (2013) that used data from the General Social Surveys from 1985 and 2004. In his work, Small found that a person’s close discussion network (generated by a name generation process) did not cover all relationships with whom important matters were discussed. Small found that in “the strength of a tie is neither a necessary nor a sufficient condition for the pursuit of confidants” (Small, 2013, p. 481). Instead, Small found that a person’s core discussion network is comprised of three groupings: first, close and intimate relationships; second, individuals who are knowledgeable about what the respondent finds important; and third, other people who are available to a person based on the ways in which an ego participates in daily activity. Since 70% of all core important discussions relate to family, career, finances, happiness, and health, many discussions are appropriate to have with experts, such as therapists, doctors, business associates, and mentors.

Further, important discussions may also occur due to proximity. If a person needs to talk, that person may decide to raise important matters through interactions with acquaintances and weak ties.

Measuring Well-being

Researchers typically define subjective well-being in terms of two elements: life satisfaction, which is a cognitive measure, and happiness, which is an affective measure: see (C. M. K. Dush & Amato, 2005; Lucas, Diener, & Suh, 1996). Yet both life satisfaction and happiness can lead to an overall judgment that life is good (Argyle, 2001). Some researchers use multiple measures to assess well-being (Oishi, Diener, & Lucas, 2007), while others only measure one element or emphasize one element (i.e. cognitive or affective) over the other (Ed Diener, 2000; Oishi et al., 2007). Each of these elements of well-being may have different predictors (Gallagher & Vella-Brodrick, 2008).

In positive psychology, there are two ways to discuss well-being (Saldarriaga, Bukowski, & Greco, 2015). The first, hedonic well-being, is based on creating high levels of happiness for people through positive emotional experiences, such as joy and contentment. The second, eudaimonic well-being, is based on fulfilling one's potential (i.e. life satisfaction). In many studies, there are strong correlations between each of these approaches. However, differences can occur in particular circumstances (Demir & Davidson, 2013). For example, best friendships often involve the highest level of positive affect and may be more strongly associated with happiness, a measure more aligned with positivity than with life satisfaction.

The Association Between Social Interactions and Well-being

Historical Perspective

Most psychological scholars have assumed that, for humans, meaningful social connections are important to well-being (Feeney & Collins, 2014; H. T. Reis, 2001), but few scholars have specifically analyzed why this is so (Saphire-Bernstein & Taylor, 2013). In the early days of research on this subject, scientists focused on the connection between social activity and well-being and found significant associations between both factors (Oken, Stock, Haring, & Witter, 1984). Soon thereafter, researchers turned to investigating the quantitative aspects of social connections, such as social network size, frequency of social activity, and number of confidants (Saphire-Bernstein & Taylor, 2013).

Then researchers' focused on how people benefitted from connecting with others (Saphire-Bernstein & Taylor, 2013), as well as identifying how relationship conflicts or strains (either direct or through ambivalence) and relationship depth (as represented by positivity, importance, and security; Verhofstadt et al., 2006) predict well-being. Starting in the late 1990's, researchers began to distinguish between social support and social networks. While social support focused on the qualitative aspects of people's relationship with each other, social networks focused on the structural components of people's close relationships, such as composition (Antonucci, Fuhrer, & Dartigues, 1997; Takahashi, 2005).

Romantic Partners

Over the life span, people have romantic partners under very different circumstances. The largest group of people who have romantic partners include people who have spouses or committed partners, are cohabiting, or are seriously dating someone. Regardless of form, marriage is the intimate relationship that has received the most attention, so this review will focus of that form of intimate relationship. From a theoretical standpoint, all four of the theories presented earlier suggest that romantic relationships should be the most important relationship in

a person's life, so the quality of a romantic relationship should directly impact well-being and happiness. In adulthood, spouses' become each other's primary attachment figure, and this attachment provides an essential closeness bond and support. Each spouse is able to grow because each expands their own identity by adopting the resources of the other and experiences their partner's identity as their own. This line of thought is explored below.

Relationship status. Researchers' have shown that the status of being married or having a committed partner is associated with higher well-being (Lucas, Clark, Georgellis, & Diener, 2003). Several factors underlie this phenomenon and include a selection effect, social support, and interdependence. With respect to a *selection effect*, it may be that happier people get married or have a committed partner (C. M. K. Dush & Amato, 2005; Waite & Gallagher, 2000), and that this accounts for their enhanced well-being compared to others who do not have such a committed relationship. In terms of *social support*, spouses or partners in committed relationships receive social support from other dyad members that "account for much of the emotional benefits of [marriage or committed partnerships]" (C. M. K. Dush & Amato, 2005, p. 609). This support creates a strong basis for greater life satisfaction. Finally, with respect to *interdependence*, it may be that the reshaping of people's social networks through marriage or a committed relationship creates an environment for greater happiness through interdependence between a husband's and a wife's networks (Fuller-Iglesias et al., 2015). For example, when a husband or a wife view their spouses' friends and/or family on equal footing with their own family and friends, they become more integrated as one, a phenomenon that can significantly enhance their marital satisfaction and well-being.

Strength of relationships. Spouses matter a lot. A meta-analysis by Proulx, Helms, and Buehler (2007) found a moderate association between marital quality (broadly defined to include

marital happiness and marital satisfaction) and well-being. This relational association is the most important within a person's social network and has the greatest effect on a spouse's well-being and happiness (Antonucci, Lansford, & Akiyama, 2001; Argyle, 2001; Binder & Broekel, 2011; Bodenmann, Hilpert, Nussbeck, & Bradbury, 2014; Y. Chen & Feeley, 2013). To Finkel, Hui, Carswell, and Larson (2014, p. 15), "happiness in one's marriage ... is perhaps the single most robust predictor of global life happiness". What this suggests is that married couples are very special social units because, among other reasons, spouses are usually very close to their partner, they share many experiences together, they conceive and raise children together, they participate in socializing with others, and through proximity, they have the strongest ability to shape their partner's future development (Hoppmann, Gerstorf, Willis, & Schaie, 2011). Further, reciprocal and synergistic effects within the dyad appear to influence each spouse's well-being positively, such that couples report similar levels of well-being (Antonucci et al., 2013; Hoppmann et al., 2011). For these reasons, intimate relationships (i.e., between spouses or committed partners) should have unique effects on the well-being of partners.

However, not all marriages are equal (C. M. K. Dush & Amato, 2005; Lehmann et al., 2014). Some marital dyads are happy, and some are not. While happy marriages may be significantly and positively associated with well-being, the state of being in an unhappy marriage does not result in a high level of well-being (Ross, 1995). Further, "being in a discordant relationship may be worse than being in no relationship at all" (C. M. K. Dush & Amato, 2005, p. 611). Whether spouses consider their partner to be their best friends may also affect the association between these relationships and happiness. For example, VanderDrift, Wilson, and Agnew (2012) explored the value of being friends with a non-marital romantic partner because the author believed, based on prior studies, that the quality of "friendship" between two such

partners' would be positively associated with relationship outcomes. In this study, the author equated enhanced friendship between a dyad to love, broadly defined. Specifically, he found that the more people were willing to invest in their friendship with their partners, the greater the rewards they reaped in their romantic relationships. This finding supports the view that the essential determinants of friendship quality within a romantic relationship can enhance well-being. Work by Groer and Helliwell (2014) lends credence to this point, as they found that if spouses were best friends, they had a 200% better chance to be happy in their marriage. Yet marriages can create high levels of conflict and strain (Argyle, 2001; Y. Chen & Feeley, 2013), with nearly one-third of all marriages reported to be "unhappy" (Hawkins & Booth, 2005). A 20-year longitudinal, multi-wave study C. M. K. Dush, Taylor, and Kroeger (2008) found that although there are psychological benefits to being in happier marriages, there are serious costs of being in unhappy marital relationships.

Social interactions. Spouses interact with their partners in myriad ways, most of which are not social in nature. Some interactions are mundane day-to-day communications, such as dealing with household chores, childcare, in-laws, and other family obligations. Other interactions involve more substantive emotional communications that are "either positive or negative in tone" (Noller & Feeney, 2002, p. 2) and may involve arguing, stress, and conflict. Typically, researchers who study these interactions from the perspective of the couple, and not the individual, are interested in how these interactions predict marital satisfaction. However, the individual well-being of each spouse can also be studied by assessing the association between depressive symptoms and marital satisfaction (Christine M. Proulx, Helms, & Buehler, 2007). Yet rarely do researchers focus on the positive aspects of spouses' well-being, and if they do so, they only do so indirectly. In these cases, researchers have found that individual spouses who are

happy within their marriages are usually happy in life, but those spouses who are distressed in their marriage are generally unhappy in life and “exhibit rigidity and inflexibility in their communication with spouses” (Fitzpatrick, 1990, p. 440).

It is important to note that spouses can and do interact with each other in a variety of ways. For example, spouses engage in “competent marital communication,” a form of social interaction that focuses on “the ability to self-disclose or reveal private thoughts and feelings about the self to the spouse” (Fitzpatrick, 1990, p. 436). This type of communication generally benefits well-being, and researchers have viewed these communications as central to marital satisfaction as well. The same appears true for participating in pleasant events, such as “visiting friends, attending a movie, attending church, and eating out” (Aron et al., 2000, p. 274). On the other hand, another form of social interaction based on self-expansion theory may be more associated with a spouses’ psychological well-being than with marital satisfaction. Consistent with self-expansion theory, the more spouses’ engage in “novel, challenging, and arousing” activities, the greater the potential for higher levels of relationship satisfaction (Aron et al., 2002, p. 184). Since novel, challenging, and arousing shared activities tend to be positive and pleasant, they satisfy one of the primary criteria for subjective well-being. Because of this, these shared activities may be associated with enhanced levels of happiness over and above marital satisfaction (Aron et al., 2000).

When spouses interact with friends, these interactions can enhance each spouse’s level of well-being. This is especially true if spouses’ include friends’ in some aspects of their social endeavors. Spouses can become more playful with each other in these situations and have stronger positive feelings towards their partners (Bost et al., 2002).

Family Relationships

Research on family relationships has typically focused on relationships with parents. However, more and more studies are now broadening their approach to include siblings and extended family members. Researchers have found that greater emotional support from family members is associated with well-being. However, “negativity across family relationships has a consistent negative impact on well-being” and “is thought to be more frequent in family relationships because of greater frequency of contact that increases the potential for strained interactions” as “family relationships tend to be obligatory and permanent” (Fuller-Iglesias et al., 2013, p. 3). This review will discuss some historical facts about families, consider how family relationships are associated with well-being, and finally, and how social interactions between family members effect family relationships.

Historical perspective. As noted by Bott (1971), the family has been, and continues to be, the backbone of society. As stated in a recent study (Fuller-Iglesias et al., 2015, p. 278), “family relationships are often heralded because they are more likely ... to offer instrumental support in times of need, [they] make up the largest part of most adults [networks and] are overwhelmingly represented among the closest [network members.]” Other studies have reinforced this conclusion and have found that families are durable and long lasting and that spouses receive greater satisfaction from family than from friends (Bost et al., 2002). Families provide a greater degree of support relative to friends and have been the most important relationship for spouses (Burger & Milardo, 1995). This is because a relationship with parents is unique (Birditt & Antonucci, 2007), as parents provide a strong resource to deal with stress (Cheung et al., 2015). Thus social networks with high proportion of family members usually are networks with strong ties (Acock & Hurlbert, 1993). Indeed, Bost et al. (2002) found that participants listed more

family than friends and also spent more time with, and had greater give-and-take with, family over friends.

Family relations and well-being. Researchers have also found that family relationships (mostly studied in the context of parents and children) play a very complex role in well-being and happiness. Family ties usually are durable and long lasting (Bost et al., 2002); however, there sometimes exists a level of negativity within family relationships that enhances depressive symptoms (Antonucci, Birditt, Sherman, & Trinh, 2011; Fuller-Iglesias et al., 2015). The greater the conflict, the lower the happiness level (Fuller-Iglesias et al., 2015; North, Holahan, Moos, & Cronkite, 2008). With all these cross-pressures, researchers have often described family relationships as “ambivalent” (Fuller-Iglesias et al., 2013) and have found more ambivalence within family relationships than within non-family relationships. This is particularly true in relationships between parents and children (Fingerman et al., 2004). Importantly, studies have also found that social support and social conflict do not correlate within family relationships (Abbey, Abramis, & Caplan, 1985; Walen & Lachman, 2000). Thus it is the case that families are not “a reliable source for positive experiences” (Larson & Bradney, 1988, p. 123).

To date there are a relatively limited number of studies that have specifically analyzed associations between family relationships and people’s happiness and well-being (Burger & Milardo, 1995; North et al., 2008). Typically, research will cover a married person’s close social support network, which usually includes a high percentage of family members (Fuller-Iglesias et al., 2015; Lyubomirsky et al., 2005). When this association is studied, researchers have consistently found that family support networks (measured either through quantitative or qualitative measures or based on degree of social support) influence psychological well-being,

both positively and negatively (Birditt & Antonucci, 2007; S. Cohen & Wills, 1985; Fuller-Iglesias et al., 2015; Thoits, 2011).

While researchers have established an association between family relationships and well-being, these associations may not be consistent across the lifespan. For example, among young adults for whom growth and novelty are extremely important, families provide few unique benefits, as “the basic qualities of family interaction are humdrum and mundane” (Larson & Bradney, 1988, p. 119). Further, if a married couple has children under 15 who live with them, those children can be family members that incur a negative effect on spouses’ well-being, (Vanassche, Swicegood, & Matthijs, 2013). However, other researchers have disputed this finding. They suggest that among parents who have satisfied their basic needs, have positive emotional relations, and have experienced meaningful events in their lives, the presence of children increases happiness and joy.

Social interaction. People interact with their adult family members in very different ways than they interact with spouses or friends (Larson & Bradney, 1988). This is probably because family relations are obligatory and not based on mutuality, especially with respect to parents (Milardo, 1988). People do not choose their parents or their siblings, and in many cases, the interactions with family are in-group situations. While some of these experiences may be enjoyable, many others may be mundane with a lot of potential for conflict and stress (Larson & Bradney, 1988), such as Thanksgiving or Christmas dinner and the days that follow.

Interactions with parents often present stressful situations for children, as parents do not necessarily respect the autonomy of their adult children. Parents may try to influence an adult child’s decision-making process and may have many preconceived notions about what is important for their children. Sibling relationships are more complex but also stressful (Thomas,

Liu, Umberson, & Sutor, 2017), as sibling rivalry can present issues that can be detrimental to well-being. For example, older siblings may try to boss younger siblings, creating conflict. For these reasons, social interactions with family members might detract from, rather than enhance, well-being.

Friends

Historical perspective. Beginning with Greek and Roman philosophers, friendships have been seen as important sources “of affection, and enjoyment, understanding, and support” (R. Blieszner & Adams, 1992, p. 28). Aristotle himself defined three types of friends: perfect friendships, involving qualities of goodness that mutually benefit both people; friendships of pleasure; and friendships of utility. Cicero, on the other hand, only viewed friendships through two lenses: friendships based on character and virtue, and friendships of dissimilar people “who affiliate for self-beneficial reasons” (R. Blieszner & Adams, 1992, p. 28,29). One modern author conceptualized friendship as follows: “Friendship is a *voluntary* interdependence between two individuals that includes the experience and satisfaction of various provisions (intimacy, support, self-validation) to varying degrees” (Demir, Orthel-Clark, et al., 2015 p. 118). Others authors have stressed words that represent quality, like mutuality, understanding, and acting in each other’s best interest (Birditt & Antonucci, 2007; G. J. Chelune, Robison, & Kommor, 1984; K. L. Fiori & Denckla, 2015). The concept of “affection” has also been applied to close friends (R. S. Miller, 2009). While these terms have been equally associated with other types of relationships, especially spousal relationships, the voluntary nature of these friendship relationships, without obligations and legal commitment, distinguish them as “most people’s relationship of choice ... [and] as the new social glue to paste over networked lives” (Vernon, 2005, p. 1-2). Researchers also have used other broad factors as measures that essentially operate

similarly to quality factors, such as closeness (Demir, Özdemir, & Weitekamp, 2006; Gillespie, Lever, Frederick, & Royce, 2014). Typically, researchers study these qualities or attributes on an overall basis by creating a composite quality score (which is the sum or average of the means of a number of these features) or by studying one particular feature, such as emotional support (Demir & Weitekamp, 2007). When researchers focus on close friends, only a few friends emerge. Of course, adults have many other friends within their separate social networks (Hua Wang & Wellman, 2010), thus making it difficult to separate out close friendships (i.e., profound relationships) from more “mundane” friendships which involve to a large extent the absence of attachment (Margolis, Derlega, & Winstead, 1984). Even with these understandings in place, it is important to note that there is no overriding applicable definition for friendship that exists for spouses or family members (Fehr, 1996).

Quality and quantity. Research on friendships have studied these relationships in terms of two factors (Saldarriaga et al., 2015). The first, quality of friendships, includes support (Antonucci et al., 2001; Cheng, Li, Leung, & Chan, 2011; Demir et al., 2006; Marsden & Cambell, 1984; Walen & Lachman, 2000). The second involves the quantity of friendships, i.e., the number of friends (Demir et al., 2006; Lucas & Dyrenforth, 2006; Lyubomirsky et al., 2005). Based on these factors relating to friendships, researchers have found that friendships are significantly associated with well-being (Demir & Ozdemir, 2010; Headley, Veenhoven, & Wearing, 1991), with the quality dimension predicting happiness at higher rates than the total number of friends (Demir, Orthel-Clark, et al., 2015). Researchers have added to these findings in later academic work. For example, in one such study, the authors found that the quality of friend networks was as important as family networks for spouses’ when measured on various martial quality scales (Kearns & Leonard, 2004). In another study, the authors found that spouses

who used various friends for different types of emotional support experienced a higher level of personal well-being (Cheung et al., 2015). Still other studies have found that respondents had more positive experiences with friends as compared to families (Chopik, 2017). Finally, although very happy spouses tend to gain weight over time, this adverse effect is reduced for spouses who have highly valued friends (Finkel et al., 2014).

The unique role of pleasure in friendships. Even though most researchers have studied friendships through variables like closeness and support and measures of numbers of friendships, Aristotle's ideas of friendships of pleasure is also applicable in the definition of friendships (K. L. Fiori & Denckla, 2015). While this dimension correlates with the quality and quantity factors, it may also account for unique variability in well-being, over and above the effects of quality and quantity. If this is accurate, then degrees of pleasure in a relationship could serve as an independent dimension of friendship outside of closeness and quantity. For example, Bukowski (1994) viewed companionship among friends as distinct from other aspects of friendships. In another study, Mendelson (1999) found that stimulating companionship (i.e., doing things together that arouse "enjoyment, amusement, and excitement") accounted for unique variance in well-being and satisfaction. Other enjoyable friendship experiences have also been found to enhance well-being, such as participating in athletic events, other activities, or a stimulating conversations (Saldarriaga et al., 2015; Seligman & Csikszentmihalyi, 2000), or even engaging in some mundane activities like hanging out (H. T. Reis, 2001).

People are happy in day-to-day life when they enjoy themselves by spending time with friends, having fun, and laughing (Saldarriaga et al., 2015). With friends, a person's attention may become more focused, distractions may be fewer, and time can seem to disappear (Larson & Bradney, 1988). The cumulative effect of small experiences matter the most (Sheldon &

Lubomirsky, 2007); for example, engaging with music and dancing with others qualifies in this regard (Compton, 2005; Weinberg & Joseph, 2016). Reis (2001), using daily diaries, found that a strong predictor of happiness and/or positivity related to an enjoyable companionship, such as “hanging out with others” (p. 75) and “doing things that were pleasant or fun” (p. 79). The more time a person spends socializing with others, the stronger the positive mood. When Reis discusses in general all themes relating to daily social activity, he creates a separate grouping for “engaging in enjoyable events, while avoiding negative events” (p.79), which is distinct from other aspects of quality. Good friendships depend on people spending substantial time together. People experience the greatest amount of enjoyment with friends as compared to other types of relationships (Larson & Bradney, 1988). See also (R. Blieszner & Ogletree, 2017), in which it was found that, among college students, enjoyment was almost on a par with understanding when asked about the most important characteristics of friendships. Finally, one study of extraverts found that sociability for extraverts (e.g. meeting new friends, dancing, and going to a noisy party or a pub) was primary and significant as a separate latent factor in a structural equation model, with another factor negatively affected by withdrawal from social activities. As Aristotle noted, ‘Cut off the talk and many times you cut off the friendship [emphasis added]’ (Vernon, 2005, p. 5).

Benefits from friendships. Researchers have emphasized the major beneficial aspects of friendships (Walen & Lachman, 2000) through their studies of the positivity found within friendships. Friends can create affective bonds that are a major source of joy which create a happy mood. Further, friends act as a buffer against issues with spouses (Argyle, 2001; Burger & Milardo, 1995; Caunt et al., 2013; Demir, Orthel-Clark, et al., 2015; Fuller-Iglesias et al., 2015; Hall & Adams, 2011; Kearns & Leonard, 2004; Milardo, 1988). Friendships may also be the

social glue within Western civilizations (Hua Wang & Wellman, 2010) as friendships are positive relationships with little negativity, in juxtaposition to family relationships that have high positivity and high negativity (Fuller-Iglesias et al., 2013). These differences probably exist because friendships are voluntary and reflect ties of choice (Argyle, 2001; Shiovitz-Ezra & Litwin, 2015a), while marriages and family have varying degrees of permanence. Therefore, if conflict becomes high in friendships, in all likelihood, the friendship ends and the respective friends just move on to others. This is not the case with family and not necessarily the case for spouses.

Friends understudied. Research has clearly recognized that friendships, through intimacy and support, can enhance a person's happiness (Demir & Davidson, 2013; Gillespie et al., 2014; Litwin & Shiovitz-Ezra, 2010; Lyubomirsky et al., 2005; Shiovitz-Ezra & Litwin, 2015a). Yet relationships with friends have been understudied (Fuller-Iglesias et al., 2015; Gillespie et al., 2014; Sherman, Vries, & Lansford, 2000). As Chopik (2017) notes, "the relative influence of [nonfamily] relationships, like friendships, on health and well-being across the lifespan has been historically understudied in research on lifespan development" (Chopik, 2017, p. 408).

Much of the research on social relations tends to "focus on parental and spousal ties" (Fuller-Iglesias et al., 2013, p. 186). For example, a number of studies have focused on association between spouses' relationships with their family and well-being and have either ignored friendships or not treated them as a distinct category (Argyle, 2001; Binder & Broekel, 2011; Y. Chen & Feeley, 2013; Fuller-Iglesias et al., 2015). Moreover, some studies have treated spouses and family as one category when assessing the association between family and well-being (Fuller-Iglesias et al., 2015; Hua Wang & Wellman, 2010; Kalmijn & Vermunt, 2007; Walen & Lachman, 2000), thereby inflating the importance of family relative to other (i.e., non-

kin) members of a spouse's social networks (Fuller-Iglesias et al., 2015). On the other hand, a recent article by Dunbar (2018) asserted that friends, very broadly defined, are the most important social relationship, a view that aligns with the work of Vernon (2005) who argued that friendship "is frequently heralded as the defining relationship of our age" (p. 1). Indeed, researchers have viewed positive affect or emotion that exists through friendships as instrumental constructs that are mutually satisfactory and create enjoyment (Gillespie et al., 2014).

The Relative Effects of Primary Social Network Relationships on Well-being

This review so far has examined the three primary relationship categories of friend, family, and spouse independently. However, these three relationship types interact with each other and have different effects on well-being during the lifespan. The following is a review of existing research that has studied these relationships simultaneously in the context of their association with well-being and happiness.

Interactions

The existing research on interactions between spouses and friends, spouses and family, and friends and family is virtually non-existent. However, Antonucci et al. (2001) conducted a study about the positive and negative aspects of social support from spouses and best friends. They found that "support from the spouse relates to well-being of men and women in similar ways, whereas men and women are affected differently by support from a best friend" (Antonucci et al., 2001, p. 74). If interactions based on gender can establish different patterns, relating to well-being and marital satisfaction, then maybe interactions among spouses, family and friends can result in important findings.

As previously discussed, about one-third of all marriages are deemed to be unhappy (Hawkins & Booth, 2005). Yet not all of these unhappy dyads contain unhappy people. Unhappy

spouses may nevertheless report adequate life satisfaction because other relationships, especially with friends, are strong and may substitute for weak spousal satisfaction. This is potentially possible because many spouses do not enter marriage with the anticipation of strong romantic feelings, but rather become married to satisfy practical ends such as starting families and expanding their social network base (Huston, Caughlin, Houts, Smith, & George, 2001). For such couples, spouses' relationship quality with friends may weaken the association between life satisfaction (happiness) and marital satisfaction, such that those spouses who have strong and high quality friend relationships may have a low level of marital satisfaction and yet a relatively high level of life satisfaction.

Relative Importance of Romantic, Family, and Friend Relationships

Researchers have not extensively studied the relative impact that spouses, family members, and friends have on a married person's well-being. Except for attachment theorists who believe that the spouse, as the adult attachment figure, serves most of the needs of the partner (Takahashi, 2005), only two studies have offered a nuanced point of view on this subject. The first study (Birditt & Antonucci, 2007) used a broad sample that had respondents rate the quality of their relationships with their mother, father, children, and same-sex best friend as a way to assess their respective life satisfaction scores. The authors found that a married person with a best friend needed high quality relationships with only two types of persons (i.e. a best friend and either be a spouse or family members) to be happy. However, if such person did not have a best friend, then the spousal relationship became more essential. This is the first study in which authors find that a strong and high quality relationship with a spouse may not be necessary for positive high-quality well-being. In other words, a moderate or strong relationship with a spouse, plus a good relationship with family, may improve well-being to a sufficient degree. This

lends some support that there might be interactive effects between levels of spousal, family, and/or friends' satisfaction and levels of well-being.

Interestingly, work by Ratelle et al. (2012) reached the opposite conclusion. The authors investigated the perceived autonomy support (AS) among university students from romantic partners, parents, and friends and how AS affected subjective well-being. The average relationship length for romantic partners in the sample was two years and nine months. The authors concluded that AS from important relationship types (i.e. romantic partners, partners, and friends) all contributed to high well-being scores, with the highest levels of subjective well-being achieved when all sources were positive.

It should be noted when considering these findings that these two studies use significantly different samples and very different distinctions between being “very happy” or just “moderately happy”. Based on this review, it might be theorized that in order to achieve high levels of life satisfaction, all three relationship types – spouses, family and friends – need to be highly satisfactory or of a high quality. Nevertheless, to be moderately happy, people may need fewer of these relationship types, with friendships creating the greatest positive association with well-being as compared to marital and family satisfaction. Additionally, spouses have the most fun when both their partners and friends are present. However, if only one is available, spouses derived more enjoyment and excitement from the presence of a friend than from the presence of a spouse (Larson & Bradney, 1988; R. S. Miller, 2009). This lends further credence to the thought that quality friendships could moderate the association between marital satisfaction and personal happiness.

Moderators

Existing research has shown that there are moderators that change how different types of relationships are associated with well-being and happiness. These include gender, marital status, ethnicity, and age (Argyle, 2001; McPherson et al., 2006). Each are discussed below.

Gender

Overall, men and women have similar level of happiness and well-being (Iaacowitz, Vaillant, & Seligman, 2003). However, they may differ in the intensity of their emotional experiences (Demir & Davidson, 2013). Research has found mixed results when studying whether men and women differ in their interactions with their social network of relationships, as well as the degree to which those relationships are associated with happiness. Some of the extant research has found that men and women have similar social goals and closeness (H. T. Reis, 2001) and that gender differences have been exaggerated (Gillespie et al., 2014). However, other investigations have noted that while women's social relationships are more likely to emphasize emotional closeness, self-disclosure, support, and conversation, men's relationships (especially friendships) are more likely to emphasize shared activities and the formation of clubs (Argyle, 2001; Demir, Orthel-Clark, et al., 2015). For both men and women, their closest confidants are women, as both men and women rely on women for intimacy (See commentary by Cloninger in H. T. Reis, 2001). In this vein, some researchers have said that "the best predictor of not being lonely is frequency of interaction with women; time spent with men made no difference" (Argyle, 2001, p. 75). Men also rate their interactions with other men lower than women rate their interactions with other women with respect to intimacy (H. T. Reis, 1998). Further, men may be more apt to quickly terminate a friendship that is not working as compared to women, as they tend to invest more into their friendships (Demir, Orthel-Clark, et al., 2015). It can be

hypothesized, based on Reis' research, that men tend to depend on their interactions with romantic relationships for their happiness, while women tend to rely on both romantic relationships and other relationships (especially with friends) for their well-being .

Most research analyzing social networks has studied married couples. As a result, these studies provide results for both husbands and wives. Unfortunately, researchers do not always analyze husbands and wives separately (Birditt & Antonucci, 2007; Fuller-Iglesias et al., 2015). This can be problematic, since husbands and wives are different in many respects, including the underlying nature of their respective networks. To wit: married men are significantly more satisfied with their marriage than married women (Biehle & Mickelson, 2012), which leads to contentment for husbands and restricts their desire to pursue friendships in major ways. Because of this, husbands may not choose to invest in non-spousal relationships. Wives, on the other hand, have been shown to have larger social networks and are drawn to others to satisfy a sense of belonging and to support self-esteem (Pietromonaco & Perry-Jenkins, 2014). This is why married women are significantly more satisfied with their friends than are married men (Antonucci & Akiyama, 1987). In addition, husbands may spend less time with friends because of their closeness to their spouse (Biehle & Mickelson, 2012). Wives, on the other hand, have larger social networks on average (Antonucci & Akiyama, 1987) and are drawn to others to satisfy a sense of belonging and to support self-esteem (Pietromonaco & Perry-Jenkins, 2014), which would imply that friendships are more vital to them as compared to husbands. However, since wives are twice as likely as husbands to suffer from depressive symptoms and are also more likely to suffer from anxiety and negative emotions (Argyle, 2001), their relationships with social network members may suffer. Further, there have been studies that have found that wives who have close relationships with friends also have more positive relationships with their

partners (C. M. Proulx, Helms, & Chris Payne, 2004). These findings confirm the major link between friendships and spousal relationships for wives.

Marital Status

Single individuals now constitute a majority of adults in the United States. This group has grown and may continue to grow because people today are marrying later in life. Delayed marriage is often based on personal choice and self-development, as both are deemed essential within marriages (Kislev, 2018).

With this in mind, it is important to understand that men and women may differ on aspects of life satisfaction, depending on whether they are married or not (Sarkisian & Gerstel, 2015). Popular literature is full of books and articles about how single women can be happy through their social contacts, particularly friends. However, there is a paucity of research comparing married versus unmarried people on the association between aspects of their social relationships and their subjective well-being (Gillespie et al., 2014; Sarkisian & Gerstel, 2015; Tschann, 1988). One study that has pursued this question found that marital status (along with age) had the strongest effect on contact frequency with friends (Verbrugge, 1977). However, until recently there were only hints that changes in friendships based on marital status are different for men and women (Tschann, 1988). Other authors agree that marriage is more socially integrative (and not being married more isolating) for men than for women (Sarkisian & Gerstel, 2015).

In the last few years, more findings have emerged. For example, Sarkisian and Gerstel (2015) found that never married men socialize with friends and neighbors significantly more than married men, but that is not the case for previously married men, as their socialization stays constant when compared to married men. For women, both never married and previously

married women socialize with friends and neighbors significantly more than married women (Sarkisian & Gerstel, 2015). This same study found that unmarried people are more likely to help friends (or neighbors) than married people. Interestingly, Tschann (1988) found that married men disclosed less intimate information than unmarried men did; in contrast, women's intimate self-disclosure was unaffected by marriage. The Tschann study also found that there are more qualitative declines in friendships for men when they marry, but not for women.

Ethnicity

Ethnicity has been associated with social networks in a number of ways. Non-Whites generally have smaller networks than Whites, with older Black men reporting especially small network sizes (McPherson et al., 2006). Hispanic network sizes usually fall in the middle, in that they are smaller than networks for Whites but larger than networks for Blacks (C.H. Stein & Hunt, 2003). Black couples (especially wives) have significantly fewer ties within their social networks to which they could turn for support. In addition, research has found that two-thirds of Black families drew support from non-relatives who they viewed as family. This was not the case for Whites (Jackson et al., 2014). Hispanics, especially Mexican Americans, have networks dominated by family. Hispanics used their family for emotional support, while Blacks tended to use kin for instrumental purposes (H. K. Kim & McKenry, 1998; C.H. Stein & Hunt, 2003). Too often, researchers do not assess race because they view the sample for non-whites as relatively small. For example, in Fuller-Iglesias et al. (2015) 26% of the sample was Black, but the authors did not assess this racial group separately. In any event, the percent of Blacks in the entire sample, unless minuscule, should matter because the potential differences between Whites and Blacks may be very large (Pietromonaco & Perry-Jenkins, 2014). Hispanics and Black social

networks might be less associated with well-being, as compared to Whites' social network, since their networks have larger proportions of family, versus friends.

Age

People's relationships with their partner, family, and friends may take on different attributes depending on whether they are young adults, middle aged, or older adults, with potential consequences relating to the association between these primary relationships and happiness (Demir, Orthel-Clark, et al., 2015). For example, women's level of positive emotions, and men's level of life satisfaction, increases with age (Argyle, 2001). Younger people also tend to have larger networks with whom they interact regularly (McPherson et al., 2006), and the social experiences of individuals in their 30's who have started raising children is quite different from older adults with grown children who are nearing retirement age (Lucas & Dyrenforth, 2006).

The moderating effect of age may therefore be complex. Young married adults may not have children, but as couples reach their mid-30's, pressures created by the demands of raising children and the demands of work may constrain married people's ability to bond and spend time with their friends (Demir, Orthel-Clark, et al., 2015; Finkel et al., 2014; Isaacowitz et al., 2003; Larson & Bradney, 1988). With respect to family, young married adults tend to have parents with whom they are close, while middle-aged married adults tend to be close with children and parents, and older married adults' tend to be close with their children (Fuller-Iglesias et al., 2015). Parents and caring for children during many life cycle periods create a lot of stress that may in turn create conflict between spouses. This can lead to depression and lower levels of well-being (Antonucci et al., 2011; Fuller-Iglesias et al., 2015). While there is less stress with

friends, spouses with children may have less time to spend with friends potentially adversely affecting the association between friends and happiness.

Conclusions and Recommendations for Further Research

The preceding review of existing literature on the associations between important relationships (i.e. romantic, family, or friend relationships) and life satisfaction has shown that each of these relationships, when assessed separately, is significantly associated with well-being (broadly defined), with the associations between romantic relationships and well-being being the strongest. Researchers, however, have rarely studied these types of relationships simultaneously. Thus, it is difficult to know whether each relationship (other than romantic relationships) accounts for well-being over and above the others. Existing theory lends credence to the idea that friendships, in particular, may have unique associations with well-being. For example, Attachment Theory includes best friends as attachment figures (with whom a person has a non-replaceable, unique relationship). Similarly, Self-Expansion Theory emphasizes romantic partners or friends operating as overlapping selves, in part, by participating in shared enjoyable activities that are novel and stimulating, leading to enhanced well-being. Further, the Belongingness Hypothesis focuses on positivity and pleasantness, both of which are primary elements of friendships.

Existing literature also supports this premise, especially when emphasizing the enjoyment aspects of friendships that can create high levels of positive affect. When people spend time with their friends, they are happy, laugh a lot and just have fun (Saldarriaga et al., 2015). Friends enjoy socializing, hanging-out, and engaging in activities together. Because they are voluntary, friendships are often free of pervasive conflicts and stress; if a friendship contains too much negativity, the friendship can end and new ones can develop. Finally, friendships may interact

with romantic and family relationships, such that the associations between romantic and family relationships and well-being might vary depending on people's level of satisfaction with their friendships.

Based on this literature review, it seems plausible to argue that high quality friendships, especially when measured on a scale that includes elements of enjoyment and fun – both strong elements of positivity – may have unique associations with people's happiness. The rest of this dissertation describes three studies designed to evaluate and elaborate upon this premise.

The first study uses multiple regressions with interactions and a cluster analysis to address two primary questions: First, does satisfaction with each type of relationship – whether with an intimate partner, family, or friends – incrementally add to people's well-being when these relationship types are studied simultaneously? Second, can people who have high level of friendship satisfaction be happy, even if their satisfaction with their intimate relationship is not strong? This study would be the first to test these hypotheses using a broad-based friendship scale that includes both elements of quality and enjoyment.

The second study explores multiple dimensions of friendships (including friendships of enjoyment) through structural equation modeling to ascertain whether specific dimensions of friendships account for happiness and how associations between each dimension and happiness are moderated by gender.

The final study is a psychometric assessment study, designed to develop and evaluate a new friendship scale that can be utilized as an independent variable when researchers' study various relationship outcomes, such as relationship satisfaction, well-being or happiness, self-esteem, depression and stress.

At the heart of each study is the premise that friendships are vitally important, as their effect on well-being and happiness may be more substantial than presently assumed.

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Study 1 – The Importance of Friendships

The nature of individuals' social relationships predicts their well-being, health, longevity, and life satisfaction (Baumeister, 1995; Beller & Wagner, 2018). However, not all social relationships are equivalent. Intimate partners seem to matter a lot more than other relationships (Argyle, 2001; Bodenmann et al., 2014; Stanley, Ragan, Rhoades, & Markman, 2012). Family members play unique roles (Fuller-Iglesias et al., 2015). Friends play other roles (Birditt & Antonucci, 2007; Demir, 2015). For a satisfying life, one strong intimate relationship might be sufficient (Coyne & DeLongis, 1986), especially if the needs fulfilled by intimate relationships are more important than the needs other relationships fulfill. Few, though, have studied these relationships at the same time, so the way different kinds of relationships may contribute uniquely or interactively to well-being remains unknown (Birditt & Antonucci, 2007; Cheng et al., 2011; Catherine H. Stein et al., 1992). The goal of the current paper is to fill that gap by drawing on survey data that assessed well-being and satisfaction with various types of social relationships in a large and diverse sample of respondents.

To this end, the remainder of this introduction is organized into three sections. The first section reviews research on how the quality of relationships with intimate partners, family members, and friends is associated with well-being. The second section analyzes the relative importance of intimate partners, family, and friends for predicting personal well-being, and explores how different types of relationships may interact to account for well-being over and above the main effects of each type of relationship. The final section provides an overview of the current study. In this paper, the terms life satisfaction, well-being, and happiness are used interchangeably.

Different Relationships; Different Functions

Social networks of individuals contain different kinds of relationships, but researchers interested in associations between social relationships and well-being often treat all of those relationships as an undifferentiated group (Ryff & Keyes, 1995). When research has identified specific types of relationships, they have typically assessed each relationship type in separate studies (Fuller-Iglesias et al., 2015; Hilpert et al., 2014).

Intimate Relationships

Among married people, the quality of the spousal relationship is significantly associated with many outcomes. For example, a meta-analysis reveals a moderate association ($r = .37$) between marital quality (broadly defined to include marital happiness and satisfaction with the intimate relationship) and well-being (Christine M. Proulx et al., 2007). There are good reasons for intimate relationships to be uniquely important. Partners are usually close with each other, spend considerable time together and support each other, share experiences together, socialize with others together, conceive and raise children together, and, due to their proximity, have the strongest ability to shape their partner's future development (Hoppmann et al., 2011).

Not all intimate relationships, however, are equal (Claire M. Kamp Dush & Amato, 2016; Lehmann et al., 2014). Whereas there are psychological benefits to being in happier marriages, there are serious costs of being in unhappy ones (C. M. K. Dush et al., 2008). Some intimate relationships have high levels of conflict and social strain (Argyle, 2001; Y. Chen & Feeley, 2013), resulting in up to 1/3rd of all marriages reported to be “unhappy” (Hawkins & Booth, 2005). Furthermore, some partners may use their relationship as a backdrop rather than as a focal point, preferring to concentrate on other aspects of their lives, such as work, outside activities, or

relationships with family and friends (Huston et al., 2001). This raises the possibility that a person can be in an unhappy marriage but still have a relatively happy life.

Family Relationships

Family (primarily parents and children) is uniquely important but plays a complex role in well-being and happiness. On the positive side, these ties often represent the closest relationships within our social networks (Acock & Hurlbert, 1993). They offer (along with spouses and romantic partners) a major source of perceived support (Fuller-Iglesias et al., 2015). They also provide a strong resource for dealing with stress (Cheung et al., 2015) and have been viewed as durable and long lasting (Bost et al., 2002). Further, family support networks are positively associated with psychological well-being (Birditt & Antonucci, 2007; S. Cohen & Wills, 1985; Fuller-Iglesias et al., 2015; Thoits, 2011).

On the negative side, however, there can be conflict within family relationships that enhances depressive symptoms and decreases well-being and life satisfaction (Antonucci et al., 2011; Fuller-Iglesias et al., 2015). The greater the conflict, the lower the happiness level (North et al., 2008). “[Conflict] is thought to be more frequent in family relationships because of greater frequency of contact that increases the potential for strained interactions” (Fuller-Iglesias et al., 2013, p. 3). With all these cross-pressures, researchers have often described these relationships as “ambivalent” (Fuller-Iglesias et al., 2013). This ambivalence is greater with family than with any other non-family relationship (Fingerman et al., 2004). Studies have found that social support and social conflict do not correlate (Abbey et al., 1985; Walen & Lachman, 2000). Families are not “a reliable source for positive experiences”, especially with young adults for whom “family interaction are humdrum and mundane” (Larson & Bradney, 1988, p. 119, 123).

This suggests that family relationships affect well-being both positively and negatively (Birditt & Antonucci, 2007; S. Cohen & Wills, 1985; Fuller-Iglesias et al., 2015; Thoits, 2011).

Friends

Although researchers' study friends less frequently (Gillespie et al., 2014), relationships with friends should also be important to well-being because friends can serve functions that lovers and family rarely do (Walen & Lachman, 2000). Unlike family relationships, people choose their friends and can rid themselves of friends easily and quickly, i.e. friendships are voluntary relationships. Perhaps as a consequence, friends are a major source of positive affect (Demir, 2015). Further, they act as a buffer against issues with spouses (Argyle, 2001; Burger & Milardo, 1995; Caunt et al., 2013; Demir, 2015; Fuller-Iglesias et al., 2015; Hall & Adams, 2011; Kearns & Leonard, 2004; Milardo, 1988). Accordingly, support from friends is associated with personal well-being (Antonucci et al., 2001; Walen & Lachman, 2000), especially for married people (Cheung et al., 2015).

In contrast to family relationships that can have high positivity and high negativity, friendships are often positive relationships with little negativity (Fuller-Iglesias et al., 2013). Researchers have also found that respondents turn to friends more than to family to combat loneliness (Cantor, 1979). A study of social connectivity in the internet era found that friendships still functioned as the primary socialization relationship in contemporary Western societies (Hua Wang & Wellman, 2010).

The Need to Study These Relationships Simultaneously

In sum, researchers have found that the three primary types of relationships -- intimate relationships, family relationships, and friendships -- are each unique. But until all of these types

of relationships are assessed in the same study, we cannot know the relative importance of these different relationships for well-being, or how different types of relationships in combination are associated with well-being. Several alternatives are possible. For example, happier people may be good at relationships, so they may have better relationships with everyone. If that were true, then we would not see each type of relationship accounting for independent variance in well-being.

The Relative Importance of Different Relationships for Well-Being

There are several different ways that the quality of the three primary relationship types might combine to account for well-being. First, some have argued that “love is all you need” and a solid intimate relationship contributes to well-being, but nothing else does beyond that due to threshold or ceiling effects. Second, as others have argued, each type of relationship may exert independent influence on well-being because they serve different functions. Third, it might be the case that well-being requires some good relationships, but it might not matter which ones because the good ones compensate for the bad ones. This situation implies statistical interactions, with each type of relationship accounting for well-being more strongly when other types are unsatisfying. Finally, it could be that particular configurations of relationships matter more or less for well-being, a possibility that can be tested with a cluster analysis. The rest of this section reviews the evidence of each of these possibilities.

Is Love All You Need?

Historically, some researchers have believed that close relationships with family or friends could not compensate for an unsatisfactory relationship with an intimate relationship (Coyne & DeLongis, 1986), i.e. a healthy intimate relationship is all an adult needs. Researchers’ reinforced this view through the belief that intimate relationships in adulthood replace the mother

as a person's primary attachment figure (Ainsworth, 1989; Fraley & Shaver, 2000; Zeifman & Hazan, 2018). Such an attachment figure serves the primary needs of a person. Romantic partners "typically feel safer and more secure when their partner is nearby, accessible, and responsive" (Fraley & Shaver, 2000 p. 2). Over the years, however, other researchers have expanded the singular attachment figure with an attachment group comprised of a person's closest relationships (Takahashi, 2005). This group typically includes parents, siblings, and at times, a person's best friend who is a "uniquely valued person, not interchangeable with others" (Ainsworth, 1989, p. 714). These types of friends typically are "best friends" (Birditt & Antonucci, 2007). Over time, most researchers have adopted the expanded attachment group theory when defining relationship types that may be uniquely and positively associated with well-being. To these researchers, more than love is necessary for a person to achieve optimum levels of happiness.

Does Each Relationship Type Contribute Separately to Well-Being?

To the extent that each of the primary relationship types satisfies unique needs, it may follow that the quality of those relationships, when studied simultaneously, will be associated with well-being and happiness independently. In a study evaluating this idea (Ratelle et al., 2012), researchers investigated student's perceived autonomy support from partners, parents, and friends and their associations with subjective well-being. These authors concluded that more autonomy support from each important relationship (i.e., romantic partners, partners, and friends) all contributed to higher well-being scores, with the highest levels of subjective well-being achieved when all sources were the most positive. This study suggests that strong relationships with our intimate partners, family, and friends all contribute to happiness and well-being. This finding, while potentially important, may only be applicable to young adults in college. It is not

clear whether the same results would generalize within representative samples of adults. Further, this study only examined the quality of autonomy support within each relationship. As such, there has yet to be a study examining the quality of these relationships more broadly. The current study will attempt to replicate these findings while overcoming both of these limitations.

Can a Few Good Relationships Promote Happiness?

It is possible that when we assess the associations between people's primary relationships and happiness, a person does not need the whole loaf to be happy. Maybe happiness with two out of the three prime relationship types is sufficient, regardless which two are strong. In Birditt and Antonucci (2007), this premise was tested. Respondents were asked to rate the quality of their relationships with their mother, father, children, and same-sex best friend. They discovered that married individuals with a best friend need high quality relationships within only two of the main relationships (spouses, family members, and friends) to be happy, and that a good relationship with the spouse was not essential. However, if such a person did not have a best friend, then the spousal relationship became more important for well-being. This is the first study in which authors find that a strong, high quality relationship with a spouse may not be a necessary component for positive high-quality well-being. A moderate relationship with a spouse, plus a good relationship with either family or friends, may support well-being as well.

Do Different Types of Relationships Interact?

No research directly examines how the quality of relationships with intimate partners, family members, and friends may statistically interact with each other to account for well-being. These interactions can exist in four ways: three two-way interactions (i.e. intimate partners interacting with friends; intimate partners interacting with family; and friends interacting with family) and one three-way interaction (i.e. intimate partners, family, and friends interacting with

each other). We are interested in knowing whether the association between any of our predictors (intimate relationships, family relationships and friends) and life satisfaction differs significantly at various levels of another predictor variable.

Are There Configurations of Relationships Associated with More or Less Well-Being?

Across all of their relationships, different people may configure their social networks in different ways. Some may have networks geared towards family involvement, while others might have networks with a heavy emphasis on friendship relations. Some might not have any friends in their network, while others might have a network that revolves around work relationships.

Researchers can test these potential differences on well-being by using cluster analysis, a statistical approach that involves the creation of uniquely classified groups. The goal of this approach is to create groups of cases (i.e. clusters) that are relatively homogeneous within themselves and heterogeneous between groups (Yim & Ramdeen, 2015). The ultimate result of cluster creation is the establishment of distinct heterogeneous groups in which the observations within each group have low levels of variances from the centroid of such cluster (Henry et al., 2005; Ketchen & Shook, 1996; Mirkin, 2013). Once researchers' have identified the groups, they then compare those separate clusters against some specified dimension, such as well-being.

One prominent example of the use of the cluster methodology is work done by Birditt and Antonucci (2007). This study estimated clusters based on the quality of individuals' relationships with spouses, family members, and a best friend, resulting in five clusters: 1) high positivity and low negativity ratings for all relationships; 2) high positivity and low negativity for family and friends, but moderate rating for spouses; 3) high positivity and low negativity for spouses and family, but high negativity for friends; 4) high positivity for friends, but high

negativity and low positivity for spouse and family, and; 5) low positivity and high negativity for all relationships. Life satisfaction and well-being varied across each cluster, with the first cluster having the highest mean life satisfaction score (the second and third clusters were not significantly different on life satisfaction). Respondents, however, in the fourth and fifth clusters had significantly lower life satisfaction than respondents in the other clusters. Most surprisingly, the second cluster – with high positivity for family and friends – showed life satisfaction scores not significantly different from comparable scores for respondents in the first clusters when all relationships were positive. When the clusters were reconfigured for respondents who did not have a best friend, none of the clusters (i.e. high overall quality, high family quality cluster, moderate over-all quality, and three low configuration clusters) differed significantly on life satisfaction.

There are a number of other cluster analyses of social networks (K.L Fiori, Antonucci, & Kortina, 2006; K. L. Fiori, Smith, & Antonucci, 2007; Litwin & Stoeckel, 2013). These researchers found four primary clusters of network types: (1) diverse; (2) family-focused; (3) friend-focused; and (4) restricted. In these studies, the diverse network (with values above the mean for almost all criterion variables) was the most extensive and was associated with highest subjective well-being (as evidenced by lower depressive symptomatology). On the other hand, restricted networks had the most limited network ties with all criterion variables below the mean and was the grouping with the lowest well-being. With respect to family-focused and friendship-focused clusters, the findings were mixed and at times confusing.

Overview of Current Study

Existing research suggests that intimate relationships, family relationships, and friends are each important to people's well-being. With this knowledge, and in light of limited and inconsistent findings that distinguish among possible configurations of people's three primary relationship types and their associations with well-being and happiness, we intend to build on existing research to learn more how these three types of relationships account for well-being. Our research will assess, simultaneously, respondent's level of life satisfaction, as well as their satisfaction with each of the three primary relationships and their interactions with each other. Toward this goal, we draw upon a survey of a large diverse sample that assessed respondents' life satisfaction, as well as respondents' levels of satisfaction with intimate relationships, family members, and friends. In our analyses, we used multiple regression analyses, with interactions, and a cluster analysis to see if specific configurations exist.

Based on the existing research, we hypothesized the following:

- Hypothesis 1 – Satisfaction with intimate partners, family members, and friends will each be significantly associated with life satisfaction, over-and-above the main effects of each other. This finding will replicate and expand on the findings in Ratelle et al. (2012).
- Hypothesis 2 – Friendships (not family) will interact with intimate relationships, such that the association between satisfaction with intimate relationships and life satisfaction will differ at different levels of satisfaction with friends.
- Hypothesis 3 – A cluster analysis will show multiple, distinct configurations of respondents' satisfaction with intimate relationships, satisfaction with family, and satisfaction with friends. When the respondents within each cluster are measured by their

levels of life satisfaction, the clusters will be significantly different from each other on life satisfaction.

Method

Sampling

In 2014, a private research firm, Research Now, solicited participants from an existing panel of over 600,000 individuals in the United States who had voluntarily consented to be invited and to participate in survey research on-line. The sampling frame was designed to reflect the diversity of the U.S. Census, such that more effort was devoted to solicit data from harder-to-reach demographic groups. Respondents in the panel received compensation (e.g., cash, points, or sweepstakes entry) for completing a survey.

Participants

A total of 2013 adults completed the survey. They ranged from 18 to 75 years of age and represented a broad sample of the U.S. population on demographic characteristics such as ethnicity, income, and education. Because the current analysis addressed questions relevant to individuals who were in long-term relationships, the analyses described below examined data from the 972 participants who indicated either that they were married or that they were living with a lifetime partner.

Of these 972 respondents, 485 (50%) were men and 487 (50%) were women. Men's mean age was 49.5 years ($SD = 13.9$), while women's mean age was 48.7 ($SD = 14.1$). Of the men, 14.2% were between the ages of 18-34; 27.4% were between the ages of 35-44; 20.2% were between the ages of 45-54; and 38.2% were age 55 or older. Of the women, 21.7% were between the ages of 18-34; 16.1% were between the ages of 35-44; 25.1% were between the ages

of 45-54; and 37.1% were age 55 or older. The sample was 67.9% White, 9.5% Black, 12% Hispanic/Latino, 4.1% Asian Americans, 1.4% Native American, and 5.1% other. With respect to income, 9.7% of the respondents earned less than \$25,000 per year; 19.4% earned between \$25,000- \$49,999 per year; 38.3% earned between 50,000-\$99,999 per year; 25.9% earned between \$100,000- \$199,999 per year; and 6.7% earned over \$200,000 per year. With respect to education, 0.1% of the respondents had less than a high school degree; 10.5% had a high school or equivalent degree; 21.0% had some college; 11.5% had a vocational degree or certificate; 30.8% were college graduates; and 26.1% had post-college degrees.

Procedure

Respondents who agreed to participate were invited via e-mail to complete a self-report on-line survey that included questions about demographics, personal relationships (e.g., with friends, spouses, and family), and other aspects of their lives (e.g., health, career, and involvement within the community). Completing the survey took approximately 30 minutes on average. Respondents received compensation (e.g., cash, points, or sweepstakes entry) for participating.

Measures

Life satisfaction. The survey included two separate measures assessing constructs related to life satisfaction and well-being: the Personal Wellbeing Index (PWI) (International-Wellbeing-Group, 2013) and the Satisfaction with Life Scale (SWLS) (E. Diener, Emmons, Larson, & Griffin, 1985). The PWI assesses subjective well-being across multiple domains: standard of living, health, life achievement, personal relationships, safety, community cohesion, future security, and spirituality. Within each of these eight domains, participants indicated their level of satisfaction on an 11-point response scale with 0 = completely dissatisfied and 10 =

completely satisfied. Within the current data, Cronbach's alpha was .89. The SWLS is a 5-item instrument measuring global satisfaction with life (e.g., "I am satisfied with my life."), rather than the specific domains assessed by the PWI. The response choices range from 1 = strongly disagree to 7 = strongly agree. The SWLS has been shown to have good discriminant and convergent validity, test-retest reliability, and internal consistency reliability (Pavot & Diener, 2008) and has been shown to be insensitive to current mood (Eid & Diener, 2004). In the current data, Cronbach's alpha for the SWLS was .90.

Some have argued that respondents, when answering the global items on the SWLS, take into account the specific domains of the PWI (Corrigan, Kolakowsky-Hayner, Wright, Bellon, & Carufel, 2013). Indeed, in the current data total scores on the PWI and the SWLS correlated strongly ($r = .69, p < .001$). Given that the two measures, while conceptually distinct, may in practice assess the same underlying construct, we explored combining the items on the two measures. Cronbach alpha for all 13 items was .92. In light of the overlap between the scales, the analyses that follow treat the sum of the responses on the two instruments divided by the total number of items as an index of Life Satisfaction, with a potential range from .38 to 9.46.

Satisfaction with romantic partner. One item in the survey asked: "Please rate ... the degree of happiness/satisfaction you derive from your relationship with your romantic partner." The response choices were: 1) High unhappiness; 2) Mostly Unhappiness; 3) Mostly Happy; and 4) High Happiness.

Satisfaction with family. Three items in the survey assessed satisfaction with relationships to parents, children, and extended family members. Response choices were the same as those used to evaluate romantic partners. To addresses cases where respondents did not

have children, extended family, or living parents, the average of any completed items was used as the score for each respondent. Cronbach alpha for the 3-item scale was .61.

Satisfaction with friendships. Seven items in the survey assessed satisfaction with friendships. Items include: “I have friends to whom I can confide my deepest concerns;” “I have friends with whom I share values;” and “I have friends with whom I have fun.” For each statement, respondents chose from three possible responses: (1) Does not describe me, (2) Describes me somewhat, and (3) Very much describes me. The average of the responses to these items was treated as an index of satisfaction with friendships. Cronbach alpha for the 7-item scale was .80.

Analysis Strategy

To assess the independent and interactive associations between life satisfaction and satisfaction with romantic partners, family members, and friends, we ran stepwise multiple regression models. Age and income (the only two demographic variables we measured that were significantly associated with life satisfaction) were entered into all models as control variables.

To identify cases with social networks that were relatively homogeneous within themselves and heterogeneous between groups, we conducted a cluster analysis (Yim & Ramdeen, 2015) using a hierarchical algorithm to define the number of clusters, followed by non-hierarchical clustering (i.e., K-means clustering). While the use of a hierarchical algorithm is adequate in certain situations, the K-means methodology is better suited for large data samples. The K-means approach initially identifies a set of means (i.e., centroids) and classifies cases based on their distance from such centroids, with each case assigned to its closest center. When completed, the K-means method partitions all cases into non-overlapping clusters, minimizing

within-cluster variances from the centroids (Mirkin, 2013). This is a common approach that results in discrete clusters (Henry et al., 2005; Ketchen & Shook, 1996).

With this methodology, we (1) identified the variables from which we wanted to create distinct profiles; (2) determined whether to standardize the variables; (3) defined, *a priori*, the number of variables through a hierarchal algorithm; (4) applied the K-mean algorithm to create mutually exclusive groups of respondents; and (5) validated our selection of the number of clusters.

We chose to base the cluster analysis on our three primary independent variables: levels of satisfaction with intimate relationships, family relationships, and friendships. Since our variables had unequal measuring scales, we standardized each variable using z scores ($M = 0$; $SD = 1$). Next, we used the hierarchal clustering tool in SPSS to define the number of clusters. In this regard, to measure distances between cases, we utilized squared Euclidian distance (best suited for continuous variables); in terms of linkage, we used Ward's method that creates clusters of cases based on degrees of similarity and minimizes the within-cluster sum of squares (Henry et al., 2005; Ketchen & Shook, 1996; Yim & Ramdeen, 2015). Further, once we ran the algorithm, we observed the incremental changes in the agglomeration coefficients at each stage and visually inspected the Dendrogram (a graph of the order of combination of clusters in each stage in the output) and determined that three cluster best fit our data set (Ketchen & Shook, 1996; Yim & Ramdeen, 2015). Finally, we validated our number of cluster selection in a variety of ways based on interpretability, the desire for a parsimonious number of clusters, comparison of different number of clusters, disregard of highly fragmented clusters, and through the use of the elbow method, assessing total within cluster sum of squares (Birditt & Antonucci, 2007; Kassambara, 2017; Milligan & Cooper, 1985; Mirkin, 2013).

Results

Preliminary Analyses

On average, respondents reported relatively high satisfaction with their romantic relationships (mean=3.4, max=4, sd=.67), their family relationships (mean=3.2, max=4, sd=.52), their friendships (mean=2.4, max=3, sd=.44), and their life overall (mean=6.3, max= 8.85, sd=1.4). Satisfaction ratings of the three different types of relationships were significantly positively correlated (r ranged between .15 and .34, all $p < .001$), but not so high that the three scores could not be examined independently for their associations with life satisfaction.

Multiple Regression Models

To estimate the independent associations between satisfaction with each type of relationships and satisfaction with life overall, we performed multiple regression analyses in which life satisfaction was predicted by satisfaction with the intimate relationship, satisfaction with friends, and satisfaction with family, controlling for age and income. As Table 1.1 reveals, satisfaction with each type of relationship was significantly ($p < .001$) and independently associated with life satisfaction, over and above the other variables in the model.

Building on the base model, we then added the three two-way interactions and one three-way interaction. Stepwise regression procedures were employed by which non-significant terms were eliminated sequentially based on inclusion and exclusion probabilities. The final model was significant, $F(6,921) = 65.826$, $p < .01$, $R^2 = .30$, retaining, in addition to age and income, satisfaction with the intimate relationship, satisfaction with family, satisfaction with friends, and the interaction between satisfaction with the intimate relationships and satisfaction with friends. All predictors were positively associated with life satisfaction, except the interaction which was negatively associated with life satisfaction ($p < .05$).

To illustrate the interaction, Figure 1.1 illustrates the associations between satisfaction with the intimate relationship and life satisfaction at different levels of satisfaction with friends, specifically at -1 standard deviation below the mean, at the mean, and at +1 standard deviation above the mean. Two of our slopes are significantly different from zero (.47, $p < .01$; .19, $p < .001$; and .10 $p < .07$, respectively) and outside the region of significance from .99 to an upper bound equal to 4.50. When respondents were highly satisfied with their intimate relationships, they were happy with their lives regardless of the quality of their friendships. But when they were unhappy with their intimate relationships, they were only happy with their lives if they had good friends.

Cluster Analysis

The K-means method produces clusters with the greatest amount of distance between clusters. With the use of hierarchal and K-mean clustering algorithms, we defined three distinct configurations (see Table 1.2) of respondents' intimate relationship satisfaction, family satisfaction, and friendship satisfaction. The clusters (with each variable standardized with $M = 0$ and $SD = 1$), are described in Figure 1.2. As the figures reveal, Cluster # 1 ($N = 421$) – respondents reported high levels of satisfaction with intimate relationships, family, and friends (approximately one standard deviation above the mean intimate relationships, and approximately one-half a standard deviation above the mean for family relationships and friendships). In Cluster # 2 ($N = 312$) – respondents reported high satisfaction with friends (one-half a standard deviation above the mean), but with the low satisfaction with romantic partners and family (one standard deviation below the mean for intimate relationships). In Cluster # 3 ($N = 239$), respondents reported low levels of satisfaction with all three relationships (more than one SD below the mean for quality of friends).

When we compared the average levels of life satisfaction within each cluster, each was significantly different ($p < .001$) from each other (see Table 1.2), with Cluster 1 reporting the highest life satisfaction, Cluster 3 the lowest, and Cluster 2 in the middle.

The correlations among intimate relationship satisfaction, family satisfaction, and friendship satisfaction within each of our three distinct configurations of relationships are presented in Table 1.3. As shown, for Cluster 1 no significant correlations were found; for Cluster 2, the correlations between intimate relationship satisfaction and each friendship and family satisfaction were significantly, positively correlated; for cluster 3, there were significant positive correlations between intimate relationship satisfaction and family satisfaction, as well as between friendship satisfaction and family satisfaction.

We further compared the demographic characteristics (i.e., gender, age, income, ethnicity, parenthood, levels of education, and employment status) of respondents categorized within each of the three configurations of relationships. The members of each cluster differed on age and income (Table 1.4) but did not differ significantly on any other demographic variable.

For Age, participants' mean age in each cluster were not significantly different, except for Clusters 1 and 2, in which case the mean age was significantly higher for Cluster 2 as compared to Cluster 1. For Income, participants' mean income (based on income categories) was significantly greater for Clusters 1 and 2, when compared with Cluster 3.

Discussion

Research has shown that social relationships matter, especially our relationships with our intimate partners, family members, and friends (Argyle, 2001; Caunt et al., 2013; Myers, 1999). However, only a few studies have examined the independent associations between the quality of

each of these relationships and overall well-being (Chopik, 2017; Thomas, 2016). We sought to elaborate on these associations in a number of ways.

Simultaneous Assessment of Relationship Types

First, we wanted to know whether the three primary relationship types – romantic, family, and friend relationships – were each significantly associated with life satisfaction, over and above the main effects of each other. In this regard, we found that, controlling for age and income, each did account for significant, unique variance in well-being over each other. This refutes the argument that love is the only thing that matters for well-being and replicates the finding in Ratelle et al. (2012). Our finding also builds on Ratelle by broadening the sample (in terms of age and gender, among other factors) and using refined measures of satisfaction.

If an intimate relationship does not stand by itself, then what other relationships do people need to be satisfied with their lives? Are quality relationships with two relationship types adequate to achieve happiness? If so, does it matter which ones? Or, does a person need high quality relationships with all three relationship types to be happy?

Two Types of Analysis

We assessed these questions using both a variable-centric and a person-centric approach, following the approach utilized in Ratelle et al. (2012). Our variable-centric approach involved using regression models that included interactions, while our person-centric approach utilized a cluster analysis that identified groups of individuals who shared identified characteristics.

With our variable-centric approach, we tested the interactions between our three variables. Only the interaction between intimate relationship satisfaction and quality of friendships was significant. When intimate relationship satisfaction is high, level of friendship satisfaction does not predict life satisfaction. If intimate relationship satisfaction is low, however,

people were only happy with their lives if they had good quality friends. This suggests that people can be happy in their lives even if they are not completely satisfied with their intimate relationships, as long as they have good friends.

Do such people exist? To address that question, we utilized a person-centric approach through a cluster analysis, identifying three groups of people with significantly different configurations (high, moderate, or low) of satisfaction with their intimate relationships, family, and friend relationships, and measured each groups' level of life satisfaction. Our findings were consistent with the negative interaction between intimate relationship satisfaction and friendship satisfaction. One group (representing 43% of our sample) reported high mean levels of satisfaction with each relationship type and high levels of life satisfaction. Another group (representing 25% of our participants) reported moderate levels of satisfaction for intimate relationships and low levels of satisfaction for family and friends, with friends at a particularly low level (i.e. more than 1 standard deviation below the mean). The third group, i.e. Cluster 2 (representing 32% of our participants), was the most interesting. This group was comprised of people who had high quality satisfaction with friends significantly above the mean, moderate satisfaction with family at the mean, and low satisfaction with intimate relationships significantly below the mean. For this group, life satisfaction was significantly below the life satisfaction of our first group, but significantly higher than the life satisfaction of our second group. This illustrates that a person can still be relatively happy in life, even if their intimate relationship satisfaction is poor. It is relevant that friendship satisfaction is the lowest in the group that has the lowest mean level of life satisfaction.

This finding (as it relates to Cluster 2) seems somewhat at odds with one of the clusters identified in (Birditt & Antonucci, 2007), namely a cluster of high positivity for friends, but high

negativity and low positivity for spouse and family – a configuration that resulted in significantly lower life satisfaction than existed for three other clusters. However, this (Birditt & Antonucci, 2007) identified cluster is so different from our Cluster 2 that they cannot be compared.

The prior study revealed two highly negative relationship types – spouses and family, with only friendships positive (contrary to our Cluster 2, in which only intimate relationship satisfaction was negative and family satisfaction was moderate). Further, this prior study only applied to a singular best friend, not friends in general. More research will be necessary to assess such differences.

Theoretical Implications

We know that love is not enough when considering which relationship types are necessary for life satisfaction. However, the question exists whether two or three strong relationship types are necessary in this regard. It may depend on the quality of an intimate relationship. When people are happy with their spouses, they tend to be happy with their friends and family, in which case, all three-relationship types are necessary (or at least positively exist). If people are unhappy in their marriages, however, they can still be moderately happy in their lives as long as they have high quality friendships and moderately good relationships with their family, strongly implying that only two relationships at either the moderate or strong level is necessary. This may be possible because many spouses do not enter marriage with the anticipation of strong romantic feelings, but rather become married to satisfy practical ends such as starting families and expanding their social network base (Huston et al., 2001).

It may be that the quality of friendships, especially the attributes that represent such relationships, is key as well when assessing life satisfaction for intimate relationship partners. For example, VanderDrift et al. (2012), exploring the value of being friends with a non-marital

romantic partner, believed, based on prior studies, that the quality of “friendship” between two such partners would be positively associated with relationship outcomes. In this study, the author equated enhanced friendship between a dyad to love, broadly defined. Specifically, he found that the more people were willing to invest in their friendship with their romantic partners, the greater the rewards they reaped in their romantic relationships.

Strengths and Limitations

Confidence in our findings is heightened by several strengths of our research methods and design. First, we used a sample that mirrored the US population, which enabled us to ascertain whether our results generalize across individuals who vary demographically. Second, our sample was large – almost 1000 participants, which enhanced our power to identify differences between groups. Third, we created a new scale for defining quality of friendships, with emphasis on the enjoyable aspects of friendships. Fourth, we used a broad and reliable life satisfaction scale. Finally, our pattern of findings were robust across both person-centric and variable centric models.

On the other hand, generalizations from these results must also be constrained by several limitations of this research. First, our study assessed data obtained through a self-report survey; these surveys contain measures that are often susceptible to positive reporting bias. Second, we based our intimate relationship satisfaction variable on a single item, which is not as reliable as a multi-item scale. Third, since we administered our survey at one point in time, our findings are cross-sectional; therefore, we were not able to draw any causal conclusions.

Conclusion

This study examined the associations between satisfaction with our primary social relationship types and general satisfaction with life. The most important findings indicate that

the role of friendships in well-being may be greater than many scholars have believed. Possibly, our findings can help accelerate further research into how friendships affect marriages and life satisfaction.

Existing theories of the interrelationship between social networks and life satisfaction emphasize the support available to spouses through their other social relationships. We have established that strong, positive friendships are significantly associated with well-being and happiness. Clinicians should be aware of this finding and be prepared to probe into the strengths and weaknesses of a married person's social networks when assessing a client's level of marital satisfaction and outlook on life.

Appendix A

Table 1.1. Hierarchical Regression Models (Full Sample)

Life Satisfaction as Dependent Variable

	b (SE)	t	b (SE)	t
Age	.19 (.04)	4.76***	.19 (.04)	4.81***
Income	.22 (.04)	5.53***	.22 (.04)	5.46***
Satisfaction with the intimate relationship (MS)	.41(.04)	9.92***	.86 (.20)	4.34***
Satisfaction with friends (QL)	.29 (.04)	7.36***	.72 (.19)	3.83***
Family Satisfaction	.25 (.04)	6.01***	.24 (.04)	5.74***
MS*QL	---	---	-.67 (.29)	-2.32***

Notes: all b coefficients standardized and centered; R^2 change between two models significant (F change = .02); N = 925 for base model; N = 921 for model with interaction

*p< .05; **p<.01; ***p<.001

Table 1.2 K-mean Descriptives of Cluster Analysis

Variable (range)	Cluster 1 Means (SD) (Range)	Cluster 2 Means (SD) (Range)	Cluster3 Means (SD) (Range)
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Life Satisfaction^ (1.23-8.85)	6.89 (1.14)a N = 421 (2.46-8.85)	6.05 (1.42)b N = 312 (1.23-8.8)	5.70 (1.40)c N = 239 (1.54-8.85)
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Note: Each cluster, measured by life satisfaction, significantly differed from each other at the .001 level

Table 1.3 Correlations (within Clusters)

	Cluster 1+	Cluster 2	Cluster 3
Intimate Relationships with Friendships	---	.19 (.001)	.00 (N/S)
Intimate Relationships with Family	---	.12 (.05)	.24 (.000)

Friendships with Family	.10 (.06)	.01 (N/S)	-.34 (.000)
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+ No variation for Intimate relationships for Cluster 1

Table 1.4. Cluster Descriptives

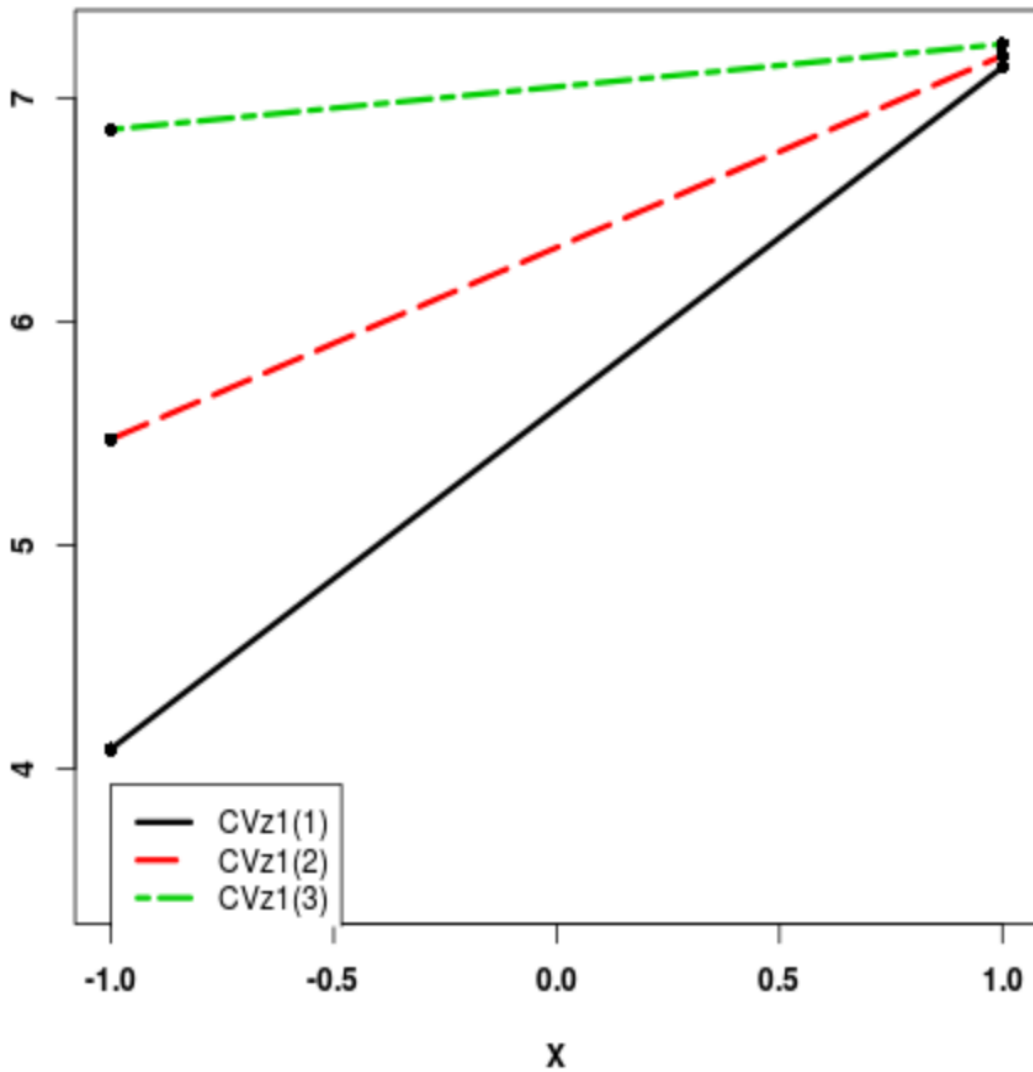
	Cluster 1	Cluster 2	Cluster 3
Mean Age	M = 48.29; SD = 15.12*	M = 50.55; SD = 12.98*	M = 48.77; SD = 13.19
Mean Income (based on Income Categories)	M = 3.07; SD = 1.05X	M = 3.13; SD = 1.14Y	M = 2.82; SD = 1.16XY

*Clusters 1 and 2 significantly different based on age

X = Clusters 1 and 3 significantly different based on age categories

Y = Clusters 2 and 3 significantly different based on age categories

Figure 1.1. Association Between Satisfaction with Intimate Relationships and Life Satisfaction at Different Levels of Satisfaction with Friends



Y – Life satisfaction (4-7)

X – Intimate relationship satisfaction (-1 to 1)

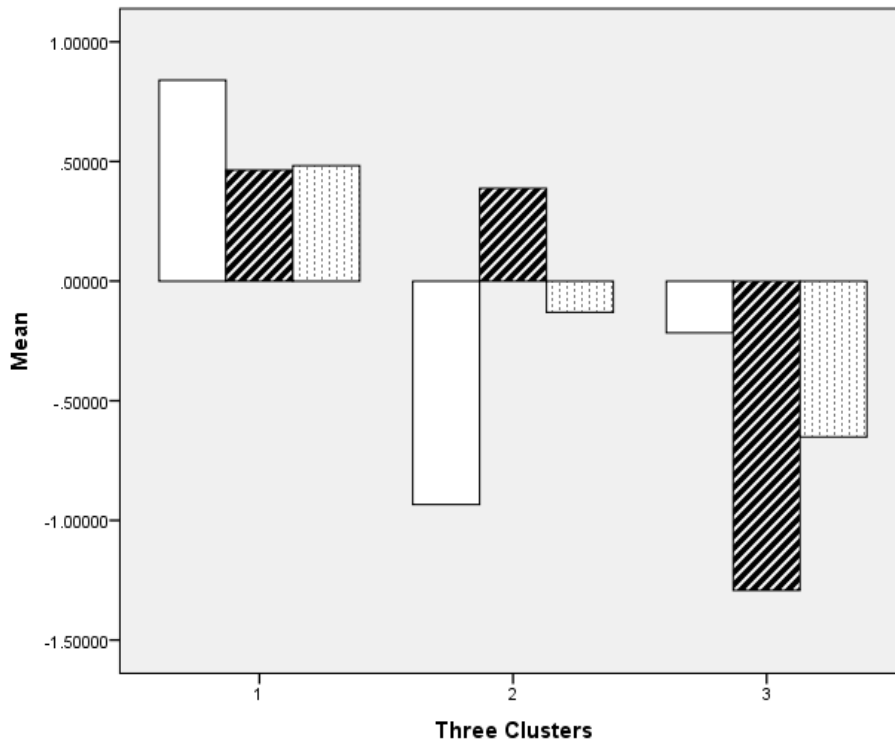
Z – Quality of Friends (Green, Red, and Black lines)

Green line – High quality of friends

Red Line – Moderate quality of friends

Black Line – Low quality of friends

Figure 1.2. Three Distinct Configurations of Intimate Relationship Satisfaction, Family Satisfaction, and Friendship Satisfaction



Bars:

- Blank – Satisfaction with the intimate relationship
- Lines – Satisfaction with friends
- Dots – Family Satisfaction

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Study 2 – Dimensions of Friendships

Throughout the ages, philosophers and intellectuals have appreciated the value of friendships. For Aristotle, a friend was “a single soul dwelling in two bodies,” Euripides believed that “life has no blessing like a prudent friend,” and many famous people and just ordinary folk have expressed similar views in the intervening centuries. Yet despite this apparent consensus, researchers historically have lagged behind (Gillespie et al. (2014). Overall, the existing literature on personal relationships has focused primarily on spouses, romantic partners, and family (Argyle, 2001; Chen & Feeley, 2013; Fuller-Iglesias et al., 2015; Gillespie et al., 2014).

After years of being underemphasized in favor of other relationships, the past few decades have seen a renewed interest in the role that friendships play in our lives (R. Blieszner & Ogletree, 2017; Sheldon & Lubomirsky, 2007). Researchers started to focus on elements that predicted a “good life,” including positive connections to others (Compton, 2005). For example, Vernon (2005 p. 1) noted that friendship “is frequently heralded as the defining relationship of our age.” Further, E. Diener and Seligman (2002) found that people who scored highest on life satisfaction spent the most time with friends socializing. Friendship quality is important and spending more time with friends is associated with improved health and well-being (Demir & Weitekamp, 2007; Fuller-Iglesias et al., 2013).

Even with this heightened interest, research on associations between friendships and happiness has been limited by the nearly exclusive focus on two dimensions of friendships: *quality* and *quantity* (Hua Wang & Wellman, 2010; Lucas & Dyrenforth, 2006; Saldarriaga et al., 2015). Researchers have found that high quality friendships and a greater number of friends are each significantly and positively associated with well-being (Demir & Ozdemir, 2010; Headley

et al., 1991), with the quality dimension predicting happiness more strongly than the quantity dimension (Demir, Orthel-Clark, et al., 2015).

Because friendships are diverse (Vernon, 2005), there may exist additional aspects of friendships that have yet to be studied directly. This possibility was first introduced by Aristotle more than 2,500 years ago (Vernon, 2005). He believed that there are three types of friendships (independent of number of friends): (1) Friendship of the good, i.e., quality friendships that will last; (2) friendships of pleasure and enjoyment; and (3) friendships of utility or advantage (K. L. Fiori & Denckla, 2015; Vernon, 2005). Agreeing with Aristotle, some scholars have suggested that goodness, pleasure, and advantage are three independent dimensions of every friendship (M. J. Mendelson, & Aboud, F. E. , 1999), but others suggest that the second two dimensions are subsumed by friendship quality (K. L. Fiori & Denckla, 2015).

The purpose of this paper is to assess whether Aristotle was correct about friendships and whether different aspects of friendship relationships independently predict happiness. For our purposes, happiness is experiencing pleasant emotions and few negative ones (Argyle, 2001; Caunt et al., 2013). Like most researchers in this area, we will for the rest of this paper use the terms subjective well-being, life satisfaction, and happiness interchangeably (Demir & Weitekamp, 2007). Although these terms do not have identical meanings, they all assess various components of overall life satisfaction and strongly correlate with each other.

The remainder of this introduction has three parts, as follows:

- (1) A review of the existing literature as it pertains to Aristotle's three dimensions of friendships, addressing how each of these three aspects of friendships is significantly associated with well-being;

- (2) A discussion of whether these associations differ based on gender;
- (3) An overview of the current study.

Dimensions of Friendships

Closeness: Friendships of the Good

Aristotle's friendship of the good relates to the caring and concern one person has for another, sharing of values, and mutually acting in each other's best interest. Friends mirror each other (Lynch, 2015). Researchers have conceptualized these friendship attributes by studying degrees of closeness (Demir, Orthel-Clark, et al., 2015; Lewis, 2015), defined as a deep intimate bond between friends with the absence of major conflicts (Kahn & Antonucci, 1980; Lewis, 2015). Closeness also involves intimacy and a strong, frequent, and diverse interdependence that lasts over a considerable period of time (Kelley, Berscheid, Christensen, Harvey, Huston, Lvinger, McClintock, Peplau, & Peterson, 2002; Miller, 2009). Some researchers, using the Convoy Model, ask participants to designate network members (including friends) as either closest, closer, or close to the respondent (Antonucci et al., 2013). Many studies have found that possessing many friendships with high levels of closeness is significantly and positively associated with happiness and well-being (Demir, 2015).

Typically, researchers' study friendship quality by creating a composite closeness score which is the sum or average of a number of these features, such as mutually acting in each other's best interest. At times, closeness and emotional support have been assessed separately (Demir & Weitekamp, 2007). When studies focus on close friends, only a limited number of friends are included: usually no more than 3-4 friends. Of course, adults have many other friends within their separate social networks, thus making it difficult to separate out close friendships (i.e., profound relationships) from more "mundane" friendships which to a large extent do not

involve secure attachment (Margolis et al., 1984). While people need a sufficient number of friends, the worth of these friends have been defined in terms of qualitative attributes, given that “quality, or at least perceived quality, can trump quantity” (Gillespie et al., 2014, p. 23).

Enjoyment

The second of Aristotle’s dimensions of friendship, pleasure, refers to the enjoyable experiences we share with friends. To enhance positivity, these social experiences cannot be fleeting and must occur on a regular basis, i.e., they need to be common events (H. T. Reis, 2001). These experiences produce emotions that feel good, such as joy, vigor, and excitement (Compton, 2005). They may involve participating in an athletic event or a stimulating conversation (Seligman & Csikszentmihalyi, 2000), or they may arise from “hanging out” (H. T. Reis, 2001) or listening to music. In each case, they involve socializing and having fun. Over the life-span, friends, more than any other type of relationship, uniquely generate enjoyment and positive experiences (Larson & Bradney, 1988).

This dimension is potentially unique for several reasons. First, a person does not need to socialize with a close friends to enjoy pleasurable experiences with others who may represent weak ties (Granovetter, 1973). Second, intimacy, a strong component of closeness, is not essential. People can experience enjoyment in mundane ways and not necessarily with people with whom a person shares a deep bond. Third, enjoying life provides added benefits that may not be present exclusively in strong close friendships, such as the prevention of declines in physical activities for older adults. Fourth, the benefits of enjoyment create better moods, as compared to material gains (Saldarriaga et al., 2015). Increasing positive affect may enhance people’s well-being and happiness. For all of these reasons, enjoyment has been viewed as a “dimension of friendship” (Larson & Bradney, 1988, p. 124).

On a theoretical level, the distinction between enjoyment and closeness has received support. Authors who have studied Aristotle's dimensions of friendship (Lynch, 2015) draw a distinction between non-instrumental dimensions like care and concern and instrumental dimensions like pleasure and enjoyment. These measures overlap to some degree (J. M. Cyranowski et al., 2013), but some argue that they may contribute independently to well-being and life satisfaction (W. M. Bukowski, Hoza, & Boivin, 1994; K. L. Fiori & Denckla, 2015; Larson & Bradney, 1988). For researchers who believe that enjoyment represents an independent dimension, their premise is that happiness is associated with activity and "are logically associated with positive affect or emotion" (K. L. Fiori & Denckla, 2015 p. 10). The Self-Expansion Model supports this view. In close friendships, each friend can experience "the others resources, perspectives, and identities ... as one's own" (Aron et al., 2013 p. 2). This can be achieved through shared activities that are exciting and invigorating, and not mundane (Aron et al., 2000). These shared activities "encourage exploration and novelty-seeking behavior" (Mattingly, 2012, p. 124). Thus, in addition to closeness of a friendship, the degree to which a friendship involves socializing with others or just doing things with others may also be important (Demir & Weitekamp, 2007; Larson & Bradney, 1988). On the other hand, for those researchers who view enjoyable endeavors as a sub-set of closeness, their premise is that closeness encompasses socialization, as well as many other factors that should be considered together (Demir, 2015; K. L. Fiori & Denckla, 2015).

The existing literature on enjoyment and friendship is limited. For example, people are happy in day-to-day life when they spend time with friends, have fun, and laugh (Saldarriaga et al., 2015). Further, they are 60% happier if they discuss important matters with friends, even if the friends are not necessarily close ones (Myers, 1999). The cumulative effect of small positive

experiences appear to matter the most (Sheldon & Lubomirsky, 2007). Studies that have utilized the daily experience method to categorize daily interactive events illustrate this evolution. One study, assessing closeness and enjoyment, was particularly relevant (H. T. Reis, 2001). In this study, Reis found that the strongest predictor of perceived relatedness (by a wide margin) was feeling understood by others, a feature of a high close friendship. However, other independent predictors of happiness and/or positivity related to enjoyment, such as “hanging out” and experiencing “fun.” In other words, the more fun socializing with others, the stronger the positive mood, independent of closeness. Similar was the work of R. Blieszner and Ogletree (2017), in which it was found that among college students, enjoyment was almost on a par with understanding when asked about the most important characteristics of friendships.

Utility

Aristotle’s third type of friendship was the friendship of utility or advantage. Considered as a dimension of evaluating friends, utility refers to the concrete benefits provided by the friendship, and not the qualities of the connection. For example, people may befriend those who have high utility because they are wealthy or generous, well-connected, accomplished, physically attractive, or in a position of power over others (Lewis, 2015). One friend may want something from the other or want merely to benefit from the association with the other. These benefits create uplift for a person (especially when a friend transfers a desirable trait to such person). Such uplifts, however, may be temporary when the benefits fade or are not reciprocated (Greco, 2015; Vernon, 2005). For this reason, Aristotle viewed friendships of utility as inferior to friendships of goodness and thought that utility presents a “problematic foundation” for successful friendships (Lynch, 2015). He believed that these types of friendships might be easy to form, but should not be confused with deeper bonds (Vernon, 2005).

Philosophers, sociologists, and social psychologists have explored this dimension of friendship only infrequently and mostly in the context of work-place friendships. In that context, they believe that people can gain benefits by working with colleagues who are also friends, as the work environment can become more pleasant, fun, and easier when collaborating with friends. Further, spending leisure time with friend-colleagues during work hours, including lunches and other breaks, tends to create moments of relaxation during stressful, tough, and competitive days (Greco, 2015).

Others, however, believe that this dimension of friendship can be potentially negative, exploitive, and transient, risking disappointment and frustration. “If a friendship is based solely on the degree to which two friends are useful to one another, for example as business associates, the relationship is likely to founder if a business conflict arises” (Lynch, 2015, p. 10). “The workplace also has an insidious capacity to undermine friendship” as it creates ambiguity, competition and self-interest (Vernon, 2005, p. 7).

The concept of blended relationships, i.e. close friends who are also work associates, is extensively studied in Bridge and Baxter (1992). The authors believed that tensions might exist for close friends at work. For example, close friends might need to avoid showing favoritism towards each other. Further, it can be difficult at times for friends to be completely open and honest with each other in the workplace. Based on their analytic procedures, Bridge and Baxter found that the benefits and tensions of workplace friendships were similar to those typically experienced in relationships in general (including friendships). Contrary to what they expected, however, “utility-unequal friends did not report more dual role tension than what was reported by utility-equal friends” (Bridge & Baxter, 1992, p. 221). While researchers have not studied this dimension of friendship recently, it may be significantly associated with happiness and well-

being. If Aristotle is right that the negative potential of such friendships outweighs the positive, the direction of the association may be negative.

Gender

There are two ways for gender differences to affect friendships. First, there may be gender differences in the experience of the three dimensions. Second, there may be gender differences in the way each dimension is associated with well-being.

Closeness

Studies have shown that while women's friendships are more likely to emphasize emotional closeness, self-disclosure, support, and conversation, men's friendships are more likely to emphasize shared activities and the formation of clubs (Argyle, 2001; Demir, 2015; K. L. Fiori & Denckla, 2015). Some researchers, however, view this short hand approach as "an oversimplification" of the differences. (R. S. Miller, 2009, p. 221-222). Consistent with that view, some researchers' have said that men and women have similar social closeness with friends (H. T. Reis, 2001). In another study, however, the authors found that for both men and women their closest confidants are women and both rely on women for intimacy (H. T. Reis, 2001). Women have higher standards when choosing and maintaining friends (R. S. Miller, 2009). In a few relevant studies researchers have found no significant differences in the association between closeness and happiness for men and women (Demir, Orthel-Clark, et al., 2015; Gillespie et al., 2014). Based on the literature discussed above, we believe that our study similarly will not find any significant different associations between close friendships and happiness based on gender.

Enjoyment

Women rate their friendships as more enjoyable than men do (H. T. Reis, 1998), and they expect more enjoyment from their friends (R. S. Miller, 2009). However, no studies have addressed whether there may be gender differences in the association between the level of enjoyment in friendships and happiness.

Based on the literature on gender differences on friendships in general, however, there is reason to believe that friendships of enjoyment may be more strongly associated with happiness for women than for men. Women's friendship relationships create more positivity than might exist with men, and enjoyment interrelates with positivity (H. T. Reis, 2001; Sarkisian & Gerstel, 2015). Men, however, may be more socially disengaged than women, which limits their enjoyable experiences (Sarkisian & Gerstel, 2015).

Utility

One of the primary areas relating to friendships of utility revolve around the workplace. Since more men work than do women (especially on a full-time basis), it is possible that this dimension of friendships applies more to men than to women (U.S. Department of Labor, 2018). No studies, however, have addressed whether there is a significantly positive association between friendships of utility and happiness. We believe, based on the labor statistics about the disparity in work for men and women and Aristotle's view about the potential negativity of work-place friendships, that there may be a greater negative association between friendships of utility and well-being for men than might exist for women.

Overview of Current Study

In light of the demonstrated importance of friendship for well-being, and in light of the lingering confusion about the aspects of friendship most strongly associated with well-being, the goal of the current study is to address two questions. First, what are the unique, independent

dimensions of friendship evaluation? Second, how is each dimension of friendship evaluations associated with well-being for men and for women? To address these questions, the study draws upon an on-line survey of a large and diverse sample of respondents who were asked about their friendships and their subjective well-being and life satisfaction.

We hypothesize the following:

Hypothesis 1 – Friendships have three separable dimensions -- Closeness, Enjoyment, and Utility.

Hypothesis 2 – These three dimensions – Closeness, Enjoyment, and Utility – each significantly and independently predict subjective well-being.

Hypothesis 3 – There is no substantial difference for men and women in their association between friendship ratings of closeness and well-being.

Hypothesis 4 – There is a substantially greater positive association between enjoyment ratings and well-being for women than for men.

Hypothesis 5 – There is a greater negative association between friendships of utility and well-being for men than exists for women.

Method

Sampling

In 2014, a private research firm, Research Now, solicited participants from an existing panel of over 600,000 individuals in the United States who had voluntarily consented to be invited and to participate in survey research on-line. The sampling frame was designed to reflect the diversity of the U.S. Census, such that more effort was devoted to solicit data from harder-to-reach demographic groups. Respondents in the panel received compensation (e.g., cash, points, or sweepstakes entry) for completing a survey.

Procedure

Respondents who agreed to participate were invited via e-mail to complete a self-report on-line survey that included questions about demographics, personal relationships (e.g., with friends, spouses, and family) and other aspects of their lives (e.g., health, career, and involvement within the community). Completing the survey took approximately 30 minutes on average. Respondents received compensation (e.g., cash, points, or sweepstakes entry) for participating.

Participants

A total of 2013 adults completed the survey. They ranged from 18 to 75 years of age and represented a broad sample of the U.S. population on demographic characteristics such as ethnicity, income and geographical region. Of these individuals, 951 (47.2%) were men and 1062 (52.8%) were women. Men's mean age was 43.31 years ($SD = 15.2$), women's mean age was 44.77 ($SD = 16.08$). Of the men, 299 (31.4%) were between the ages of 18-34; 250 (26.3%) were between the ages of 35-44; 161 (16.9%) were between the ages of 45-54; and 241 (25.4%) were age 55 or older. Of the women, 353 (33.2%) were between the ages of 18-34; 171 (16.1%) were between the ages of 35-44; 195 (18.4%) were between the ages of 45-54; and 343 (32.3%) were age 55 or older. The sample was 59.8% White, 13.4% Black, 14.5% Hispanic/Latino, 4.8% Asian Americans, 1.6% Native American, and 5.9% other. Economically, 404 (20.1%) individuals earned less than \$25,000 per year; 569 (28.3%) earned between \$25,000- \$49,999 per year; 635 (31.5%) earned between 50,000-\$99,999 per year; 322 (16%) earned between \$100,000- \$199,999 per year; 56 (2.8%) earned between \$200,000- \$499,999 per year; and 27 (1.3%) earned \$500,000 or more per year. With respect to education, 20 (1%) individuals had less than a high school degree; 203 (10.1%) had a high school or equivalent degree; 506 (25.1%)

had some college training; 240 (11.9%) had a vocational degree or certificate; 630 (31.3%) were college graduates; and 414 (20.6%) had post-college degrees.

Measures

Subjective well-being. While defining subjective well-being in terms of two elements (happiness, an affective element, and life satisfaction, a cognitive measure (C. M. K. Dush & Amato, 2005; Lucas et al., 1996)), researchers, in many instances, choose to measure one element over the other (Ed Diener, 2000; Oishi et al., 2007). Each such measure may have different predictors (Gallagher & Vella-Brodrick, 2008). Because our study focuses on dimensions of friendships that emphasize positivity, which is a strong affective measure, we chose to measure well-being based on important domains in people's lives (a hedonic approach that measures happiness through positive experiences) as compared to a scale that measures overall life satisfaction (Huppert et al., 2008). In this regard, we assessed well-being with the Personal Well-being Index (PWI) (International-Wellbeing-Group, 2013). The PWI assesses subjective well-being across eight domains: standard of living, health, life achievement, personal relationships, safety, community cohesion, future security, and spirituality. On each of these eight items, participants indicated their level of satisfaction on an 11-point response scale with 0 = *completely dissatisfied* and 10 = *completely satisfied*. This scale has good psychometric qualities within the current data (Cronbach's alpha was .89). While one of these domains, personal relationships, may appear to contain shared content with our statements about our three dimensions of friendship, this domain is broad (including all personal relationships) and not the same as specifically crafted statements about friendships (which is only one of many types of personal relationships). Rather than considering eliminating this domain, we believed it more

appropriate to leave intact an index that has been tested and used in its entirety, with a strong Cronbach alpha.

Friendships. The survey included 13 statements describing different elements of friendship based on the question “How well do each of the following statements describe your friendships at this time in your life?” Respondents were asked whether each statement “very much describes me,” “describes me somewhat,” and “does not describe me,” which we reversed coded when necessary (from 1-3 to 3-1). On an overall basis, Cronbach alpha for these statements was .73. We then separated these statements into three dimensions of friendships based on the existing literature, as follows:

(1) Closeness – (a) “I have friends with whom I can confide my deepest concerns” (Confide); (b) “I have friends who would be there to help me in times of need” (Help); (c) I have friends with whom I share values” (Values); (d) It is very important to have close friends” (Importance); (e) “I maintain active friendships with people that I have known since childhood” (Childhood); and (f) “I have been friends with several people for more than 10 years” (Years).

(2) Enjoyment – (a) “I have friends with whom I socialize with frequently and regularly” (Socialization); (b) I have friends with whom I have fun” (Fun); (c) “I have intentionally broken-off one or more friendships in my life (End); and (d) I wish I could spend more time with friends” (Time).

(3) Utility -- (a) “People seek out friendship with me because of my utility and connections” (MyS”); (b) “I seek out friendships with people who have high utility or connections in my profession or community” (OthersS); and (c) “I am friends with some people primarily for what they can do for me” (DoForMe).

Statistical Analysis

To evaluate our hypotheses, we used structural equation modeling (SEM), which is considered better than other analytic techniques because of its ability to evaluate simultaneously complex models involving latent indicator-variables. In this regard, our SEM analysis was conducted with EQS 6.1 using maximum likelihood (ML) estimations. ML is considered a preferred methodology for large samples since its findings are as precise as possible with the smallest errors possible. Due to non-normal distribution in some of the variables analyzed, models were estimated using robust maximum likelihood and thus robust model fit indices were evaluated. Specifically, preliminary analyses of the data indicated multi-variate kurtosis based on Mardia's coefficient (median normalized estimate equals 35.57). Missing data exists only for 69 cases (3.4% of the full sample): 48 for men and 21 for women. Because the missing data was so low, respondents with missing data were dropped in the SEM analyses.

To best examine potential interrelationships, we tested a base model (see Figure 2.1) through the use of a confirmatory factor analysis (CFA). When CFA is used, it is a confirmatory process based on theory. It compares an estimated population covariance matrix with an observed covariance matrix. The analysis is driven by the relationship between observed and latent variables (Schreiber, 2006).

A hypothesized model was specified including three latent variables (Closeness, Enjoyment, and Utility) and one measured outcome variable, subjective well-being (PWI). This model was tested to evaluate the hypothesized structure of friendship items as well as to identify whether each aspect of friendship significantly predicted well-being. Overall fit of the hypothesized model was evaluated using multiple robust fit indices: (1) Satorra-Bentler scaled X^2 (SBX^2); (2) the comparative fit index (CFI); (3) the standardized root mean square residual (SRMR); (4) the root mean square error of approximation (RMSEA), with its 90% confidence

interval (CI). The $SB\chi^2$ is a test of model misspecification (using in lieu of X^2 as a robust method for non-normal data). This test is usually significant for large samples, so other fit indices are also evaluated to best determine fit. The CFI is another fit index which is used extensively. This index compares the adequacy of the hypothesized model and a baseline model that assumes the observed variables are not correlated. The SRMR is a badness to fit index. It represents the average of the standardized residuals in the hypothesized model. Further, RMSEA is another badness to fit model, which represents the average lack of fit for degrees of freedom. In this context, the CI for the RMSEA is also used to guide decisions about fit. For this test, a lower limit below .05 and a higher limit less than .08 creates the possibility of a good fit. Values above .95 for CFI and values below .08 for the SRMR and below .06 for RMSEA, respectively, support good fit (Kline, 2016). All fit indices are evaluated together in order to provide a complete evaluation of model fit.

In order to evaluate the proposed structure in men and women separately, a baseline model including all participants was first established. This was followed by separate models for each gender with all parameters freely estimated. Upon inspection of each model, differences were identified which then formed the basis for imposing constraints to evaluate configural invariance. This configural model, which represented the best fits of the two groups, was then used based on the covariance structure to test measurement and structural invariances by applying different constraints for each subsequent hierarchical step. In testing measurement invariance, only the invariance between factor loadings and co-variances are of interest. In particular, determining whether cross-loadings and co-variances are equal between groups is important (Byrne, 2006). For testing the measurement model, equality constraints are imposed on freely estimated factor loadings. Once measurement invariance is confirmed, the multi-group

hypothesized model is then tested for structural invariance utilizing a number of additional hierarchal steps, including testing for partial measurement invariance (Byrne, 2006). Structural invariance involves testing, through constraints, for equality between the three factors and whether the relationships with the distal outcome is the same or different for men and women.

Results

Descriptive Statistics

The means (see Table 2.1) for Closeness and Enjoyment were on the higher side (between 2.3 and 2.6 out of 3.0), with four parameters (Help, Values, Years, and Fun) at 2.6 out of 3. The comparable means for men and women, estimated separately, were similar to the overall means. However, women had higher means for each parameter than men, except for the Fun parameter, which was equal for men and women. The means for each Utility parameter were all low overall and for women and men, separately (1.2-1.4). Most of the 10 parameters (for the Closeness and Enjoyment dimensions) correlated with each other, significantly and positively, on an overall basis and for men and women, separately, ranging from .20 to .49 with limited exceptions.

Testing the Model

The base model (Figure 2.1), after adjusting for changes suggested by the LaGrange Multiplier indices, fit the data well: S-B χ^2 (67) = 230.95, $p = .000$; CFI = .969; SRMR = .028; RMSEA = .035; 90% CI = .031, .040. All items loaded significantly on their corresponding factors. However, based on the LaGrange indices, cross-loadings were also included. Specifically, Fun loaded on all three factors (highest on the Enjoyment factor, loading at .50, with the other loading factors at a low level), while Childhood and Importance loaded on both

the Closeness and Utility factors (with low level loading, except for Important on the Closeness dimension (loading at .65).

Model Fit

The overall structure identified in the baseline model was fit to both males and females separately. For men, the overall fit remained strong: S-B χ^2 (67) = 139.61, $p = .000$; CFI = .970; SRMR = .031; RMSEA = .035; 90% CI = .026, .043. The same was true for women: S-B χ^2 (67) = 152.88, $p = .000$; CFI = .968; SRMR = .030; RMSEA = .035; 90% CI = .028, .042. To test for configural invariance, this same baseline model was fit to both groups using a multi-group approach. Not surprisingly, the model fit well: S-B χ^2 (134) = 292.58, $p = .000$; CFI = .969; SRMR = .031; RMSEA = .035; 90% CI = .029, .040. Given that the model fit well for both males and females, the next phases included testing for measurement and structural invariance between groups.

To that end, five additional models were created hierarchically to evaluate the aforementioned forms of invariance. First, a measurement invariance model was estimated in which factor loadings, covariances, and error terms were constrained to be equal. Results from the univariate portion of the Robust Lagrange Multiplier Test for releasing constraints were used to inform subsequent changes to the model. In this model, equality was established for all parameters for both men and women, except for the factor loading corresponding to the 'MyS' item on the Utility factor, for which the data showed that this parameter behaved differently for men and women. As such, this constraint was released and the new model estimated. This model fit well; however, another parameter was identified as requiring the constraint to be released, that is, the factor loading for 'the OthersS' item on the Utility factor. Releasing this constraint resulted in a final structure that required no further modification. Overall, the model fit well: S-B

$\chi^2 (148) = 309.19, p = .000; CFI = .968; SRMR = .033; RMSEA = .033; 90\% CI = .028, .039.$

Results suggest that items loading on the Utility factor function differently for men and women. These results also provide evidence for partial measurement invariance. As a note, this does not preclude testing for structural invariance.

Finally, we tested the full structural model, constraining all remaining parameters from the configural model (e.g., between factor correlations) and paths from the three factors to the outcome of interest, PWI. This structural model was estimated and fit well; however, the constraint imposed on the path predicting PWI from the Enjoyment factor was identified as needing to be released. This suggests that while Enjoyment was an important facet of friendship for both men and women, it had a differential relationship on PWI depending on gender. Therefore, this constraint was released resulting in a strong final model requiring no further model modifications: S-B $\chi^2 (152) = 310.41, p = .000; CFI = .969; SRMR = .021; RMSEA = .033; 90\% CI = .028, .038.$ Parameter estimates for this model are presented in Table 2.3 with a graphical depiction of the final model in Figure 2.2.

Model Results

The base model provides support for hypothesis 1 that Closeness, Enjoyment, and Utility represent key facets of friendship as highlighted by factor correlations. That said, Closeness and Utility in the base model were not significantly correlated. Moreover, results suggest that Closeness and Enjoyment each significantly and uniquely predict subjective well-being, whereas Utility did not significantly predict subjective well-being. Thus, hypothesis 2 only was supported in part. These findings are somewhat not pure, since the loading with Fun on all dimensions of friendships may weaken the independence and uniqueness of each dimension. However, if we

remove Fun as a parameter for the dimensions of Closeness and Utility, the model fit becomes inadequate.

This final model supported Hypothesis 3. The standardized beta coefficient for the Closeness statements when measured with PWI was .16 for men and for women .15. They were the same, as they were appropriately constrained to be equal (without any significant differences noticed on modification indices through the application of the Lagrange Multiplier test). However, this was not the case with the Enjoyment factor.

To determine whether the effect from Enjoyment to well-being differed by gender, we tested a model constraint forcing them to be equal. Based on modification indices (measured through the Lagrange Multiplier Test), results indicated that the paths from Enjoyment to well-being were in fact significantly different (Chi-Square = 4.822; $p = .028$); thus, these paths were not constrained to be equal. The standardized beta coefficient for the Enjoyment statements was .23 for women and .11 for men. Thus, consistent with Hypothesis 4, women's Enjoyment of their friends was associated with their well-being significantly more strongly than men's enjoyment of their friends was associated with their well-being. Finally, because the Utility dimension was found (in the final model) not to be significantly associated with PWI, Hypothesis 5 could not be tested.

Discussion

There has been a recent resurgence in the study of friendships and their contributions to well-being (Anderson & Fowers, 2019; Demir, 2015; Dunbar, 2018). Friendships, to some, are viewed as “the single most important factor influencing our... happiness” (Dunbar, 2018 p. 32). While most studies have emphasized the quality of friendships, expressed in terms of closeness and support (Lewis, 2015) and the quantity of friends (Wang & Wellman, 2010), researchers

may have overlooked other dimensions of friendships, especially enjoyment and utility, two dimensions of friendships considered crucial since Aristotle first proposed them (Bukowski, Nappi, & Hoza, 1987). Some believe that the enjoyment and utility factors are just part of a larger singular dimension of friendships – quality or closeness. However, items relating to these two dimensions are rarely included in studies assessing the associations between friendships and well-being, except in daily diary studies (Reis, 2001).

Our goal was to evaluate Aristotle’s three dimensions of friendship as predictors of general well-being. We wanted to know whether Aristotle’s three dimensions of friendship can be considered facets of a unidimensional quality construct, or whether each facet is best assessed as a separate dimension of friendships.

Consistent with Hypothesis 1, we found that all three dimensions of friendships – closeness, enjoyment and utility – are separate and distinct. Partially consistent with Hypothesis 2, only the closeness and enjoyment latent factors accounted for unique variance in subjective well-being. The failure to observe significant associations between the utility dimension and well-being may be due to our choice of items used to represent this latent variable. A few other studies that have assessed the associations between Aristotle’s three dimensions of friendships and well-being have found that all three dimensions account for unique variance in well-being, using very simple exploratory data and methodologies.

Most importantly, our findings show that quality and enjoyment of friendships should be assessed as two distinct latent factors that are associated with well-being. Within the enjoyment dimension, the socializing item loaded highest (.72). It appears that to be able to experience enjoyment with friends, or meaningful “socializing,” is essential. Having fun is also important, but the item assessing “fun” loaded both on enjoyment (.49) and on closeness (.30). This less

than ideal factor loading may be because we have not psychometrically tested our friendship items. If we used a simple structure, uncorrelated factors and an orthogonal rotation, there would be no cross-loadings (Schmitt & Sass, 2011). For many, this is a perfect solution within an exploratory factor analysis (Ferguson, 1993). For our data, this was not true. When studying data within the social sciences there is always some significant correlations between factors – which would result in some cross-loadings (Osborne & Costello, 2009). Consistent with this view, some researchers believe that cross-loadings are okay to include in a model if the cross-loading parameter loads at no greater than .32 (Beavers, 2013). For the item assessing “fun,” allowing cross-loadings was necessary to establish a strong model fit. Other similar items might have loaded more clearly onto one factor or the other. Additional research is necessary to develop a sound tool for assessing experiences in adult friendships (Schmitt, 2011).

The Role of Gender

Prior research on adult friendships suggests that, on average, men and women interact with their friends differently, with women’s friendships emphasizing emotional closeness and men’s friendships emphasizing shared activities. Our study adds nuance to this picture, showing that men and women experience and benefit from similar levels of closeness with their friends, but experience significantly different benefits from enjoyment of their friends. Thus, enjoyment of friends is a larger contributor to life satisfaction for women than for men. This is a new finding. No study before has ever specifically tested this premise.

Strengths and Limitations

Confidence in our findings is heightened by several strengths of our research methods and design. First, we used a sample that mirrored the US population, which enabled us to ascertain whether our results generalize across individuals who vary demographically. Second,

our sample was large – over 2000 participants, which enhanced our power to identify differences between groups. Third, we created a new series of items to represent Aristotle’s three dimensions of friendships, with a particular emphasis on our Enjoyment factor. Fourth, we used a broad and reliable subjective well-being scale. Finally, we used a sophisticated structural equation method that enabled us to learn a lot about our different parameters of friendships. On the other hand, generalizations from these results must also be constrained by several limitations of this research. First, our study assessed data obtained through a self-report survey; these surveys contain measures that are often susceptible to positive reporting bias. Second, we tested our model using a confirmatory factor analysis, which led to the need to establish more cross-loadings to obtain a good model fit than might have been most appropriate if we used an exploratory factor analysis initially to create our final numbers of dimensions. Third, since we administered our survey at one point in time, our findings are cross-sectional; therefore, we were not able to draw any causal conclusions.

Conclusion

This study examined the varying dimension of friendships as postulated by Aristotle 2,500 years ago. As with a lot that Aristotle studied, he was very prescient about friendships, especially in his identifying an enjoyment element. While the quality of friendships measured emotionally has been identified often, the focus on enjoyment – which is experienced through social interaction (i.e. socializing) – opens up an important area to study, especially in the context of life satisfaction and well-being. How we experience enjoyment may be vital to our overall feeling about our lives. This concept may also be relevant to the ways in which marriage partners inter-react. Clinicians should be aware of this finding and be prepared to probe into its relevance when assessing a client’s level of marital satisfaction. For example, experiencing

enjoyment with our friends and spouse together, may positively affect a person's marital satisfaction.

Appendix B – Tables and Figures

Table 2.1. Descriptive Statistics: Means & Standard Deviations

Parameters	Overall Sample	Men	Women
	Mean (SD)	Mean (SD)	Mean (SD)
	N = 1944	N = 903	N = 1041
Confide	2.4 (.69)	2.3 (.73)	2.6 (.63)
Help	2.6 (.69)	2.6 (.61)	2.7 (.53)
Values	2.6 (.57)	2.5 (.59)	2.7 (.54)
Childhood	2.0 (.81)	2.0 (.79)	2.1 (.82)
Years	2.6 (.66)	2.5 (.65)	2.6 (.66)
Importance	2.4 (.69)	2.3 (.72)	2.5 (.65)
Socialization	2.3 (.72)	2.2 (.71)	2.3 (.72)
Fun	2.6 (.58)	2.6 (.59)	2.6 (.58)
End	2.0 (.77)	1.9 (.78)	2.0 (.76)
Time	2.3 (.68)	2.2 (.69)	2.3 (.67)
MyS	1.3 (.58)	1.4 (.62)	1.3 (.54)
OthersS	1.2 (.48)	1.3 (.60)	1.2 (.46)
DoForMe	1.3 (.53)	1.3 (.54)	1.1 (.41)

Table 2.2. Model Fit & Tests for Invariance: Full Sample & Men and Women

MODEL+*	S - B_x^2 +	Df+	CFI+	SRMR	RMSEA+	RMSEA 90% CI*	MODEL COMPARISON	$\Delta S - B_x^2$	ΔDF	ΔCFI
1	230.95	67	.969	.028	.035	.031 .040	----	----	----	----
2	139.61	67	.970	.031	.035	.026 .043	----	----	----	----
3	152.88	67	.968	.030	.035	.028 .042	----	----	----	----
4	292.58	182	.969	.031	.035	.029 .040	1 vs 4	.670	115	.000
5	325.18	150	.966	.033	.035	.029 .039	4 vs 5	1.10	32	.020
6	321.66	149	.966	.034	.035	.029 .040	5 vs 6	.000	1	.000
7	309.19	148	.968	.036	.033	.028	6 vs 7	1.10	1	.020

						.039			
8	315.24	182	.968	.034	.033	.028	7 vs 8	34	.000
						.038			
9	310.41	152	.969	.033	.033	.028	8 vs 9	30	.010
						.038			

+ ROBUST

*Model:

- MODEL 1 – CONFIRMATORY FACTOR ANALYSIS – FULL SAMPLE
- MODEL 2 – BY GROUP – MEN
- MODEL 3 – BY GROUP – WOMEN
- MODEL 4 – CONFIGURAL – NO CONSTRAINTS
- MODEL 5 – CONFIGURAL – WITH ALL PATH AND ERROR COVARIANCE CONSTRAINTS
- MODEL 6 – CONFIGURAL – RELEASING SEL,F3
- MODEL 7 – CONFIGURAL – RELEASING UTILITY,F3
- MODEL 8 – STRUCTURAL – ADD: CONSTRAINTS FOR FACTORS PWI,F1 AND PWI,F2
- MODEL 9 – STRUCTURTAL – FINAL – RELEASE F2

Table 2.3. Parameter Estimates

Parameters	Overall			Men			Women		
	F1*	F2*	F3*	F1*	F2*	F3*	F1*	F2*	F3*
(standardized):									
Confide	.70	--	--	.66	--	--	.73	--	--
Help	.68	--	--	.66	--	--	.69	--	--
values	.66	--	--	.64	--	--	.64	--	--
Childhood	.33		.18	.34	--	.18	.31	--	.17
Years	.46	--	--	.48	--	--	.45	--	--
Important	.65		.13	.57	--	.14	.58	--	.14
Socialization	--	.72	--	--	.71	--	--	.73	--
Fun	.29	.50	-.14	.31	.47	-.14	.30	.50	-.14
End	--	.62	--	--	.62	--	--	.62	--
Time	--	.41	--		.41	--	--	.41	--

MyStat	--	--	.65	--	--	.62	--	--	.68
OthersS	--	--	.69	--	--	.73	--	--	.61
DoForMe	-.11	--	.62	-.01	--	.66	-.12	--	.56

F1 – Friendships of Closeness

F2 – Friendships of Enjoyment

F3 – Friendships of Utility

Notes: *b-coefficients – Standardized;

Table 2.4. Friendship's Percent Effect on PWI

$$\text{PWI}^* = \text{Overall} - .17(\text{F1}) + .17(\text{F2}) + .97(\text{E}) \quad R^2 = .10;$$

$$\text{Men}^* -- .16 (\text{F1}) + .11 (\text{F2}) + .97(\text{E}) \quad R^2 = .06;$$

$$\text{Women}^* -- .15 (\text{F1}) + .23 (\text{F2}) + .94(\text{E}) \quad R^2 = .13;$$

Figure 2.1. The Base Model

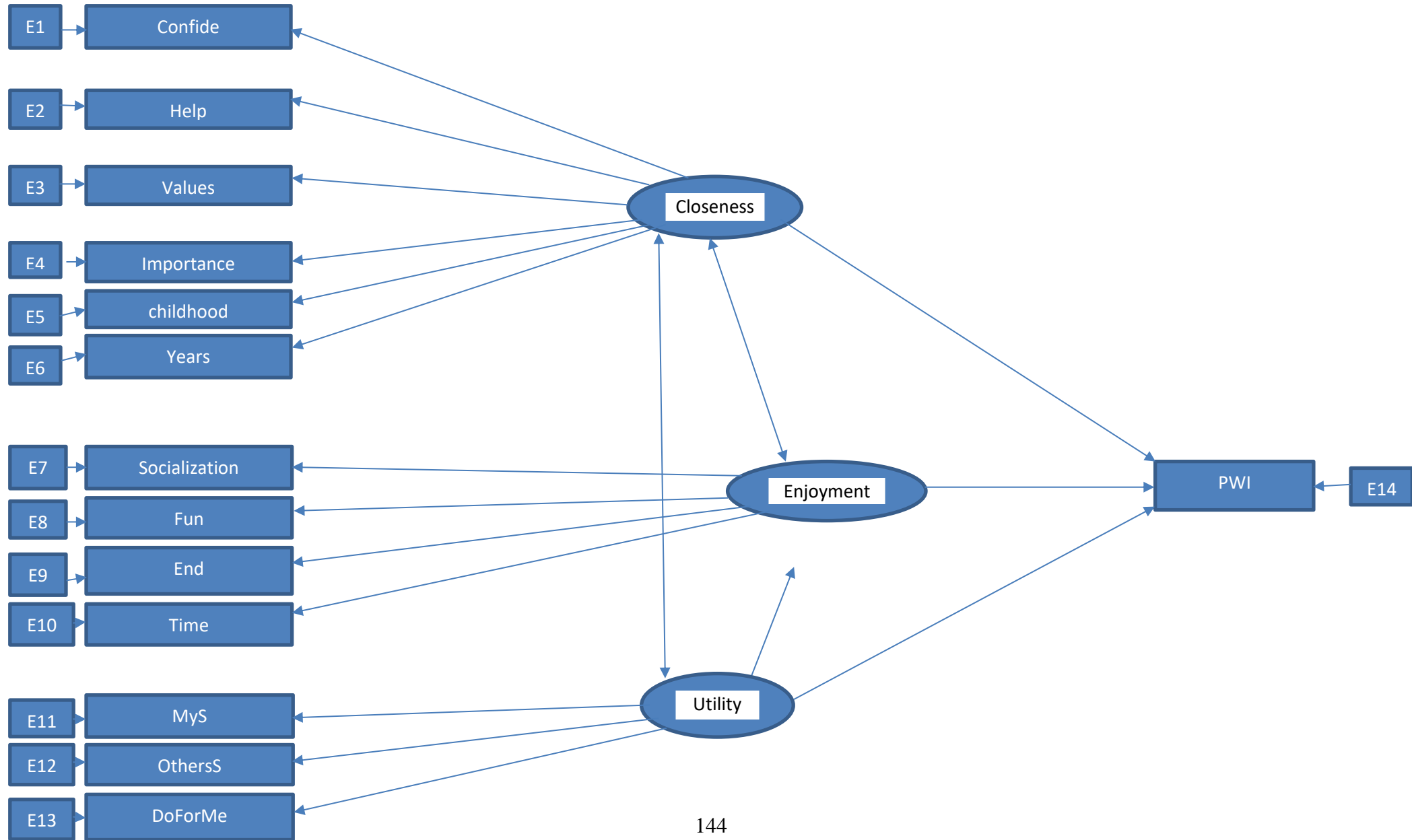
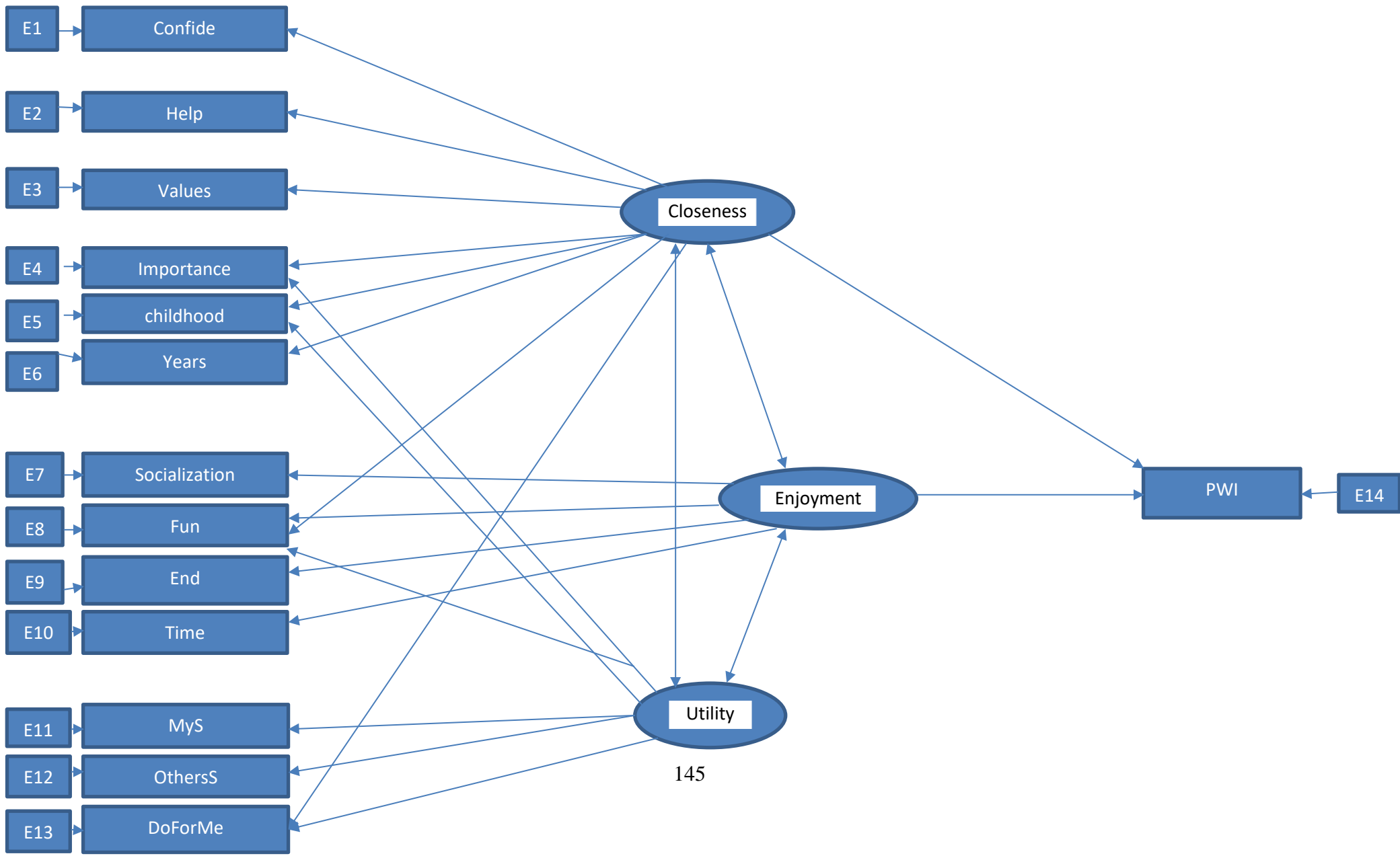


Figure 2.2. The Final Model



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Study 3: Assessing Satisfaction with Adult Friendship Networks -- A New Scale

Friendships are important in our lives. Aristotle emphasized the value of friendships over 2,500 years ago, but researchers have been slow to recognize their importance. Until the start of the 21st century, researchers only sparingly studied adult friendships while they studied other prominent relationships (e.g., romantic relationships and family relationships) frequently and in detail. Recently, however, researchers have started to study adult friendships, especially in the context of the associations between the quality of adult friendships and well-being, and in studies of the composition of social networks (Blieszner & Ogletree, 2017; Fuller-Iglesias et al., 2013; Sheldon & Lyubomirsky, 2007). This work has found that having high quality friendships is associated with happiness and well-being (Lewis, 2015; Saldarriaga et al., 2015), over and above personality factors (Demir & Weitekamp, 2007). On self-report happiness scales, the degree of “happiness” and the quality of “friendships” are strongly correlated (Lyubomirsky et al., 2005). Accordingly, friends “[are] frequently heralded...as the defining relationship of our age” and “as the new social glue to paste over networked lives” (Vernon, 2005 p. 1, 2). Friends create affective bonds, put us in the most positive mood, and give us joy with minimal levels of conflict (Argyle, 2001; Burger & Milardo, 1995; Caunt et al., 2013; Demir, 2015; Kearns & Leonard, 2004). In contrast, the lack of meaningful friendships contribute to loneliness, which can result in chronic illnesses, including depression (Chen & Feeley, 2013).

Despite the research interest, important questions about adult friendships remain unaddressed. For example: (1) Who are our friends? (2) What are the implications of investing in friends vs. other social network members? (3) What are the distinctions between best friends, close friends, and friends with whom a person has “weak ties” (Birditt & Antonucci, 2007;

Granovetter, 1973; Takahashi, 2005)? and (4) How do associations between friendships and well-being come about?

Researchers have made limited progress answering these questions due to a lack of well-validated assessment tools for measuring satisfaction with adult friendships. The goal of this work is to address this limitation by developing and evaluating a new, psychometrically sound instrument to assess people's satisfaction with their adult friendship networks.

What is a friendship? Classical definitions

Quality. Because they are diverse and serve different purposes for different people, friendships are difficult to define (Lynch, 2015). One researcher suggested there are “as many definitions of friendships as ... social scientists studying the topic” (Fehr, 1996 p. 5). Nevertheless, most agree that a central element of a friendship is a good quality relationship. A theoretical “ideal definition of friendship [is a voluntary relationship] that includes a mutual and equal emotional bond, mutual and equal care and goodwill, as well as pleasure” (Lynch, 2015 p. 9). Sampling other definitions portrays friendship as “a voluntary, personal relationship, typically providing intimacy and assistance, in which two parties like one another and seek each other's company” (Fehr, 1996 p. 7). High quality friendships exist when people act as a mirror of each other, act with mutuality, act in each other's best interest, exhibit caring, concern and understanding, and are emotionally supportive of each other (Birditt & Antonucci, 2007; Chelune, Robison, & Kommor, 1984; Fiori & Denckla, 2015). This quality dimension encompasses other features as well, such as intimacy, closeness, lack of conflict, instrumental support, intensity, autonomy, competence, perceived mattering, and self-validation (Chen & Feeley, 2013; Demir, 2010; Demir, 2015; Demir & Davidson, 2013; Demir, Orthel-Clark, et al., 2015; Demir, Özen, Doğan, Bilyk, & Tyrell, 2011; Demir, Şimşek, & Procsal, 2012; Demir &

Weitekamp, 2007; Gillespie et al., 2014; Litwin & Shiovitz-Ezra, 2010; Saldarriaga et al., 2015; Shiovitz-Ezra & Litwin, 2015b).

Friendships are similar to romantic and family relationships in that all involve trust, care, help, loyalty, intimacy, and the sharing of values (Fehr, 1996; Lynch, 2015; Miller, 2009). Yet there are also several important differences. First, friendships mandate fewer obligations, emphasizing companionship more than romantic or family relationships do (Lewis, 2015; Lynch, 2015; Saldarriaga et al., 2015). Second, although friendships are similar to romantic relationships in that partners are “deeply invested in one another” in both relationships (Lynch, 2015 p. 14), romantic relationships are higher in exclusivity (Miller, 2009), while friendships are “less regulated by social norms and easier to dissolve” (Fehr, 1996; Miller, 2009 p. 208-209; Vernon, 2005). Third, friendships do not require the passion and fascination that typically characterize romantic relationships (Lynch, 2015; Miller, 2009). Finally, friendship relationships are usually characterized by positivity and understanding, in contrast to relationships with spouses and family members that are not always “exceptionally enjoyable” and often include a lot of conflict (Larson & Bradney, 1988 p. 122). There are fewer hostile exchanges with friends than with family (Larson & Bradney, 1988).

Other possible dimensions. Although it may be central, the quality of the relationship is not the only possible dimension on which to evaluate friendships. Aristotle first raised this possibility, theorizing that there are three distinct types of friendship: friendships of the good (i.e., high quality friendships); friendships of enjoyment or pleasure; and friendships of utility (Blieszner & Adams, 1992; Vernon, 2005). Others have since expanded on Aristotle’s views and identified other separate dimensions. A body of literature has demonstrated that friendships are not unidimensional, that is, they are multifaceted and cover several meaningful yet distinct

domains (Demir, 2015; Demir, Özdemir, & Weitekamp, 2015). For example, there are two fundamental views of friendships: a non-instrumental perspective that “[focuses] on the care and concern for a friend for the friend’s own sake” and a utilitarian or instrumental perspective that “focuses on mutual benefit, pleasure, and desirable outcomes” (Lynch, 2015 p. 10). The first perspective includes all aspects of quality of friendships; researchers have primarily focused on this perspective while generally neglecting the second perspective which includes the companionship (e.g., cheerfulness, laughter, and activities) that friendships offer (Argyle, 2001). This second perspective might constitute a separate dimension of friendship (Mendelson, 2014) – as it is grounded in the view that friendships have a great power to “generate enjoyment” (Larson & Bradney, 1988 p. 122) and “social interaction”, especially through activities and engaging in “enjoyable events” (Reis, 2001 p. 77, 79). Seemingly “trivial activities,” – i.e. things people do together, like “ dancing, playing tennis, drinking..., and going for a walk,” (which people experience more with friends than with others) “can cause a lot of joy” (Argyle, 2001 p. 72).

Time spent with friends (i.e. more rather than less) may particularly enhance this second perspective and create positivity towards, and liking of, one’s friends (Dunbar, 2018; Fehr, 1996; Kelley, Berscheid, Christensen, Harvey, Huston, Levinger, McClintock, Peplau, & Peterson, 2002; Saldarriaga et al., 2015). Doing things with friends (e.g., specific events or activities) may create a separate dimension of evaluation for friendships (Lyubomirsky et al., 2005; Saldarriaga et al., 2015). This is supported by some sociologists who believe that there are two dimensions of friendship: an interactive component and an emotional component (Greco, Holmes, & McKenzie, 2015). Others define two dimensions differently, saying that the two dimensions are: features (i.e. positive and negative attributes, companionship, and self-validation); and qualities (which represent “the degree of excellence in a particular characteristic or feature of a

friendship” (Saldarriaga et al., 2015 p. 63). Still others believe that there are four dimensions of friendship – quality, quantity, conflict, and satisfaction – when investigating the association between friendship and happiness (Demir, Özdemir, et al., 2015). Finally, at least one prominent author has said activity represents one domain of social interaction for friends (Reis, 2001).

This question of dimensionality, therefore, remains open within the literature on friendships. Progress in understanding friendships may require scholars to agree “on a precise set of defining features” or a coherent “list of attributes” (Fehr, 1996 p. 7), which may include more than one dimension. However, these other dimensions may correlate significantly with the quality dimension, which would then raise the question whether the multiple dimensions can be treated as essentially unidimensional (Reise, Morizor, & Hays, 2007). Developing a psychometrically tested scale may be a first step towards solving this confusion.

Limitations of Previous Friendship Scales

Pursuing of a new adult friendship satisfaction scale is only justified if an adequate scale does not already exist. While a number of researchers have created self-report friendship scales to measure attributes of friendships, their scales have not been widely adopted and used by other researchers. Table 3.1 provides information about these scales, and reveals that each has a number of shortcomings.

First, virtually all the assessment scales were developed to study friendships among children and adolescents. Because adult friendships differ from childhood friendships in significant ways, items relevant for children and adolescents are not necessarily meaningful for adults. Item content for adults will be different. For example, children do not focus on emotional support or help received from friends to the same degree as adults, and discussions of important matters with friends are likely more prevalent among adults than with children.

Second, most existing scales are long and cumbersome. Some have close to 100 items, with others ranging from 40 items to 70 items. This is problematic because: a) lengthy instruments can lead to exhaustion in respondents, b) item content is often redundant, and c) measures of reliability, such as Cronbach alpha, are sensitive to scale length and can give a false sense of high inter-correlation.

Third, most scales have examined feelings and evaluations of a single friendship, rather soliciting evaluations of the whole friendship network. This has evolved due to researchers' interest in individual patterns of interaction during childhood between specific friends, such as a child's relationships with their best friend (Bukowski et al., 1994; Horrocks, 1951). For instance, Mendelson & Aboud (1999) noted that "individuals can specify types of friendships, distinguishing, for example, between best friends, good friends [and causal friends thereby creating] distinctions [which] are gross criterion of quality" (Mendelson & Aboud, 1999 p. 130). Also, this methodology permitted researchers' to focus on features particularly relevant to close peers (Parker, 1993). While this type of study is extremely important, especially in the context of children, its use to create a psychometric scale for adults is potentially misleading because a person's relationship with one friend tells only a small part of the story of that person's overall experience of friendships. A casual friend may help a person find a job, whereas a close friend may provide meaningful emotional support. A person's entire friendship network gives a broader picture of a person's overall experience of friendships than can be obtained by focusing exclusively on one friend (Birditt & Antonucci, 2007).

Fourth, these scales are designed to be multi-dimensional, attempting to assess distinct friendship functions (Mendelson & Aboud, 1999; Mendelson, 2014), as compared to creating an aggregate scale with sound psychometric properties. This can be beneficial but it is also limited

in scope. For example, in one study, the authors specifically wanted to study six separate and distinct friendship functions (Mendelson & Aboud, 1999). In another study, the authors wanted to understand the pattern of relationships among various dimensions on a latent variable (Bukowski et al., 1994). The unmet challenge is to develop a scale that covers the multidimensional *content* of friendship while still possessing the properties of a unidimensional instrument.

Finally, the psychometric testing of existing scales has relied heavily on traditional test theory methodologies (including using Cronbach alpha, exploratory and confirmatory factor analysis) but has not used more sophisticated techniques, such as bi-factor modeling and item response theory. Such methods were not common at the time that most existing scales were created. While traditional test theories remain valid and useful in psychometric testing (creating meaningful sub-scores), newer test theories can provide additional information that can improve scale development. This is important because in many studies assessing multidimensionality (Rodriguez, 2016), distinct dimensions tend to represent a single underlying general factor (i.e. with variances common to all dimensions) with little variance remaining (after controlling for the general factor) in the subscale scores. In other words, in past studies, most multidimensional scales may have been essentially unidimensional. These multi-dimensions often do not provide significant unique variances over and above variances that are common to all the items in the scale (Reise, Waller, & Comrey, 2000; Kyriazos & Stalikas, 2018).

Considerations in Designing a New Scale

Content Validity. Creating a valid scale requires defining a friendship construct. “Validity is not complex.... It is a very basic concept....A [scale] is valid if it measures what it purports to

measure.” It must “causally produce variations in the outcomes of the measurement procedure” (Borsboom, 2004 p. 1061). Friendship is a known concept, although defined differently by researchers. It addresses something that is real in people’s lives, while its quality varies among people. It acts as a point of reference and results in observed scores. Further, the items within the scale have to be “representative and consistent” with the construct (Reise et al., 2000 p. 287). “Scales can be developed to assess constructs at each of many levels of abstraction (Clark, 1995 p. 310). A researcher could define this construct narrowly, such as only addressing a best friend, or a specific named friend, or a specific type of friend like a work friend. On the other hand, researchers can define this construct more broadly, such as by studying satisfaction with friendships in general.

Choice of Format. The format for the way in which items are tested can take numerous forms (Clark, 1995). In the past, researchers have used declaratory statements, checklists (i.e. scanning a list and choosing only applicable items), force-choice (i.e. choosing between alternatives), and visual analog measures (i.e. endpoints, like “no pain at all” vs. “excruciating pain”). Today, most researchers use definitive statements, such as “My friends trust me.”

Response Options. Researchers also use many different types of response options for the way in which a survey participant responds to an item. The most dominant response options are dichotomous responding, using “yes/no” or “true/false” responses, or Likert-type rating scales with multiple response items (i.e. 3 or more options). Likert scales provide for ordered responses and typically result in obtaining more information from the respondents.

Sample size and sampling frame. According to (Reise et al., 2000), the sample size in assessment research should be large enough to have adequate power to test confirmatory factor models. When the number of facets is large and the number of items loading on many facets is

small, a large sample is appropriate. The sample size should be sufficient to determine a useful variable-to-factor ratio, a strong commonality of the variables, and whether factors are over-determined based on number of items that load on each factor.

Structural Validity. The structural validity of a scale (i.e. the internal consistency of the structure) is established if the items selected are consistent with the goal of the construct. However, establishing whether that is achieved has been tested in different ways. Today, though, most researchers use some form of principal component analysis or principal factor analysis for such testing. Principal *component* analysis assesses which items indicate latent variables and acts as an accurate report (on which many potential items can be eliminated) while preserving the essence of the dimensionality within the data. On the other hand, principal *factor* analysis assesses variables as indicators of effects on latent variables (permitting the exploration of potential latent variables) thought to be a “reflective measure...of the construct” (Beavers, 2013 p. 5). The findings from each of these methods can be substantially different. Only factor analysis uses common variance exclusively. By not assessing specific variances as part of the structure, error variance can be reduced and will “produce more accurate solutions” (Beavers, 2013 p. 6).

Discriminant Validity. For a scale to be useful to researchers, it needs to be clearly differentiated from other existing scales. For example, my friendship scale should be a more specific and unique measure than a broader concept of social relationships in general. If this is the case, items included in the factor analysis should load higher on the friendship scale than on a broader based scale. There is no value in creating a scale that is “indistinguishable” from existing scales (Clark, 1995).

Convergent Validity. For a scale to be valid, it needs to correlate in the appropriate direction with outcome measures that one would believe relate to the construct. For example, good quality friendships should significantly and positively correlate with measures of subjective well-being (as well as other similar types of outcomes).

Overview of Current Project

In light of the limitations of existing scales, the goal of this study is to develop a novel, psychometrically superior scale using both new and existing items to assess the quality of adult friendship networks. Given that people have multiple friends and it is impractical to assess each one separately, this proposed scale will focus on assessing friendship networks, rather than the quality of one specific friendship.

Method

Assembling the Initial Item Pool

The first step in developing a new scale is to create a list of potential items (Clark, 1995; Reise et al., 2000). The list should be over inclusive, as it is easier to reduce than add items (Reise et al., 2000). It should include items that discriminate between people who score high on the construct measured, as well as people who score low on said construct (Kyriazos & Stalikas, 2018). It is essential to choose systematically diverse items that represent all different aspects of friendships (Tellegen, 2008). A sufficient number of items should be included to adequately represent major content areas within the broad concept of friendships. This creates “multi-item homogeneous item clusters” (Reise et al., 2000 p. 289). As noted by (Clark, 1995), item pool creation is an iterative and deductive process.

The process of item construction is the “assembling or/and writing” items that best convey the construct (Kyriazos & Stalikas, 2018 p. 2532). This can be achieved by relying on the

existing literature, items previously use in scales, and through the use of theory (Reise et al., 2000). Further, one should consider the retention of items that are parallel, but not identical or redundant (Smith, 1995).

Consistent with these considerations, an over-inclusive initial list of items for the proposed adult friendship scale was developed. This list (with 450 items) was comprised of items taken from existing friendship assessment scales (see Table 3.1), in addition to original items crafted based on the adult friendship literature. When appropriate, the language of specific items was adjusted to be applicable to an adult friendship network, since many items were created with a specific population (e.g. children) or type of friendship (e.g. close friends, singular best friend, etc.) in mind. For example, “ I feel close to him/her.” (Sharabany, 1994a) was changed to “I feel close to my friends.” To ensure adequate representation of all aspects of the construct, each item was also classified as representative of a facet of adult friendship hypothesized to be important, using the dimensions of friendships contained in existing scales, as well as other dimensions assessed in empirical studies or theorized by researchers (e.g., closeness, enjoyment, etc.).

Once the inclusive list of items was developed, each item was reviewed and either modified, retained, or eliminated them from the list. The following criteria were implemented in the decision process:

- Redundant items were deleted.
- Items containing or combining multiple ideas (double barrel) were separated into multiple statements each expressing a single idea.
- Items containing jargon or vocabulary that was not interpretable by someone with a 10th grade education were modified or deleted.

- Items that describe the respondent and not the respondent's friendships were modified or deleted.
- Items that pose hypothetical scenarios were modified or deleted.
- Vague or ambiguous items were modified or deleted.
- Items difficult to ask and answer both orally and online were deleted.
- Items containing content specific to children's friendships were rephrased to apply to adults when possible.
- Items originally referring to one specific individual were rephrased to apply to the entire friendship network.
- Items containing absolute language (e.g., "always" and "never") were modified or deleted.

Through this process, the initial 450 items were reduced to 157 items, grouped within 14 facets of the concept (See Table 3.2).

Assessing Item Response Bias

Some assessment researchers recommend including within the initial item list items assessing social desirability to measure response bias. For creation of the friendship scale, the items to be tested did not include items from such a scale for several reasons. First, the addition of such a scale would add confusion. The items on such a scale, e.g. "I never felt like I was punished without cause," (Crowne, 1960) have nothing to do with friendships, the stated purpose for the survey. Second, such social response scales use dichotomous responses (i.e. true or false), also inconsistent with the response options initially tested for the new friendship scale. Finally, there has been criticism of such social desirability scales as a test of bias, since they may represent a personality variable in and of themselves (Crowne, 1964).

Data Sources

Data for this project came from two independent surveys conducted between October 2019 and February 2020. Data for Study 1 were collected in October 2019, from 2143 respondents using Dynata, a research firm, to administer an on-line survey. Dynata solicited participation in a survey from an existing panel of individuals in the United States who had voluntarily consented to be invited and to participate in survey research online. The goal was to obtain a sample that yielded individuals whose demographic characteristics mirrored the proportions found in the most recent data available through the U.S. Census Bureau. Individuals who met the U.S. Census demographic criteria were recruited specifically for this survey through email invitations that contained a link to enter the survey. A total of 5,369 individuals participated. Of these individuals, 3,417 completed all survey questions (with no missing data). Engagement checks were instituted throughout the survey to monitor if participants were closely following along with each statement (i.e., participants were prompted “Please select ‘Somewhat Agree’ here.”). If participants failed 1 or more of the engagement checks (i.e., failed to select “Somewhat Agree” when prompted), they were disqualified from the sample. After such disqualifications, 2,159 qualified participants remained. Of these, 16 participants were further excluded because they did not respond to the gender demographic question with a binary answer (i.e., male or female). Thus, our final Study 1 sample consisted of 2,143 qualified participants. Completing the survey took approximately 20 minutes on average. Respondents received compensation in the form of cash, rewards points, discounts, etc.

For Study 2, Dynata was also retained to solicit a sample comparable to the one used for Study 1. Potential participants, once again, had previously opted in to be a part of a subject pool, initiated by Dynata, of individuals eligible to be invited to participate in a variety of different

online surveys. Following the same processes as in Study 1, 3,699 individuals completed all survey questions (with no missing data). After eliminating individuals who failed any of the engagement checks, and who failed to meet demographic criteria, 2,000 qualified and reported participants comprised the Study 2 sample. Completing the survey took approximately 20 minutes on average. Respondents received compensation in the form of cash, rewards points, discounts, etc.

Sample Characteristics – Study 1

The Study 1 sample was comprised of 2,143 participants identified with the above procedures. Men comprised 47.6% of the sample while women comprised 52.4%. Respondents' ranged in age from 18 to 92 years, with 10.3% of participants being 18-24 years old, 17.6% being 25-34 years old, 17.4% being 35-44 years old, 18.1% being 45-54 years old, 20.1% being 55-64 years old, and 16.6% being 65 years or older. Of the sample, 66.3% identified as White or Caucasian, 14.9% as Hispanic or Latino, 12% as Black or African American, 4.1% as Asian or Pacific Islander, and 2.4% as other or multiracial. Approximately 1.5% of the sample had less than a high school education, 17.5% had a high school diploma or the equivalent, 25% had some college or vocational education, 34.2% had a college degree, 21.7 had a graduate degree, and .2% preferred to not answer. Seventeen percent of the sample's total household income for the year of 2018 was less than \$30,000, 15.5% was \$30,000-49,999, 16.8% was \$50,000-\$74,999, 15.4% was \$75,000-\$99,999, 17.7% was \$100,000-\$149,999, and 17.6% was \$150,000 or greater. The total sample was divided in half randomly to use 1,071 for the Exploratory Factor Analysis (EFA) and the remaining 1,072 participants were reserved for Confirmatory Factor Analysis (CFA) conducted later. The University of California, Los Angeles' Institutional Review Board approved all procedures.

Sample Characteristics – Study 2

The Study 2 sample was comprised of 2,000 participants identified with the above procedures. Men comprised 49% of the sample while women comprised 51%, and ranged in age from 18 to 92 years, with 11.7% of participants being 18-24 years old, 19.9% being 25-34 years old, 17.7% being 35-44 years old, 18.1% being 45-54 years old, 18.8% being 55-64 years old, and 14% being 65 years or older. Of the sample, 64.1% identified as White or Caucasian, 16.3% as Hispanic or Latino, 11.9% as Black or African American, 4.9% as Asian or Pacific Islander, and 2.8% as other or multiracial. Approximately 1.7% of the sample had less than a high school education, 15.7% had a high school diploma or the equivalent, 24.9% had some college or vocational education, 37.9% had a college degree, 19.8% had a graduate degree, and .3% preferred to not answer. Seventeen percent of the sample's total household income for the year of 2018 was less than \$30,000, 15% was \$30,000-49,999, 17.3% was \$50,000-\$74,999, 14.9% was \$75,000-\$99,999, 17.7% was \$100,000-\$149,999, and 18.1% was \$150,000 or greater. As with Study 1, the total sample was divided in half randomly (i.e. 1,000 participants) for EFA, with the remaining 1,000 participants reserved for final CFA. The full sample of 2000 participants was used together using CFA to replicate certain findings in Study 1. The University of California, Los Angeles' Institutional Review Board approved all procedures.

The samples in Studies 1 and 2 are not significantly different from each other in terms of gender, ethnicity, education and income. However, the participants are significantly older in Study 1 than in Study 2, with such means ($M = 3.70$ and $M = 3.54$, respectively) being in the 35-44 years old category (in each study), but higher for participants in Study 1. As can be seen from above, the age of participants in Study 1 was higher in the oldest two age categories as compared with Study 2, partially offset by the opposite with the respect to the youngest two categories.

Strategy for Preliminary Analyses

I initially evaluated basic descriptive statistics, such as means, standard deviations, skew, and kurtosis for 157 items (Ferguson, 1993). I also examined correlations among all items, computing polychoric correlations. Polychoric correlations (as opposed to Pearson's correlations) were preferred because they produce findings that are more accurate when using ordinal variables (such as Likert Scales). For items to be retained in the scale, the correlations among the items were moderate to high, but not too high as too much overlap indicates redundancy and possible multi-collinearity.

Next, I inspected the distribution of category response frequencies for each item. Ideally, frequencies reflected spread across response options, rather than clustered in one or two response choices. Further, I examined the item-total correlations to determine the value of each item. Items with high correlations spoke to the utility of an item being included in a total score. Items with low correlations indicated problematic items that may not be measuring the same thing as the rest of the items.

Given that there is no *a priori* theoretical number of appropriate factors, I applied exploratory procedures, the aim of which was to group items to form preliminary clusters or factors to gain a better understanding of the possible dimensional structure. Specifically, I computed and plotted Eigenvalues, as well as ran cluster and bassAckward (a backwards way of assessing the factor composition) analyses. These analyses were conducted in R (R code Core Team 2019). Eigenvalues are a measure of how much of the variance of observed variables is explained by a specific factor (i.e. the sum of squared loadings for a factor). The scree test was used most prominently and it functioned reasonably well (Fabrigar, 1999; Osborne, 2005). It plotted the eigenvalue for each factor in order of descending value. While a common convention

is to use a threshold of 1.0 to decide on the number of factors, the best practice is to visually inspect the plot for the point at which there is a pronounced bend, or elbow (Reise et al., 2000). The bend can assist in determining the appropriate number of factors to retain/extract. With the use of a scree test, the appropriate number of factors was the number of factors specified when the elbow appeared, minus one. These results were informative as to the number of factors to be specified in subsequent analyses. For example, if it was clear that there were no more than three factors suggested using the above-mentioned analyses, then it would not make sense to consider upward of five, six or ten factors in subsequent analyses.

Exploratory Factor Analysis (EFA). I then used exploratory factor analysis, a common factor model, in R as my primary statistic tool to test the structural validity of the friendship satisfaction scale and to discover the most parsimonious way of characterizing a set of variables through dimension reduction procedures. EFA permitted the discovery of whether “the observed variables can be explained largely or entirely in terms of a small number of variables called factors” (Sinharay, 2011 p. 32). EFA extracted factors based on shared/common variance among items (Reise et al., 2000). Thus, the final factors reflected domains for which subsets of items measured a similar construct or facet of a broader construct. This EFA process allowed me to examine multiple solutions to identify a structure that most meaningfully represented the construct (Briggs, 1986). I examined a series of models, beginning with a unidimensional (one factor) model and continued moving forward with additional factors until the “best” model was identified through model fit and theory. Results from EFA, specifically from the best final model, were used to make decisions regarding item retention and deletion such that I selected those items that were the strongest indicators of the latent structure of the friendship satisfaction

scale (Kyriazos & Stalikas, 2018). Further, after removing items from the scale, my goal was to retain sufficient items (at least 4 items) representing each common factor (Fabrigar, 1999).

Rotation. Before estimating models, a rotation method was determined (Osborne & Costello, 2009; Reise et al., 2000) through which I selected the appropriate number of factors that would allow me to investigate the “correlational structures of [multi-data] sets” (Tellegen, 2008 p. 257). The goal, in this regard, was to “simplify and clarify the data structure” (Costello, 2005; Williams, 2010). Oblique rotations, which account for the correlated nature of factors, were used (i.e. “promax”). This type of rotation “accounted for relationships between factors before determining an item’s relationship to the factor” (Beavers, 2013 p. 10). While orthogonal methods are common, if factors were in fact orthogonal, this would be evidenced in the final model solution.

Estimation of Model fit. I used Maximum Likelihood (ML) estimation, which is an iterative process that identifies factors that reproduce the correlation or the covariance matrix in the population. This estimation procedure produces model fit indices, which allowed for overall evaluation of model fit. Fit for each model was evaluated for model fit using conventional model fit indices and criteria: (1) Chi square, (2) either the Tucker Lewis Index (TLI) or the comparative fit index (CFI), (3) the standardized root mean square residual (SRMR), and (4) the root mean square error of approximation (RMSEA). I used significance testing which enabled me to select the model that explained the data better than any other model. Specifically, nested models were evaluated for significant decrements/changes in model fit (e.g., 2 factor vs 3 factor model). I evaluated these changes by chi-square difference testing, with the change in chi-square evaluated at the change in degrees of freedom. Additionally, I have used ML estimation to

handle missing data and for adjusting non-normality. ML estimation was the best choice when data was relatively normally distributed (Costello, 2005).

To start, I ran models with 1-5 factors. The best model required a balance between parsimony and plausibility, consistent with theory, as well as overall model fit. In my final model, there was a sufficient number of common factors to account for a major portion of variance. Each factor was theoretically meaningful and comprised of at least 3 items. Further, factor loadings for each item were at least 0.60 with higher values being preferred. To the extent possible, a simple structure with limited cross-loadings, in which each item loads strongly on one factor, was the goal (Beavers, 2013).

In my analysis, I made sure that each factor made sense from a theoretical standpoint. If the theoretical underpinnings were strong, the data ideally supported the theorized structure. I wanted to know whether the correlations between the factors were too high. This provided information about similarity and redundancy between factors. I found that the final factors were moderately correlated, which suggested that subdomains, in total, while distinct, reflected a broader underlying construct (i.e., friendship satisfaction). Even low correlations provided some evidence of an underlying construct. Uncorrelated factors suggested that they were not measuring aspects of the same broader construct.

My best fitting and final model was the cleanest structure with zero or limited cross-loadings (Osborne, 2005), or stated otherwise, reflected a simple structure with “items load[ing] highly on one or perhaps two factors and [with] near zero loadings on the remaining factors” (Reise et al., 2000 p. 292). I was mindful of the fact that some researchers eliminate items that load on more than one factor; however, this was not appropriate if such item(s) was vital or important to the theory of the construct. If the cross-loading on the secondary factor was small

(under 0.30), I retained such cross-loading items (Hirschfeld, 2014). Eliminating the loading on the secondary factor would have resulted in understating the effect of the model. “When items or facets have complex patterns of loadings, aiming for mathematically based simple structure solutions may not be appropriate” (Reise et al., 2000 p. 292)

It is important to note that this process was iterative. I explored the structure with the initial set of items and then made determinations about item selection and deletion. I retained strong and non-redundant items and repeated the sequence of model testing until the final preliminary reduced set of candidate items was determined. I then subjected these items to the following analyses that resulted in further refining of the final instrument.

Using an exploratory bi-factor model. While many psychological measures are designed to create a scale with one score (i.e. unidimensional), there are many other scales designed to measure diverse manifestations through heterogeneous content and as such create scales that are multidimensional and scored as subscales. If the final preliminary solution from EFA models suggest possible multidimensionality (or the presence of several factors), it is appropriate to examine whether a bi-factor structure fits the data better and whether there is utility in scoring subscales separately (Rodriguez, 2016).

This methodology was particularly well suited for data about friendships, which, based on previous scales and the literature, may very well be multidimensional, but also with the possibility that there is much overlap across dimensions, conceptually, and ultimately statistically. Thus, I relied heavily on the use of a bi-factor model to help determine whether the data are essentially unidimensional (i.e. whether there was one underlying construct tapped into by all items, or whether there was more than one dimension measured reliably).

The bi-factor model consists of a general factor (friendship satisfaction) that measured the “commonality shared by the facets [i.e. the sub-groups] and therefore all items” while simultaneously measuring the unique influences that each sub-group (such as closeness or socializing) provided over and above the general factor (Chen, Jing, Hayes, & Lee, 2013 p. 1033). In other words, a bi-factor model is a statistical method that allowed for the partitioning of variance. Each item’s variance was separated out to reflect shared variance that is common among all items (i.e., a general factor), and then modeled shared variance among subsets of items (i.e., group factors) once accounting for or partitioning out variance attributable to the general factor (Rodriguez, 2016).

A major feature of the bi-factor model is the ability to determine the degree of unidimensionality within the model. “The bifactor model can ... be used to create a unidimensional scale ... from an existing multidimensional questionnaire” (Toland, 2017 p. 46). Determination about the dimensionality of scale scores provided me with valuable information about whether to proceed with unidimensional Item Response Theory, an important assumption of such methodology (Revicki, 2015; Sinharay, 2011). However, it was not necessary that the item response data was “strictly unidimensional.” What was important was the degree to which any multidimensionality “distorts estimation of item parameters” (Reise, Cook, & Moore, 2015).

The bi-factor model provided statistical indices that allowed me to make determinations about the potential gains of scoring subscales or whether a total score was sufficient (Reise, 2012; Rodriguez, 2016). In this regard, I used the Schmid-Leiman orthogonalization procedure (Mansolf & Reise, 2016; Schmid, 1957) in R using the psych package, which has been the “dominant approach to exploratory bifactor modeling” (Reise, 2012 p. 670). Using the omega function in the psych package in my exploratory analyses, I was able to obtain important indices,

such as (see (Rodriguez, 2016)) Omega hierarchical (OmegaH), that assessed reliability of the general factor scores excluding group factor variance. In essence, OmegaH provided the percent of variance in a unit-weighted composite that was attributable to a general factor. If high, I regarded unit-weighted total scores to be “essentially unidimensional” in the sense that their reliable variance was influenced primarily by a single source. OmegaH was evaluated using conventional standards for reliability (e.g., >0.70). I examined the Explained Common Variance (ECV), which described variance specific to a general factor by taking the ratio of variance explained by a general factor and dividing it by the variance explained by the general plus group factors, where factors were assumed to be uncorrelated. Higher ECV values (max of 1.0) guided me in my decision to fit a unidimensional model even to data that is multidimensional. Finally, I also relied on indices such as the Omega hierarchical subscale (OmegaHS) that measured the reliability of group factor scores after removing variance from the general factor. OmegaHS also was evaluated using conventional standards for reliability (e.g., >0.70). Importantly, OmegaHS told me whether there was any reliable variance left in subscale scores accounting for reliable variances in general factor scores.

Item response theory (IRT). IRT is a model-based measurement approach based on response patterns of participants. It measures the probability of different item responses by participants (Caprara, 2005). Based on participant responses to items, each participant was given a trait score (theta) which reflected their position (e.g., low vs. high) on the latent trait continuum (e.g. friendship satisfaction). Each item was characterized by a discrimination parameter (slope) and at least one difficulty parameter. The discrimination parameters reflected the ability of an item to differentiate between individuals possessing similar traits. Thus, greater discrimination was desirable. The difficulty parameter reflected the point on the latent trait where there was a

50% chance of endorsing the item (Embretson, 2000). However, the number of difficulty or threshold parameters depended on the number of response options, which also determined which IRT model to use. For any given item, the number of thresholds were one less the number of response categories. So, for a dichotomous item, there would be one difficulty parameter (which was not applicable for me). For polytomous items, (more than two responses) like those included in this study, there were several thresholds and each represented the point on the latent trait where a person was more likely to respond above such thresholds where the probability is 50%. In this regard, I have selected the Graded Response model (GRM) (an appropriate model with polytomous items) to use when each model was estimated. Assuming the data was unidimensional enough (as I determined through the use the exploratory bifactor model and the Schmid-Leiman method), I proceeded by fitting the unidimensional GRM and computing factor scores.

For each IRT model, I evaluated each item by inspecting item parameters as well as item characteristic plots and information standard errors. Additionally, I evaluated total test performance graphically by inspecting test characteristics curves and test information/standard errors. These results did not only describe item and test performance but also allowed for the evaluating of response category functioning. In other words, while multiple response categories were used, results informed whether all categories were actually used by respondents. Collectively, these results allowed for informed decisions made about how to revise the proposed items and overall scale.

Refine, Replace, & Eliminate Items

Using the strategies for statistical analyses previously discussed, I refined the item pool in various phases (based on data from Studies 1 and 2). This process was exploratory in significant parts – in essence, a journey of trial and error using statistical tools (Tellegen, 2008).

Confirmatory Factor Analysis

Once I completed my exploratory factor analyses, i.e. “the first step to explore dimensionality,” (Revicki, 2015 p. 144) and had finalized my models (i.e. reduced the number of items to a number that best represented the construct and was also parsimonious), I then used confirmatory factor analyses to reinforce and reaffirm my findings (Church & Burke, 1994; Revicki, 2015). With confirmatory factor analysis, I was able to assess significance tests and various goodness-to-fit indices; this was an important part of evaluating structural validity. Toward this end, (for each of Study 1 and Study 2) I split the data sample into two equal groups of participants, randomly selecting one group for use with the exploratory analyses and then using the remaining participants for the confirmatory processes.

For the confirmatory analyses, I used the final exploratory model as a hypothesized factor structure – I was no longer exploring to find the best model, I was attempting to replicate the model as an *a priori* assumption (i.e., a forced test; Fabrigar, 1999). These types of models give me “a powerful set of tools for evaluating the tenability of a hypothesized factor structure both within and between populations” and “work[ed] best when the “the factor structure [was] clean” (Reise et al., 2000 p. 293). The confirmatory factor analysis helped to test the appropriateness of the hypothesized structure and fit a bifactor model to see if the fit was better (i.e., evaluating the utility of the group factors after accounting for the general factor).

Expert review

I forwarded a reduced 20-item scale (from Study 1) to 11 experts who study friendships, other interpersonal relationships, and/or social networks and asked them to review the items with respect to the appropriateness of the items. Seeking such expert views about items to be included in a new scale was important (Kyriazos & Stalikas, 2018). Of the 11 experts contacted, 8 responded. The comments overall were very positive about the need for a scale such as this one.

I asked experts for their views of these items, especially relating to the clarity, conciseness, and comprehensiveness of each item and the overall set of items. Experts were asked to rate the relevance of each item to the construct on a 4-item Likert Scale to assess content validity: (4) = Highly Relevant; (3) = Quite Relevant; (2) = Somewhat Relevant; (1) = Not at All Relevant.

At times, the experts gave specific comments on particular items. The comments I received (as well as the item ratings) were very informative. On the closeness items, each expert rated those items as either a 3 or a 4, with an average of 3.46 (towards the mid-point between highly and quite relevant); on the other hand, three of the social interaction items were rated a 1 — not at all relevant. Based on the responses from the experts, I made changes to reduce the set of items.

Focus groups

Through Dynata, a research firm, I organized two focus groups to solicit their views about the reduced list of 20-items assessing the quality of adult friendships. One group was comprised of young adults (ages 18-24) and the other was comprised of a community sample (ages 39 -70). Some of the participants in the older group were in their 30's. Among the first group, participants were in transition from living with their parent to living on their own; some

were in college, while others were working. Importantly, they all frequently saw their friends (as well as dating partners or roommates). The older group included mainly people without children living in their homes. They were mostly in long-term relationships and had set routines. Eating dinner and watching TV were common activities. Compared to the younger group, their lives were more complicated, so they rarely agreed with items that were time based (e.g., using words like “a lot” or “often” as qualifiers). For the younger group, friendships were strengthened through common interests such as music, films, and hobbies. For the older group, friendships were strengthened by eating meals together whether at home or outside of the home. For both groups, friendships were also strengthened by easy communication (i.e., texting for the young, and listening and understanding for the older group) and trust (i.e., ability to go to a friend with a problem or to seek support, whether on an emotional basis or material needs basis).

The focus groups were helpful (Kim, Atkinson, & Yang, 1999) in a variety of ways. They identified specific items that were ambiguous or appeared to not directly relate to the proposed construct. They expressed views about the dimensions of adult friendships proposed to be applicable. Moreover, they provided perspective on whether gender or SES factors affected the perception of the questions. The participants of the focus groups also provided their own word description about what constitutes a friend. I used the views expressed by focus group participants to further refine my scale items.

Study 2 Data Collection

Once I completed all the exploratory and confirmatory processes (including revisions based on the views of experts and the focus groups) for Study 1, I presented the final preliminary scale to a new sample of participants for replication purposes (Study 2). Replication analyses mirrored those previously discussed in the confirmatory factor analysis section.

At that time (and with the same sample), I added 21 additional items with the belief that some of those items might provide greater or relevant information. Through a new EFA analysis process, these items (12 original and 21 new) were tested and a final scale evolved. Further, I asked participants in Study 2 to respond to certain additional items contained within various well-known scales. These scales included various outcome scales (to confirm convergent validity) relating to well-being, life satisfaction, happiness, and marital satisfaction, and other general relationship scales (to test for discriminatory validity), including the Perceived Partner Responsiveness Scale, the Basic Psychological Needs Scale, and a Social Intimacy Scale. I used this new sample to test shorter versions of the final scale for researchers to use who might feel the full scale would be too burdensome for them to administer as part of their research. I then tested these shorter scales for validity and reliability. To do this expected a posteriori (EAP), I obtained trait scores for the full version and the short version and correlated scores on both versions to make determinations about the value of scores from a short form.

Finalizing the Scales

Following all the appropriate testing of the final scale and shorter versions thereof, I replicated the final model and selected the best shorter version on which to report.

Measures – Study 1

Friendship Network Quality. A total of 157 items were tested to assess the satisfaction of adults' friendship networks. The items were phrased in the form of statements that respondents were asked to rate, on a zero to five Likert-scale (six response choices), how much they agree with each statement (i.e., zero being “Not at all agree” and five being “Completely agree”).

Measures – Study 2

Friendship Network Quality. A total of 31 items were tested to assess the satisfaction of adults' friendship networks. The items were phrased in the form of statements that respondents were asked to rate, on a zero to five Likert-scale (with six response choices), how much they agree with each statement (i.e., zero being “Not at all agree” and five being “Completely agree”).

Discriminant Validity Testing. Four previously validated scales were used to test for discriminant validity of the friendship network satisfaction items: 12 items from the Perceived Partner Responsiveness Scale (Reis, Crasta, Rogge, Maniaci, & Carmichael, 2017), 14 items from the Basic Psychological Needs Scale (La Guardia et al., 2000), 17 items from Miller's Social Intimacy Scale (Miller, 1982), and 8 items from the University of California, Los Angeles Loneliness Scale.

Convergent Validity Testing. Seven previously validated scales were used to test for convergent validity of the friendship network satisfaction scale: 8 items from the Personal Well-Being Index (International-Wellbeing-Group, 2013), 5 items from the Satisfaction with Life Scale (Diener et al., 1985), 10 items from the Rosenberg Self-Esteem Scale (Rosenberg, 1965), 16 items from the Couples Satisfaction Index (Funk & Rogge, 2007), 4 items from the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999), 10 items from the Family Satisfaction Scale (Olson, 1982), and 4 items from the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983).

Results: Study 1

Item Reduction Process

The initial item pool consisted of 450 items. After applying the item reduction criteria previously discussed, the list of items was reduced to 157 items representing 14 different

dimensions of adult friendships (Table 3.2). Below I discuss the results from the analytic procedures described above wherein a number of iterative steps were applied to arrive at a subset of key items measuring friendship satisfaction and possible sub-domains or facets.

Selection of Items and Number of Factors

I started this reduction process (which includes determining how many factors to retain in the model) by looking at the polychoric correlations of the 157 items examining them for signs of multi-collinearity and item content redundancy, and reviewing the means, standard deviations, skew, and kurtosis for each item. Further, I utilized a cluster analysis, BassAckwards, and Exploratory Factor Analysis to provide guidance.

Phase 1 reduction -- Reducing 157 items to 91 items (eliminating 66 items) – with 3 factors. Items that were heavily skewed (i.e., with skew of more than plus or minus 1.65) indicated items that potentially had limited variability. All such items were items that asked about friendship from a negative perspective (i.e., “My friends act nasty to me”). Based on this skew information, I eliminated 17 items. Next, I evaluated clustering and item grouping methods. BassAckward showed two clear factors, and a Cluster analysis (iclust in R) identified two clear factors. I computed and examined eigenvalues and a scree plot of eigenvalues. Both indicated the presence of two strong factors and possibly a third (i.e. eigenvalues of 22.82, 7.42, 2.18, 1.28, etc., respectively). To gain more clarity, I used EFA to estimate separate models for the 157 items. I started with a unidimensional model that did not present a good model fit. The 2-factor model showed the presence of the two strong factors; however, it also did not have an adequate model fit. The three-factor model created a solution that fit the data best. The three factors were “Closeness,” “Socializing,” and “Negativity.” I inspected factor loadings, together with item content, to proceed with further item reduction. Items with factor loadings less than

0.59, that had duplicative item content or, based on theory and existing research, did not well represent the construct of friendship satisfaction were eliminated. This resulted in the elimination of an additional 49 items. The final set of 91 items was re-examined to ensure the three-factor solution fits best and it did.

Phase 2 reduction -- Reducing items from 91 to 52 items (eliminating 39 items) – with 3 factors. Based on assessing the polychoric correlation matrix, I considered eliminating items if inter-item correlations were greater than 0.70 with more than five other items (which, on inspection, flagged a set of items that indicated a strong possibility of multi-collinearity or item redundancy). I also considered eliminating items that were redundant in content with other items and items that, based on theory and existing literature, did not substantially represent the construct. I further looked at items that had the lowest remaining factor loadings (for the three-factor model, the best fitting model).

As with Phase 1, I first evaluated item clustering and grouping methods. BassAckward and cluster analysis converged on a two-factor solution being the most likely underlying structure. I computed and examined Eigenvalues and a scree plot of eigenvalues. Both indicated the presence of two strong factors and possible a third (eigenvalues of 22.91, 7.34, 2.02, 1.37, etc., respectively). Then, I estimated one, two, three, and four factor models for the 91 items. Results indicated that the three-factor solution fit the data best. Based on the criteria described above, **I eliminated another 39 items.**

These remaining 52 items were assessed using all appropriate psychometric methodologies, including looking at all potential number of factors from 1-5. Once again, the EFA analysis showed a three-factor solution had the best model fit; the three factors were closeness (30 items), socializing (11 items), and negativity (11 items). Many items that I

eliminated at this stage (i.e., 39 items) were previously adopted from scales designed to assess children's friendship quality or, in a few instances, assessing only college students.

Phase Three reduction -- Reducing items from 52 to 23 items (eliminating 29 items) – with 2 factors. At this point, (with 52 items and three factors remaining) there was a strong correlation between the closeness and socialization factor, a weak negative correlation between closeness and negativity, and a .23 positive correlation between socializing and negativity; the final correlation, positive 0.23, is somewhat not intuitive. The factor structure explained 60% of the total variance, which is a strong effect number for social science scales. The next phase of item elimination followed the same procedure applied previously (i.e., inspection of correlation matrix and factor loadings accompanied by theory); I eliminated substantially overlapping items (determined by correlations and item content). Further, I eliminated certain items with the lowest factor loadings (other than certain items specifically tested in prior research, as well as certain additional items based on theory and the existing literature). This process **eliminated another 18 items.**

The remaining 34 items were then subjected to EFA once more. I reviewed the overall factor structure and factor loadings. Even though the three-factor model fit was still the best fit, the weak negative correlation between the closeness factor and the negativity factor was reduced further, creating serious questions whether this factor was part of our construct of satisfaction with adult friendships. In the past, researchers have viewed negative items, especially in the area of life satisfaction and well-being, as separate and distinct variables, such as depression and happiness (Dupuis, 1995). Analogously, work on self-compassion has demonstrated that self-compassion and self-coldness factors have been treated as separate and distinct factors and not as part of the same construct. This led me to adopt a 2-factor solution by **eliminating the 11**

“negative” items. This resulted in retaining 23 items that comprised two factors: closeness and socializing.

Phase Four Increase -- Increasing items from 23 to 31 items (an addition of 8 items) – with 2 factors. For this stage, all previously eliminated items (other than the lowest loading items) were reviewed item-by-item to determine whether any valuable item content in those items (based on theory and existing literature) was worth re-incorporating into the scale given the sequence of item elimination (including the elimination of previously viewed redundant items). From this review, **8 additional items were identified and reconsidered for inclusion.** This resulted in 31 items: 18 items in Closeness and 13 items in Socializing, which were again subjected to the same battery of analyses as previously discussed. BassAckward and cluster analyses identified two clear factors clusters. EFA indicated there were two clear factors which were moderately correlated ($r = 0.67$), explaining 64% of the total variance, and had adequate model fit (RMSR = .04 and RMSEA = .09).

At this stage, I introduced the bi-factor model into my analyses. This bi-factor model (for these 31 items) then was tested with one general and two group factors. Omega hierarchical for the general factor was .73, with an ECV of 65%. Omega hierarchical subscale was 0.35 for closeness and 0.28 for socializing. Results indicate that there is very little gained in terms of unique reliable variance in subscale scores once accounting for the general factor. Thus, while two factors emerged consistently, I concluded that not much variability remained (for specific factors) above the common variability contained within the general factor, and that the scale was essentially unidimensional.

Phase 5 reduction -- reducing from 31 items to 20 items – with 2 factors. With the application of phase four resulting in an increase to 31 items (Table 3), it was now appropriate to reduce further the number of items to help specify the final exploratory model. At this point, I focused on factor loadings, correlations, skew, redundancy and duplication as the basis for elimination. As a result, 11 items were eliminated:

Closeness (5 items eliminated):

- i. The item “I share my opinions with my friends” was redundant with “I express my opinions and thoughts with my friends.” The former was the narrower item and was removed.
- ii. The item just retained “I express my opinions and thoughts with my friends” mostly had responses within the lowest three response choices, loaded negatively on the closeness factor, and was redundant with another item (i.e., “I talk to my friends about my hopes and plans for the future.”); I eliminated this item.
- iii. A third item, “I trust my friends,” appeared to be an easy item with most respondents endorsing the highest category response option. This item was removed.
- iv. A fourth item, “My friends make me laugh” was similar to another item “I have fun with my friends.” I removed this item.
- v. A fifth item, “My friends make me feel understood, validated, and cared for” was redundant with “My friends understand me.” I removed this item.

Socializing (6 items eliminated):

- i. Two items, loading positively on the Socializing dimension, but strongly negative on the Closeness dimension, were eliminated: “I participate in athletic activities with my friends” and “I attend sporting events with my friends”. Participants’ responses to these items were negatively skewed, indicating that these items might only apply to a narrow portion of a broad network friendship construct.
- ii. A third item, “My friends and I drink together,” was eliminated because it was also a narrow and negatively skewed item that also loaded negatively on the Closeness dimension. Further, it was part of a broader item “My friends and I talk, eat, and *drink* together,” that I retained.
- iii. A fourth item, “I go to concerts with my friends,” loaded negatively on the Closeness factor. It was also similar to another item, “My friends and I listen to music together,” which represented a broader construct. I removed this item.
- iv. A fifth item, “I socialize with my friends regularly and frequently,” was redundant with “I spend a lot of time socializing with my friends,” a retained item. I removed this item.
- v. A sixth item, “I spend a lot of time with my friends,” was redundant with “I spend a lot of leisure time with my friends,” a retained item. I removed this item.

After eliminating **these 11 items from the 31 items**, 20 items remained to assess satisfaction with adult friendships. These 20 items represented two domains. (Table 3.4). I now wanted to test this reduced exploratory model. These items were now subjected to the same exploratory procedures described previously. BassAckward and cluster analyses identified two clear factor clusters: Factor one being Closeness with 13 items and Factor 2 being Socializing with 7 items. The eigenvalues for these two factors were 12.35 and 1.57, with the remaining

eigenvalues noticeably under 1.0. EFA indicated there were two clear factors which were moderately correlated ($r = 0.74$), explaining 66% of the total variance, and had adequate model fit (RMSR = .04 and RMSEA = .09).

Next, I tested the bi-factor model with 20 items. Important indices were better for the 20-item exploratory model, as compared with the 31-item model. Omega Hierarchal for the general factor was .80, Omega Hierarchal subscale was .24 for closeness and .22 for socializing, ECV = 74%; basically, the scale appears to be “unidimensional enough.”

The correlation between the factor scores from the unidimensional model and the general factor scores from the bi-factor model was .99. This finding indicated that little, if anything, was gained by considering group factors, and that treating the scale as unidimensional resulted in scores that were practically identical to those obtained in a more complex structure using group factors.

Phase six – reducing the number of items from 20 items to 12 items. At this point, I had established a psychometrically sound scale containing 20 items. However, it was important to consider whether a shorter scale was more appropriate. To help with this assessment, I solicited comments from experts and focus groups (providing them with the 20 items) and asking them a series of questions pertaining to whether my scale contained items that well represented my construct.

Expert Review

Experts rated the more general items higher than particularly specific items. They viewed three items as too narrow “My friends and I watch TV together,” “My friends and I listen to music together,” “I go for walks with my friends,” and “My friends eat, talk, and drink together”

as confusing because it assessed three aspects of socializing through one. Also, some experts believed that these items were not appropriate for a friendship scale measuring quality.

Some experts thought some of the items in the scale measured activities, not quality, and might represent additional dimensions. This is consistent with the literature that has found that researchers view these aspects of friendships as separate and distinct. Also, some experts cautioned that items including references to time, such as spending “a lot of time” with friends, may represent a separate domain (with time as more structural than quality which is more of a feeling).

Experts also noted that some items may only be relevant to certain age groups, may be different for men and women, and may only be relevant for certain configurations of a person’s social network (e.g. married or not, children or not, involvement with family, socializing couples with couples, etc.).

Some of the experts questioned whether a unidimensional scale was even possible for the study of adult friendships, while others believed that closeness itself could be broken down into multiple dimensions. One expert, Arthur Aron, referred me to his 1992 paper in which referred to the two aspects of closeness as feeling close and behaving close. Defining specific dimensions and deciding whether the scale is unidimensional or multidimensional was often mentioned in comments by the experts. I very much appreciated these comments and addressed their concerns in the final scale.

Focus Groups

My focus groups viewed 8 of my items to be good items, including items referring to having fun with friends and doing things with friends, helping friends when they have trouble, feeling close to friends, confiding in friends, and understanding friends (although they thought

that some such items applied to a smaller group of people). They viewed the other 12 items as significantly more applicable to certain demographic groups. Some participants suggested that some items, such as going for walks, listening to music, watching TV, and spending a lot of time with friends were more applicable to younger people than older people. They also listed the following items as applicable to most friendships: “I spend a lot of time socializing with friends.” “I have fun with my friends,” “My friends and I go out and do things together,” “I like to hang out with my friends,” “It is hard to imagine my life without my close/best friends,” “I feel close to my friends,” “My friends help me when I am having trouble,” and “My friends understand me.” Overall, both focus groups had similar comments to the experts about particular items.

Responding to Experts’ and Focus Group’s Comments

Based on my analysis of the comments from my experts and focus groups, I thought it best to reduce the number of items further. I did so by eliminating items that: (1) presented issues for my experts and focus group members and (2) based on theory and factor loadings, did not fit the friendship construct as well as other items. Thus, the following eight items were eliminated. First, the three items, all loading on the socialization factor, that were the most problematic to the experts and focus groups (i.e., “My friends and I watch TV together,” “My friends and I listen to music together,” and “I go for walks with my friends”) were eliminated. This left the Socializing facet with four items, the minimum number of items to be able to test a multidimensional scale. To best continue the relationship between the number of items included in the Closeness and Socializing factors and retain relative parity between the number of items within each factor, I further eliminated five items (out of 13 items) covering closeness. The five additional items eliminated were:

- i. “When I am under stress, I turn to my friends for support” – This made sense to eliminate since I had retained a similar item – “When I have a problem, I can talk to my friends about it.”
- ii. “I talk to my friends about my hopes and plans for the future” – The substance of this item overlapped with another retained items – “I have meaningful conversations with friends.”
- iii. “I tell my friends how much our friendship means to me” – One expert commented that respondents might view this item as only relating to limited circumstances.
- iv. “My friends help me when I have trouble” – One expert commented that this item may be confusing in situations in which the friend has not been told that the other is having troubles or is struggling. Another expert agreed, commenting that it might make a difference if the help was solicited or not.
- v. “I confide my deepest concerns in my friends” – One expert commented that by using “deepest” as part of the criteria for responses to the item set too high a bar. Another expert commented that the working is awkward and grammatically not worded in the most appropriate way. While a third expert commented that some might not view this item as involving a role for friends (presumably as compared with family and partners).

I eliminated these 8 items from the 20 items, resulting in 12 items (Table 3.5) remaining to define the preliminarily final satisfaction with adult friendship construct. These 12 items represented two domains. Table 3.6 show the factor loadings and polychoric correlations for these 12 items.

Testing exploratory model with 12 items and 2 factors

I now wanted to test this final preliminary model with 12 items (represented by two factors: Closeness with 8 items and Socialization with 4 items). These items were now subjected to the same exploratory procedures described previously. The eigenvalues for these two factors were 12.35 and 1.57, with the remaining eigenvalues noticeably under 1.0. The EFA model had an acceptable fit (RMSR = .02 and RMSEA = .09; confidence interval .08 to .096 and Tucker Lewis Index – 0.951), accounting for 71% of the total variances, with factors moderately-strongly correlated ($r = 0.75$.) Model fit improved compared to the two-correlated factor EFA for the 20-item model. Next, I tested the bi-factor model with 12 items. Reliability estimates from the bi-factor model provide support for a strong general factor as indicated by an omega hierarchical of 0.79 with little reliable variance in subscale scores. Specifically, Omega Hierarchical subscale was 0.23 for Closeness and 0.21 for Socializing. Lastly, ECV was 75%, providing additional evidence that the scale appeared to be “essentially” unidimensional.

The correlation between the factor scores from the unidimensional model and the general factor scores from the bi-factor model was .99. This finding indicated that little, if anything, is gained by considering group factors.

Confirmatory Factor Analysis - Study 1

12 items. The preliminary final scale from Study 1 (with 12 items and two distinct factors: closeness and socializing) was then tested through confirmatory factor analysis of 1072 participants who were not assessed in the EFA stage. Three models were tested: A one-factor model, a two-correlated factor model, and a bi-factor model (with two groups). This enabled me to validate the final structure identified by exploratory processes. Table 3.7 presents model fit indices: Chi-Square, CFI, SRMR, RMSEA, and RMSEA (confidence intervals). Comparisons of

model fit provide clear evidence supporting the bi-factor model. The model fit for the bi-factor model was: CFI = .978; SRMR = .02; RMSEA = .068 [CI -- .06 to .076].

Results: Study 2

Replication of Findings in Study 1

The primary goal of Study 2 was to replicate (through the use of CFA on the new sample N = 2000) the findings in Study 1. I used the data from the second sample to test three models: A one-factor model, a two-correlated factor model, and a bi-factor model (with two groups). This enabled me to validate the preliminary final structure identified by exploratory processes. Table 3.8 present model fit indices: Chi-Square, CFI, SRMR, RMSEA, and RMSEA (confidence intervals). Comparisons of model fit provide clear evidence supporting the bi-factor model. The model fit for the bi-factor model was: CFI = .975; SRMR = .02; RMSEA = .085 [CI -- .079 - .091].

Testing of additional items, further removal process, and selection of final items

For Study 2, an additional 21 items (Table 3.9) were developed and tested (along with the 12 preliminary final items from Study 1) resulting in 33 items. Using EFA, the full set of items was tested to determine whether adding items to, or substituting items from, the 12-item scale would establish a better model. Therefore, the objective was to examine a 33-item set to establish a final set of items that included the most ideal items for the scale construct.

Phase 1 reduction – Reducing items from 33 items to 23 items – with two factors. Based on EFA results, 10 items were removed – all of which were new items loading on the closeness factor). Items eliminated (as shown on Table 3.9) from the 33 items were as follows:

- i. Five items, having the lowest factor loadings and high cross-loadings, were removed.

Items eliminated were “My friends and I spend quality time together,” “My friends

- make me feel validated,” “My friends and I enjoy activities together,” “I communicate regularly with my friends,” and “I make time for my friends.”
- ii. Three additional items were removed for being highly skewed towards the highest response options (i.e., items with the greatest likelihood of endorsing the top two response categories). These items were “I care a lot about my friends,” “My friends respect me,” and “I trust my friends.”
 - iii. One additional item was removed because its factor loading was relatively low (i.e., “I am satisfied with how many friends I have”).
 - iv. One additional item was removed based on theory and the literature, such that it would not add anything extra to the construct, since it only totally defines the construct (i.e., “I am satisfied with my friendships”).

The resulting 23-item scale had 11 items loading on the Closeness factor and 12 items loading on the Socializing factor. The factor loadings ranged from .70 to .86 for the Closeness factor and .61 to .96 for the Socializing factor. The two factors correlated at .77. The cumulative proportion of variance explained by the two factors in the model was .73. The model fit was satisfactory (Tucker Lewis Index = .94; RMSR = .02; RMSEA = .08; CI: 0.077 - 0.084). The bifactor model had an OmegaH = .88 and ECV = .82. OmegaHS were .17 for Closeness and .18 Socializing. Thus, this scale was “essentially unidimensional.”

However, the 23-item scale was still longer than desired and therefore it was still subjected to further analysis to potentially reduce the item set, without adversely affecting model fit.

Phase 2 – reduction from 23 items to 14 items (with two factors) – Final Scale. The remaining 23 items (11 closeness items and 12 socializing items) were then tested, using EFA

and other psychometric process described above, to remove items and establish the final adult friendship scale (AFS).

- i. The three new closeness items (i.e., “My friends and I enjoy each other’s company,” “I laugh a lot when I’m doing things with my friends,” and “I stay in touch with my friends”) were removed for the following reasons: the first two items assessing “enjoyment” and “laughing” overlap substantially with one of the original items (i.e., “I have fun with my friends”); each of these items are relatively “easy” items and would not provide additional information about the construct; the third item (i.e., “staying in touch”) is too generic and provides less information when compared to other of the original closeness items retained within the 12-item scale.
- ii. Two of the socializing items (included in the 12-item scale from Study 1) were removed, since some of the newly tested items loading on the socializing factor were stronger and more understandable items. These items were: “I spend a lot of leisure time with my friends” and “My friends and I talk, eat, and drink together often.” The first item was removed mainly because of the use of the words “leisure time,” which the experts and focus groups had some concerns believing the words may be misunderstood and/or not commonly used by all participants. The second item was removed mainly because it expressed three ideas within one question which experts thought to be inappropriate for a single item on a scale.
- iii. Four additional socializing items from the newly tested items (i.e., “My friends and I do things together often,” “My friends and I go out together,” “I socialize regularly with my friends,” and “I spend a lot of time with my friends”) were removed for the following reasons. The first item overlapped with a retained item (i.e., “My friends

and I go out and do things together”) which provides more information. The second item overlaps with the same retained item. The third item overlaps with another retained item (i.e., “I spend a lot of time socializing with my friends”). The fourth item overlaps with existing content and is highly correlated with a number of retained socializing items.

As a result of this reduction process, AFS consists of 14-items. (Table 3.10). The polychoric correlation matrix for the 14-items is attached as Table 3.11.

The 14-item scale was then tested using the same exploratory procedures described previously (with respect to Study 1). My final exploratory model has two factors: Factor 1 is Closeness with 8 items (factor loadings from .72 to .87); Factor 2 is Socializing with 6 items (factor loadings from .64-.91). The eigenvalues for these two factors were 9.41 and 1.10, with the remaining eigenvalues noticeably under 1.0 (with next highest at .51). The EFA model had an acceptable fit (Tucker Lewis Index -- .95; RMSR = .02; RMSEA = .09; CI = .08 to .09), accounting for 71% of the total variances, with the factors moderately-strongly correlated ($r = 0.77$).

Next, I tested the bi-factor model with 14 items. The model fit was comparable to the 23-item model. OmegaH for the general factor was .86; Omega Hierarchal subscale was .18 for closeness and .16 for socializing; ECV = 82%. Thus, the scale appeared to be “unidimensional enough” to justify the use of unidimensional IRT.

At this point, I introduced IRT into my analysis to assess the amount of information provided by each item in the final scale. To start, I examined three different polytomous graded response IRT models for the 14 remaining items, based on the recommendations of and

principals used for explaining the dimensionality (i.e., internal structure) of a psychological scale (Reise, Morizor, & Hays, 2007; Stucky, 2013; Toland, 2017).

The three models that I ran (see Table 3.12, 3.13, 3.14), based on (Toland, 2017) and (Stucky, 2013), were:

- (1) A standard Unidimensional graded response model (with each item representing the same common latent trait);
- (2) A bi-factor graded response model with orthogonal group factors and only levels of common traits considered;
- (3) A reduced Bi-factor graded response model (with marginal slopes), which included a general, primary trait that explained the items while taking into account other specific traits. This model, unlike the bi-factor graded response model, produces a single slope estimate for each item, such that the multidimensionality is not partitioned out, but rather marginalized.

In general, these models were useful to address the question whether a scale is a general measure of one construct or a measure of a number of content-specific traits. The models measured item discrimination parameters, (i.e., slopes; Edelson, 2007), and also tested the assumption of local independence. In general, “the higher the slope parameter..., the steeper the operating characteristics curves... and the more narrow and peaked the category response curves...indicating that the response categories differentiate among trait levels fairly well” (Embretson, 2000 p. 99).

The reduced bi-factor model was the most important model of the three “to gain insight on the most appropriate solution to multifaceted questionnaires” (Toland, 2017 p. 43-44). This bi-factor model (with marginal slopes) was the only model that utilized both common and

specific factor variances in its calculation of slopes. The use of marginal slopes permitted the slopes to reflect not only the general trait, but also give information about the specific trait. These marginal slopes were adjusted slopes and “simplify[ied] the interpretation of the conditional slopes of the general latent trait,” and created slopes that can be compared to the slopes in the unidimensional model (Stucky, 2013; Toland, 2017 p. 54). As it would not be appropriate, I did not compare general slopes to specific slopes (Toland, 2017).

Item slopes in the unidimensional model ranged from 1.49 to 4.03, with an average slope of 2.90. In the bi-factor model, all general factor slopes ranged from 1.49 to 4.35, with an average slope of 3.38. Lastly, item slopes in the reduced bi-factor model ranged from 1.37 to 4.29, with an average slope of 2.70. From this last model, all the slopes were above 1.8, except for “I socialize with a lot of different people,” which had a slope of 1.37, but also was the most difficult item as indicated with the highest location parameters. The items in the 14-item scale are highly discriminating, with a good spread of information and item difficulty from relatively “easy” to “hard” items. I have not included any fit indices for any of the IRT models, since they would not provide useful interpretive information, even for psychometricians.

Factor scores were computed for the unidimensional and bi-factor models, and plotted with histograms in Figures 1 and 2, respectively. I then correlated factor scores to determine the relative effect of ignoring group factors. The correlation between the factor scores from the unidimensional model and the general factor scores from the bi-factor model was .98.

Ultimately, I wanted to estimate each of these models to determine whether the accounting for multidimensionality has an impact on item parameters and trait scores. This can be determined by examining the test information and/or the test response curves on the unidimensional model and the bi-factor models.

The multidimensionality built into the 14-item final scale does not distort the scaling of individual differences along the common dimension. This was established by comparing the test information between the unidimensional graded response model (Figure 3.3) with the marginal “collapsed” IRT model (Figure 3.4). Accordingly, treating the scale as unidimensional resulted in scores that were practically identical to those obtained in the more complex multidimensional structure as indicated with a nearly perfect correlation ($r = 0.99$) between scores obtained from models.

Confirmatory Factor Analysis – 14 item Scale

In order to replicate my findings with respect to the AFS (with 14-items), I performed a CFA on these 14 items using the remaining unused participants from Study 2 ($N = 1000$). I tested three models: A one-factor model, a two-correlated factor model, and a bi-factor model (with two groups). This enabled me to validate the final structure identified by exploratory processes. Table 3.15 presents model fit indices: Chi-Square, CFI, SRMR, RMSEA, and RMSEA (confidence intervals). Comparisons of model fit provide clear evidence supporting the bi-factor model. The model fit for the bi-factor model was: CFI = .979; SRMR = .02; RMSEA = .067; [CI -- .06 to .074].

With this replication, I have found that the AFS is a psychometrically sound scale appropriate to measure satisfaction with adult friendships. Since some researchers might want to use a shorter scale, I next tested whether the use of such a shorter scale was also psychometrically sound and could be used, alternatively, to assess satisfaction with adult friendships, without losing important information and still providing for a good model fit.

Shortened Scale – 8 items

The goal, at this stage, was to create shorter version of the AFS while retaining at least four items that load on each of the Closeness and Socializing factors. When using factor analysis, psychometricians have recommended that each factor have a minimum of four items, with a higher number of items preferable (Fabrigar, 1999).

To accomplish this task, I used IRT parameters and trait scores generated in Firefox/R, where it was possible to select items to be removed from the 14-item scale that provided less information than other items, while also retaining items that represented a good model fit. Figure 3.4 presents the item information for each item on the 14-item scale. There were four items that provided significantly more information than all other items (i.e., “My friends celebrate my good news (Item 3),” “I have fun with my friends (Item 4),” I like to hang out with my friends (Item 8),” and “I feel close to my friends (Item 1)”). Each of these items loaded on the closeness factor with two items having the highest slopes (over 4.0) and the other two items also having high slopes (3.1 and 2.8). These items each provided information with good spreads across the latent trait. The remaining four closeness items were eliminated. Each of these items provided substantially less information across the trait. With four items retained from the closeness factor, at a minimum, four items needed to be retained for the socializing factor. Once again, the items providing the most information were retained. To keep the scale balanced, only four such items were retained. Two of these items provided greater information than the other socializing items with good spread across the latent trait (i.e., “My friends and I go out and do things together,” and “I spend a lot of time socializing with my friends”). The slopes for these items were good (2.76 and 2.32) and these items were much “harder” items, such that in order to endorse the highest category, participants needed to be high on the trait (locations parameters = 1.51 and

0.98). To complete the scale, I chose to retain the next two socializing items that provided the greatest amount of information (i.e., “I attend social events with my friends” and “I spend free time with my friends”). These two items had slopes of 2.13 and 1.86, respectively.

This 8-item scale (Table 3.16) was tested through CFA. I tested three models: the unidimensional model; the two-factor GRM correlated factor model; the bi-factor GRM model. This enabled me to validate the final structure identified by exploratory processes. Table 3.17 presents model fit indices: Chi-Square, CFI, SRMR, RMSEA, and RMSEA (confidence intervals). Comparisons of model fit provide clear evidence supporting the bi-factor model. This bi-factor model had a good model fit (CFI = .98; SRMR = .01; RMSEA = .09 (CI - .08 to .11)). The Tucker Lewis Index was .96. To demonstrate the validity and utility of the 8-item scale, total scores computed from the 14-item scale were correlated with the total score from the 8-item version. Total scores were almost perfectly correlated at .99.

Divergent and Convergent Validity Testing

Divergent Validity. When creating a new scale, it is important to establish that the new scale is not duplicative (i.e., does not have an extremely high correlation) with scales that measure similar constructs. Without such differences, there would be no need to create such a new scale. While no scales exist that measure adults’ satisfaction with their friendship networks, other scales assess, in general, the strength of peoples’ personal relationships. Study 2 obtained data from participants on four well-known scales that represent potentially similar constructs:

- (1) The Perceived Partner Responsiveness Scale (PPRS), which measures individuals’ responsiveness to their partners. For our purposes, consistent with the views of the authors, “best friend” was substituted for “partner” to better measure the comparability of the PPRS.

(2) The Basic Psychological Needs Scale (BPNS), which measures need satisfaction for various relationships, such as “best friend” (the relationship studied).

(3) Miller Social Intimacy scale (MSIS), which measures intimacy in relationships based on frequency and intensity. The authors created the scale to be applicable to many types of relationships, including closest friend (the relationship studied).

(4) University of California, Los Angeles Loneliness Scale, which measures how a participant felt over time (UCLA-LS).

Each of these scales correlated moderately in the expected direction with the final 14-item friendship satisfaction scale (using Pearson correlations): PPRS ($r = .69, p < .01$); BPNS ($r = .514, p < .01$); MSIS ($r = .611; p < .01$); UCLA-LS ($r = -.225, p < .01$). While these correlations are meaningful, they establish that the 14-item friendship satisfaction scale had discriminant validity since each of these other scales only share less than half of their variance with the new scale. In order to threaten discriminant validity, established scales would need to be correlate with the new scale at .85 or higher (Henseler, Ringle, & Sarstedt, 2014). Established scales, therefore, failed to explain the unique variance in the friendship scale, thereby supporting its discriminate validity.

Convergent Validity. It was important that the final 14-item satisfaction with friendship scale be significantly related to other measures in theoretically predicted directions, but there was no need that such relationships be highly correlated. Correlations between these scales and the friendship satisfaction scale established the existence of such a relationship. The following scales were tested:

(1) The Personal Well-Being scale (PWI).

(2) The Satisfaction with Life Scale (SWLS).

- (3) The Rosenberg Self-Esteem scale (SE).
- (4) The Couples Satisfaction Index (CSI).
- (5) The Subjective Happiness Scale (SHS).
- (6) The Family Satisfaction Scale (FSS).
- (7) The Perceived Stress Scale (PSS).
- (8) Eysenck Personality Questionnaire – Neuroticism (EPQN).

Each of these scales significantly correlated (using Pearson correlations) with the 14-item friendship satisfaction scale in the expected direction: PWI ($r = .439, p < .01$); SWLS ($r = .375, p < .01$); SE ($r = .192, p < .01$); CSI ($r = .314, p < .01$); SHS ($r = .303, p < .01$); FSS ($r = .355, p < .01$); PSS ($r = -.155, p < .01$); EPQN ($r = -.152, p < .01$).

Five of these scales measure satisfaction in life and marriage: PWI, SWLS, SHS (each measuring well-being, life satisfaction and happiness), SE (measuring self-esteem), and CSI (measuring marital happiness). From a theoretical standpoint, it is plausible that these measures would be low/moderately associated with friendship satisfaction (which is the case). This is true since personal relationships (including friendships) are an essential element of positivity, happiness, and strong social networks. Similarly, friendship satisfaction would also be positively associated with FSS since people need diverse social networks (which include family and friends). The remaining two scales that each measure negativity that affect relationships, PSS (measuring perceived stress) and EPQN (measuring neuroticism), naturally would be negatively but significantly associated with friendship satisfaction, since these negative factors would be contrary to the joy that is associated with positive friendships.

Discussion

Over the last decade, psychological research has become increasingly aware that friendships are worthy of study (Demir, 2015). As a recent popular book reviewing the science of friendship put it: “[*They*] are one of the great pleasures of life that has been hiding in plain sight” (Denworth, 2020 p. 6).

Friendships may have been “hiding in plain sight” because researchers have had a hard time defining friendships. Researchers use a plethora of diverse words to describe friends, yet have been unable to arrive at a consensus on an overall meaning (Fehr, 1996). Furthermore, researchers have been unable to agree on whether friendships should be assessed as a unidimensional concept (representing quality, intimacy, and mutuality) or a multidimensional one.

By thinking through a rigorous psychometric process and the creation of a sound scale to measure satisfaction with adult friendships, this dissertation is the first research to directly address this question. My goal was to compare the evidence for two competing perspectives. The first is that satisfaction with friendships is unidimensional and can be measured using a limited number of items that fit well with Cronbach alpha (Birditt & Antonucci, 2007). The second, and more complex, is that friendships are multi-dimensional and each dimension must be assessed separately (i.e., not as one unidimensional composite; Mendelson & Aboud, 1999).

Across two independent samples of over 2000 respondents each, the evidence from this dissertation overwhelmingly supports one of these perspectives over the other. Bi-factor modeling and IRT all indicate that *one unidimensional scale (or one that is essentially unidimensional) can measure overall satisfaction with friendships*. The AFS contains 14 items, with content covering two domains (closeness and socializing) and has two factors, loading

significantly on the concepts of “closeness” and “socializing.” The bi-factor results point out very clearly that there is one underlying dimension (assessing OmegaH and ECV) and that there is little, if any, unique variance in subscale scores (i.e., on closeness or socializing, specifically). This means that, while content in these two domains focus on “distinct” facets of friendships, overall, there is more utility to the broader unidimensional concept of friendship satisfaction. Therefore, researchers can measure friendship satisfaction with one overall score for each respondent.

These findings clarify many inconsistent approaches used by prior researchers who have studied friendships. In these analyses, 14 dimensions derived from the existing literature on friendships were reduced to only two unique domains. Seven of the original dimensions (autonomy, closeness, competence, positive feeling, quantity, loneliness, and support) were shown to be overlapping and, through the EFA process, only loaded on a single factor. Another six dimensions addressed “negativity” in friendships (conflict, criticism, demand, negative feelings, rejection, and status). These items were all eliminated from the friendship scale since they either had low factor loadings in the EFA process, or they formed a third independent factor, but one which was not significantly correlated with the other two factors. The final dimension was “Enjoyment,” which ended up having some items that loaded on the closeness factor while others loaded on “socializing”.

Additional Lessons Learned

The two highly correlated facets of friendship satisfaction correspond to a “feeling” component and a “doing” component. A few researchers have viewed friendships in similar ways, suggesting that friendships have an “emotional” component and an “interactive” component (Greco, Holmes, & McKenzie, 2015), or, as Arthur Aron concluded, a “feeling”

component and the “behavioral” component. The current analyses extend these ideas by showing that the items on the friendship scale that loaded on the “feeling” component had higher slopes and provided more information than existed for items loading on the “doing” component. This verifies that those researchers, including Aristotle, who focused on the “quality” aspect of friendships as the most important aspect of friendships. Yet, the “doing” component also provided a lot of additional information (i.e., those items were very discriminating).

On items assessing activities like socializing, words referring to the amount of time spent on the activity affected responses to the item (i.e., “I spend a lot of time socializing with my friends”). This was not the case for items assessing feelings about friends. This is somewhat inconsistent with some researchers (Dunbar, 2018; Saldarriaga et al., 2015).

Some items that relate to enjoyment (e.g., “I have fun with my friends) loaded on the “feeling” facet, rather than the “doing” facet. This was somewhat surprising since “fun” and “enjoyment” seem related, and is usually experienced when people participate in physical activities and experiencing sporting events. Several items representing these concepts had relatively low slopes and were removed. This undercuts some researchers’ views about the importance of engaging in such activities with friends, especially ones that are stimulating. While some researchers might want to study the effects of people “engaging in stimulating activities,” this, alone, may not be that meaningful when studying relationships unless a closeness dimension is also studied.

Divergent and Convergent Validity

While all of the scales that were used to test divergent and convergent validity significantly correlated with the AFS in the expected direction (thereby reinforcing the validity of the friendship scale), a number of the divergent validity scales are worth discussing. The

PPRS, BPNS, and MSIS each correlated moderately (PPRS ($r = .687, p < .01$); BPNS ($r = .514, p < .01$); MSIS ($r = .611, p < .01$). In each case, the scales measured items that dealt with various aspects of “closeness,” such as understanding, validation, competency, caring, and intimacy. They each posed items in reference to a best or closest friend. The AFS differed from these scales in two important ways: the items in the scale referenced participants’ entire network of friends; they also included items related to socializing, in addition to closeness. Due to the differences in the scales, it is not surprising that the final friendship scale was not found to be redundant with the existing scales. In fact, the maximum amount of variance shared by any two scales was 47%.

Strengths and Limitations

Despite the strengths of this work, my conclusions must also acknowledge three significant limitations in my studies. First, these studies were conducted solely online to a community of respondents who received rewards for participation. While the survey tried to mirror the U.S. census on an overall basis, achieving this goal might be limited due to potential non-participation by low-income minorities, who might not have access to computers or the internet, or for whom the rewards given might not be appealing. Second, these studies only considered the population on an overall basis, without any testing of the final friendship satisfaction scale on specific segments of the population, such as based on gender, age, ethnicity, income, and education. It was beyond the scope of these studies to test “measurement invariance” between groups. In the future, it will be important to test the properties of the friendship scale within diverse groups. I know from the expert and focus groups comments that some questions might be more applicable to a particular group, such as “I like to hang out with my friends,” which may be more applicable to younger people. However, this item was one of

the best performing items assessed by IRT. Finally, the use of the bi-factor model in psychological research has been rare. However, in recent years, this method has gained significant prominence, and I expect it will be used more frequently in the future. Especially with psychological measures, not to consider specific, special variances (in addition to common variances) may create misleading results.

Implications for Future Research

With the creation of the friendship satisfaction scale, researchers now have an empirically validated tool with which to study friendships on many different levels. Having a scale that can be scored as unidimensional is very valuable. The friendship scale can be used as either an independent or dependent variable; it also can serve as a moderator or mediator between two other variables.

Examples of the ways in which the friendship satisfaction scale can be used include: (1) Researchers will be able to assess whether friendship satisfaction is different for men and women (on closeness and/or socializing) in its association with life satisfaction or well-being; (2) Researchers can also study the effects of the three primary social relationship types (i.e., romantic partners, family and friends) simultaneously (in relation to their associations with life and/or marital satisfaction) with established scales for each relationship type; (3) Researchers will now be able to assess the amount of variance that is explained by friendship satisfaction, over-and-above other variables, when studying various outcomes such as happiness, self-esteem, and marital satisfaction' (4) Relationship researchers will be able to include a significant positive element of personal life satisfaction (i.e., friendship satisfaction), in addition to depression as a negative substitute when studying marital partners' marital satisfaction or individual well-being; (5) Finally, researchers will be able to study the associations between friendship satisfaction and

different personality types. This could be very important, since these two variables have the greatest effect on people's overall well-being and life satisfaction.

The use of this friendship scale could elevate the study of friendship in meaningful ways. If this occurs, the importance of friendship will no longer be "hiding in plain sight."

Appendix C – Tables and Figures

Table 3.1. Description of Assessment Scales

Author & Date (earliest to latest)	Name of Scale	Sample Studied	Method of Validation	Number of Statements	Constructs Assessed	Friend Relationship vs. Network	Examples of Statements*+
(Lea, 1989; Wright, 1969)	Acquaintance Description Form	College students	Exploratory factor analysis	70 items	Utility value, ego support value, stimulation value, self-affirmation value, & security value	Nominated friend	When I plan for leisure time activities, I make it a point to get in touch with TP, to see if TP can arrange to do things together; TP is willing to use his [her] skills and abilities to help me reach my own personal goals; TP is a conscientious person
(Parker, 1993)	Friendship Quality Questionnaire	Middle childhood	A derived scale from Bukowski et al. (1987)	40 items	Validation and caring, conflict resolution, conflict betrayal, help and guidance, companionship and recreation,	Nominated very best mutual friend	Tell me I'm good at things, make up easily when we have a fight, argue a lot, do special favors for each other, do fun things together a lot, tell

					intimate exchange		each other private things
(W. M. Bukowski et al., 1994)	Friendship Quality Scale	School-age and adolescents	Confirmatory Factor Analysis	23 items	Companionship, conflict, help, security, & closeness	Designated best friend	My friend thinks of fun things for us to do together; I can get into fights with my friend; My friend would help me if I needed it; if I said I was sorry after I had a fight with my friend, he would still stay mad at me;
(Sharabany, 1994b)	Intimate Friendship Scale	Children and pre-adolescents	Used alpha coefficients to measure reliability of scale	32 items	Frankness and spontaneity; sensitivity and knowing; attachment; exclusiveness; giving and sharing; imposition; common activities; trust and loyalty	Nominated best friend	I feel free to talk to TP about anything; I feel close to TP; The most exciting things happen when I am with TP and nobody is around; I can be sure TP will help me whenever I ask for it;
(M. J. Mendelson, & Aboud, F., 1999)	McGill Friendship Questionnaire	College Students	Factor analysis	30 items	Stimulating conversation, help, intimacy, reliable alliance, self-validation, &	Nominated best friend	BF makes me laugh; BF helps me when I need it; BF is someone I tell private things to; BF

					emotional security		makes me feel special; BF would make me feel comfortable in a new situation
(Neilsen, 2000)	Workplace Friendship Scale	Graduate students	Confirmatory factor analysis	12 items	Opportunity, prevalence	Network of work friends	I have the opportunity to develop close friendships at my workplace; I socialize with coworkers outside of the workplace
(Polimeni, 2002)	Friendship Closeness Inventory	Mostly college students – full-time or part-time	Factor analysis	46 items	Emotional Closeness, Behavioral closeness, & Cognitive Closeness	Network of friends	I feel I can confide my personal problems to my friends; We plan social events together; we clown around; My friend(s) influence everyday things in my life
(Hawthorne, 2006; G. Hawthorne, & Griffith, P., 2000)	Friendship Scale	Older adults	Exploratory factor analysis	6 items	unidimensional	Network	I had someone to share my feeling with; I found it easy to get in touch with others when I needed it; I felt alone and friendless
(Thien, 2012)	Friendship Quality Scale	Secondary school children	Qualitative and quantitative	21 items	Closeness, help, acceptance, and safety	Network	My friends never break a promise; I

			approaches to content validity and reliability				always joke with my friends; My friends forgive me easily; I do not feel shy when performing something humorous in front of my friends
(J. M. Cyranowski, Zill, N., Bode, R., Butt, Z., Kelley, M. A. R., Poilkonis, P. A., Salsman, J. M., & Cella, D, 2013)	NIH Toolbox Adult Social Relationship Scales	adults	Classical test theory and item response theory	97 items	Social support, companionship, & social distress	Network	I have someone who understands my problems; I have someone to help me if I'm sick; I feel like I have a lot of friends; I have TP's who blame me when things go wrong
(Miller & Lefcourt, 1983)	Miller Social Intimacy Scale	Undergraduate students (married & unmarried), and clinic sample	Used alpha coefficients to measure reliability of scale	17 Items	Unidimensional	Network	When you have leisure time how often do you choose to spend it with him/her alone; How often do you confide very personal information to him/her?

Center for Self-Determination Theory at Rochester	Basic Need Satisfaction in General	Adults	In the process of being developed	24 Items	Autonomy, Competence, & Relatedness	Self	Often, I do not feel very competent; I feel pressured in my life.
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*name of Best Friend (BF), +name of “target person” (TP)

Basic Needs Satisfaction in General Scale (n.d.). Retrieved July 23, 2019, from University of Rochester, Self-Determination Theory

Website. <http://www.psych.rochester.edu/SDT/measures/needs_scl.html>.

Table 3.2. Original 157 Items and Facets

Likert Response Scale:

0 = Not at all Agree; 1 = Hardly Agree; 2= Somewhat Agree; 3 = Pretty Much Agree; 4 = Very Much Agree; 5 = Completely Agree;

Original Facet	Item	Original Source
Autonomy	I respect my friends	Original Items
Autonomy	I express my ideas and opinions to my friends	Basic Psychological Needs Scales
Autonomy	My friends do not try to change who I am	Original Items
Autonomy	I respect my friends' privacy	Original Items
Autonomy	My friends influence how I act with others	Original Items
Closeness	I share my personal feelings and problems with my friends	Argyle
Closeness	I discuss my thoughts and feelings with my friends	Reis
Closeness	I share my feelings with my friends	Hawthorne & Griffith
Closeness	I discuss important matters with my friends	Original Items

Closeness	I have friends to whom I can confide my deepest concerns	Pepperdine Survey
Closeness	When I have a problem, I can talk to my friends about it	Bukowski, Hoza, & Boivin
Closeness	My friends believe in me	Original Items
Closeness	I have meaningful conversations with friends	Original Items
Closeness	My friends and I have good conversations	Original Items
Closeness	I am loyal to my friends	Original Items
Closeness	I confide my deepest concerns in my friends	Original Items
Closeness	I think about my friends when they are not around	Bukowski, Hoza, & Boivin
Closeness	I wish that I could spend more time with friends	Pepperdine Survey
Closeness	I talk with my friends about my hopes and plans for the future	Sharabany
Closeness	I tell my friends how much our friendship means to me	Polimeni, Hardie, & Buzwell
Closeness	I tell my friends that I like/love them	Polimeni, Hardie, & Buzwell
Closeness	My friends are available when I want to connect with them	Hawthorne & Griffith
Closeness	I listen to my friends' advice	Urbach & Ahlemann
Closeness	I share my opinions and thoughts with my friends	Original Items

Closeness	It is hard to imagine my life without my close/best friends	Original Items
Closeness	My friends and I have similar values	Pepperdine Survey
Closeness	My friends keep their promises	Parker & Asher
Closeness	My friends understand me	McGill Friendship Questionnaire
Closeness	When something nice happens to me, I tell my friends	Sharabany
Closeness	I feel safe when my friends are around	Urbach & Ahlemann
Closeness	My friends know me well	Reis, Maniaci, Caprariello, Eastwick, & Finkle
Closeness	I joke with my friends	Urbach & Ahlemann
Closeness	I avoid showing my deepest feelings to my friends	Argyle
Closeness	I ask my friends about their personal problems	Polimeni, Hardie, & Buzwell
Closeness	I confide my personal problems to my friends	Polimeni, Hardie, & Buzwell
Closeness	I miss my friends when they are not around	Sharabany
Closeness	My friends know when I am upset	McGill Friendship Questionnaire
Closeness	I feel close to my friends	McGill Friendship Questionnaire
Closeness	My friends sometimes lie to me	Urbach & Ahlemann
Closeness	I avoid discussing controversial topics with my friends	Argyle

Closeness	My friends and I watch TV together	Polimeni, Hardie, & Buzwell
Closeness	I spend a lot of time with my friends	Argyle
Closeness	I socialize with my friends frequently and regularly	Pepperdine Survey
Closeness	My friends and I go out and do things together	Toolbox Social Relationship Scales
Closeness	I go for walks with my friends	Polimeni, Hardie, & Buzwell
Closeness	My friends are generally all friends with each other	Original Items
Closeness	My friends know each other well	Original Items
Closeness	My friends and I go out to eat together	Parker & Asher
Competence	My friends make me feel sure of myself	McGill Friendship Questionnaire
Competence	My friends compliment me when I do something well	McGill Friendship Questionnaire
Competence	My friends make me feel special	McGill Friendship Questionnaire
Competence	My friends make me feel good about myself even when I mess up	McGill Friendship Questionnaire
Competence	My friends make me feel important	McGill Friendship Questionnaire
Competence	My friends point out things that I am good at	McGill Friendship Questionnaire
Competence	My friends make me feel smart	McGill Friendship Questionnaire
Conflict	My friends apologize when they hurt my feelings	Parker & Asher
Conflict	I often argue with my friends	Original Items

Conflict	I get into fights with my friends	Bukowski, Hoza, & Boivin
Conflict	Sometimes my friends are not nice to me	Toolbox Social Relationship Scales
Conflict	My friends and I disagree about many things	Bukowski, Hoza, & Boivin
Conflict	I am competitive with my friends	Original Items
Control	I feel intimidated by my friends	Original Items
Control	I'm afraid to disagree with my friends	Original Items
Criticism	My friends criticize the way I do things	Toolbox Social Relationship Scales
Criticism	My friends are quick to point out flaws in my character	Original Items
Criticism	My friends get mad at me	Toolbox Social Relationship Scales
Criticism	My friends act nasty to me	Toolbox Social Relationship Scales
Criticism	My friends yell at me	Toolbox Social Relationship Scales
Criticism	My friends tease me in a mean way	Toolbox Social Relationship Scales
Criticism	My friends blame me when things go wrong	Toolbox Social Relationship Scales
Criticism	I get jealous of my friends' other relationships	Argyle
Criticism	I feel self-conscious when I am with my friends	Original Items
Criticism	My friends point out flaws in my character	Toolbox Social Relationship Scales
Demand	My friends make a lot of demands on me	Basic Psychological Needs Scales
Demand	I feel pressured by my friends	Basic Psychological Needs Scales

Demand	My friends expect a lot of me	Basic Psychological Needs Scales
Demand	My friends take up a lot of my time	Basic Psychological Needs Scales
Enjoyment	I like to hang out with my friends	Polimeni, Hardie, & Buzwell
Enjoyment	My friends make me laugh	McGill Friendship Questionnaire
Enjoyment	I have fun with my friends	Pepperdine Survey
Enjoyment	My friends and I clown around	Polimeni, Hardie, & Buzwell
Enjoyment	I joke with and tease my friends	Argyle
Enjoyment	I participate in athletic activities with my friends	Original Items
Enjoyment	I attend sporting events with my friends	Polimeni, Hardie, & Buzwell
Enjoyment	I go to concerts with my friends	Polimeni, Hardie, & Buzwell
Enjoyment	I spend a lot of my leisure time with friends	Original Items
Enjoyment	My friends and I listen to music together	Original Items
Enjoyment	I spend a lot of time socializing with friends	Original Items
Enjoyment	My friends and I talk, eat, and drink together often	Original Items
Enjoyment	My friends and I get drunk together	Polimeni, Hardie, & Buzwell
Enjoyment	My friends and I go to the cinema together	Polimeni, Hardie, & Buzwell
Enjoyment	My friends and I drink together	Polimeni, Hardie, & Buzwell
Enjoyment	My friends and I get together to relax	Toolbox Social Relationship Scales
Enjoyment	My friends and I do fun things together	Parker & Asher

Loneliness	I feel lonely when I am with my friends	Hawthorne & Griffith
Loneliness	I feel distant from my friends	Toolbox Social Relationship Scales
Negative Feelings	My friends do not listen to me	Parker & Asher
Negative Feelings	My friends get on my nerves	Original Items
Negative Feelings	My friends and I get mad a lot	Parker & Asher
Negative Feelings	My friends and I argue a lot	Parker & Asher
Negative Feelings	I am jealous of my friends	Original Items
Negative Feelings	My friends and I bug each other a lot	Parker & Asher
Positive Feelings	I feel good when I am with my friends	Original Items
Positive Feelings	I like my friends a lot	McGill Friendship Questionnaire
Positive Feelings	My friends respect me	Polimeni, Hardie, & Buzwell
Positive Feelings	I care about my friends	McGill Friendship Questionnaire
Positive Feelings	I want to stay friends for a long time	McGill Friendship Questionnaire
Positive Feelings	My friends treat me well	Urbach & Ahlemann
Positive Feelings	I laugh a lot when I am with friends	Original Items
Positive Feelings	I prefer my friends over most people I know	McGill Friendship Questionnaire
Positive Feelings	I believe my friends will not exploit me	Original Items
Quantity	I have several different groups of friends	Original Items
Quantity	I have many friends who are important to me	Pepperdine Survey

Quantity	I have friends that I have known since childhood	Pepperdine Survey
Quantity	I have friends that I've known for at least 10 years	Pepperdine Survey
Quantity	I socialize with one group of friends	Original Items
Quantity	I have lots of friends	Toolbox Social Relationship Scales
Quantity	I feel that I am a part of a group of friends	Original Items
Rejection	My friends can't be bothered by me or my problems	Toolbox Social Relationship Scales
Rejection	My friends let me down when I am counting on them	Toolbox Social Relationship Scales
Rejection	My friends don't have time for me	Toolbox Social Relationship Scales
Rejection	My friends don't care about me	Toolbox Social Relationship Scales
Rejection	My friends avoid talking to me	Toolbox Social Relationship Scales
Rejection	My friends don't listen when I ask for help	Toolbox Social Relationship Scales
Rejection	My friends act like my problems aren't that important	Toolbox Social Relationship Scales
Rejection	I do not feel close to my friends	Toolbox Social Relationship Scales
Status	My friends are friends with me because of my status and connections	Pepperdine Survey
Support	My friends make me feel understood, validated, and cared for	Reis
Support	My friends stick up for me	Parker & Asher

Support	My friends value my opinions	Reis, Maniaci, Caprariello, Eastwick, & Finkle
Support	My friends and I make each other feel important	Parker & Asher
Support	My friends encourage me in whatever I do	Original Items
Support	I support my friends when they have problems	Original Items
Support	My friends like me	Reis, Maniaci, Caprariello, Eastwick, & Finkle
Support	When I am under stress, I turn to my friends for support	Original Items
Support	My friends are interested in my thoughts and feelings	Reis, Maniaci, Caprariello, Eastwick, & Finkle
Support	My friends give me advice	Parker & Asher
Support	My friends help me when I am having trouble	Bukowski, Hoza, & Boivin
Support	When I need help, I can depend on my friends	Toolbox Social Relationship Scales
Support	My friends really listen to me	Reis, Maniaci, Caprariello, Eastwick, & Finkle
Support	My friends help me when I have problems	Original Items
Support	My friends give me useful information when I need it	McGill Friendship Questionnaire
Support	My friends help me when I need it	McGill Friendship Questionnaire
Support	I feel secure when I am with my friends	Original Items

Support	My friends celebrate my good news	Original Items
Support	I help my friends in times of need	Argyle
Support	I trust my friends	Parker & Asher
Support	If I needed money, my friends would loan it to me	Bukowski, Hoza, & Boivin
Support	I talk with my friends when I have a bad day	Toolbox Social Relationship Scales
Support	My friends help me achieve my goals	Original Items
Support	My friends do favors for me	McGill Friendship Questionnaire
Support	My friends lend me things that I need	McGill Friendship Questionnaire
Support	I get advice from my friends	Original Items
Support	My friends tell me I am pretty smart	Parker & Asher
Support	When my friends are having a hard time, I want to help them	Original Items
Support	My friends help me find work	Original Items
Support	My friends and I celebrate each other's birthdays together	Original Items

Table 3.3. 31 Items

(Including 11 eliminated items in BLUE)

Variable Name	Item:	Original Facet
Q6r7	When I am under stress, I turn to my friends for support	Support
Q3r4	I talk with my friends about my hopes and plans for the future	Closeness
Q12r9	I tell my friends how much our friendship means to me	Closeness
Q1r1	My friends help me when I am having trouble	Support
Q1r3	I share my opinions and thoughts with my friends	Closeness
Q4r3	It is hard to imagine my life without my close/best friends	Closeness
Q13r8	My friends understand me	Closeness
Q10r6	I express my ideas and opinions to my friends	Autonomy
Q5r6	My friends celebrate my good news	Support
Q12r10	I like to hang out with my friends	Enjoyment
Q5r8	My friends make me laugh	Enjoyment
Q7r4	I have fun with my friends	Enjoyment
Q2r3	I feel close to my friends	Closeness
Q3r10	I confide my deepest concerns in my friends	Closeness
Q6r6	My friends make me feel understood, validated, and cared for	Support
Q12r4	I have meaningful conversations with friends	Closeness
Q15r10	I trust my friends	Support
Q16r1	When I have a problem, I can talk to my friends about it	Closeness
Q13r2	I participate in athletic activities with my friends	Enjoyment
Q13r7	I attend sporting events with my friends	Enjoyment
Q13r9	I go to concerts with my friends	Enjoyment
Q8r2	My friends and I watch TV together	Closeness

Q10r8	I spend a lot of my leisure time with friends	Enjoyment
Q14r2	I spend a lot of time with my friends	Closeness
Q9r2	My friends and I listen to music together	Enjoyment
Q7r7	I spend a lot of time socializing with friends	Enjoyment
Q11r5	My friends and I talk, eat, and drink together often	Enjoyment
Q6r9	I socialize with my friends frequently and regularly	Enjoyment
Q8r1	My friends and I go out and do things together	Enjoyment
Q7r5	My friends and I drink together	Enjoyment
Q8r3	I go for walks with my friends	Enjoyment

Table 3.4. 20-Item List

Variable Name	Item:
	Closeness items:
Q6r7 --	When I am under stress, I turn to my friends for support
Q3r4 --	I talk with my friends about my hopes and plans for the future
Q12r9 --	I tell my friends how much our friendship means to me
Q1r1 --	My friends help me when I am having trouble
Q4r3 --	It is hard to imagine my life without my close/best friends
Q13r8 --	My friends understand me -
Q5r6 --	My friends celebrate my good news
Q12r10 --	I like to hang out with my friends
Q7r4 --	I have fun with my friends
Q2r3 --	I feel close to my friends
Q3r10 --	I confide my deepest concerns in my friends
Q12r4 --	I have meaningful conversations with friends
Q16r1 --	When I have a problem, I can talk to my friends about it
Socializing Items	
Q8r2 --	My friends and I watch TV together
Q10r8 --	I spend a lot of my leisure time with friends
Q9r2 --	My friends and I listen to music together
Q7r7 --	I spend a lot of time socializing with friends
Q11r5 --	My friends and I talk, eat, and drink together often
Q8r1 --	My friends and I go out and do things together
Q8r3 --	I go for walks with my friends

Table 3.5. Adult Friendship Satisfaction Scale: List of 12 Items

Closeness:

1. Q4r3 – It is hard to imagine life without my close/best friends
2. Q5r6 – My friends celebrate my good news
3. Q7r4 – I have fun with my friends
4. Q12r10 – I like to hang out with my friends
5. Q13r8 – My friends understand me
6. Q2r3 – I feel close to my friends
7. Q12r4 – I have meaningful conversations with my friends
8. Q16r1 – When I have a problem, I can talk to my friends about it

Socializing:

9. Q7r7 – I spend a lot of time socializing with my friends
10. Q8r1 – My friends and I go out and do things together
11. Q10r8 – I spend a lot of my leisure time with my friends
12. Q11r5 – My friends and I talk, eat, and drink together often

Table 3.6. Factor Loadings and Polychoric Correlations: 12 Items

Factor Loadings

	MR1	MR2	h2	u2	com
q4r3	0.71	0.13	0.65	0.35	1.1
q5r6	0.80	0.05	0.71	0.29	1.0
q7r4	0.81	0.06	0.73	0.27	1.0
q7r7	0.06	0.81	0.73	0.27	1.0
q8r1	0.26	0.64	0.72	0.28	1.3
q10r8	-0.08	0.92	0.74	0.26	1.0
q11r5	0.01	0.83	0.70	0.30	1.0
q12r10	0.64	0.24	0.70	0.30	1.3
q13r8	0.87	-0.04	0.72	0.28	1.0
q2r3	0.69	0.16	0.67	0.33	1.1
q12r4	0.89	-0.07	0.71	0.29	1.0
q16r1	0.87	-0.03	0.72	0.28	1.0

Polychoric Correlations

	Q4r3	Q5r6	Q7r4	Q7r7	Q8r1	Q10r8	Q11r5	Q12r10	Q13r8	Q2r3	Q12r4	Q16r1
Q4r3	1.00	0.69	0.69	0.61	0.61	0.56	0.51	0.67	0.66	0.73	0.66	0.67
Q5r6	0.69	1.00	0.72	0.58	0.65	0.52	0.56	0.65	0.71	0.69	0.71	0.72
Q7r4	0.69	0.72	1.00	0.58	0.66	0.52	0.58	0.77	0.72	0.69	0.71	0.69
Q7r7	0.61	0.58	0.58	1.00	0.69	0.77	0.69	0.63	0.55	0.64	0.52	0.56
Q8r1	0.61	0.65	0.66	0.69	1.00	0.68	0.76	0.68	0.61	0.61	0.61	0.60
Q10r8	0.56	0.52	0.52	0.77	0.68	1.00	0.71	0.58	0.51	0.57	0.51	0.51
Q11r5	0.51	0.56	0.58	0.69	0.76	0.71	1.00	0.63	0.51	0.54	0.51	0.53
Q12r10	0.67	0.65	0.77	0.63	0.68	0.58	0.63	1.00	0.69	0.67	0.69	0.68
Q13r8	0.66	0.71	0.72	0.55	0.61	0.51	0.51	0.69	1.00	0.70	0.72	0.72
Q2r3	0.73	0.69	0.69	0.64	0.61	0.57	0.54	0.67	0.70	1.00	0.64	0.70
Q12r4	0.66	0.71	0.71	0.52	0.61	0.51	0.51	0.69	0.72	0.64	1.00	0.75
Q16r1	0.67	0.72	0.69	0.56	0.60	0.51	0.53	0.68	0.72	0.70	0.75	1.00

Table 3.7. CFA - MODEL FIT: 12 items (Study 1)

	Chi-Square	CFI	SRMR	RMSEA	RMSEA (confidence intervals)
One Factor Model	1120.628 (df 54)	.885	.06	.136	.129 - .143
Two Correlated Factors Model	431.394 (df 53)	.959	.03	.082	.075 - .089
Bi-Factor Model - Two Group factors	249.231 (df 42)	.978	.02	.068	.060 - .076

Table 3.8. CFA - MODEL FIT: 12 items (Study 2)

	Chi-Square	CFI	SRMR	RMSEA	RMSEA (confidence intervals)
One Factor Model	2551.69 (df 54)	.895	.05	.152	.147 - .157
Two Correlated Factors Model	1152.318 (df 53)	.954	.03	.102	.097 - .107
Bi-Factor Model - Two Group factors	645.063 (df 42)	.975	.02	.085	.079 - .091

Table 3.9. 21 New Items Added

(Items eliminated in **BLUE**)

Variable Number	Item
hQ3abr1	My friends and I enjoy each other's company.
hQ3abr2	My friends and I spend quality time together.
hQ3abr3	My friends make me feel validated.
hQ3abr4	I care a lot about my friends.
hQ3abr5	My friends respect me.
hQ3abr6	I trust my friends.
hQ3abr7	I am satisfied with how many friends I have.
hQ3abr8	I am satisfied with my friendships.
hQ3abr9	My friends and I enjoy activities together.
hQ3abr10	My friends and I do things together often.
hQ3abr11	I laugh a lot when I'm doing things with my friends.
hQ3abr12	My friends and I go out together.
hQ3abr13	My friends and I eat together often.
hQ3abr14	I attend social events with my friends.
hQ3abr15	I spend free time with my friends.
hQ3abr16	I socialize regularly with my friends.
hQ3abr17	I socialize with a lot of different people.
hQ3abr18	I spend a lot of time with my friends.
hQ3abr19	I communicate regularly with my friends.
hQ3abr20	I stay in touch with my friends.
hQ3abr21	I make time for my friends.

Table 3.10. 14-Item Scale

(Item Information Number in RED)

Closeness:

1. I feel close to my friends (1)
2. It is hard to imagine my life without my close/best friends (2)
3. My friends celebrate my good news (3)
4. I have fun with my friends (4)
7. I have meaningful conversations with my friends (7)
8. I like to hang out with my friends (8)
9. My friends understand me (9)
10. When I have a problem, I can talk to my friends about it (10)

Socializing:

5. I spend a lot of time socializing with my friends (5)
6. My friends and I go out and do things together (6)
11. My friends and I eat together often (11)
12. I attend social events with my friends (12)
13. I spend free time with my friends (13)
14. I socialize with a lot of different people (14)

Table 3.11. Correlation Matrix for final 14 items

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q1	1.00	0.81	0.78	0.81	0.74	0.75	0.80	0.78	0.80	0.79	0.65	0.66	0.70	0.57
Q2	0.81	1.00	0.73	0.74	0.70	0.68	0.75	0.72	0.76	0.73	0.57	0.60	0.65	0.51
Q3	0.78	0.73	1.00	0.77	0.67	0.72	0.76	0.74	0.76	0.73	0.62	0.63	0.66	0.53
Q4	0.81	0.74	0.77	1.00	0.68	0.77	0.75	0.81	0.74	0.71	0.62	0.63	0.65	0.53
Q5	0.74	0.70	0.67	0.68	1.00	0.79	0.66	0.66	0.67	0.66	0.73	0.72	0.77	0.65
Q6	0.75	0.68	0.72	0.77	0.79	1.00	0.69	0.73	0.67	0.66	0.75	0.77	0.77	0.61
Q7	0.80	0.75	0.76	0.75	0.66	0.69	1.00	0.79	0.84	0.85	0.65	0.64	0.71	0.54
Q8	0.78	0.72	0.74	0.81	0.66	0.73	0.79	1.00	0.78	0.75	0.66	0.65	0.72	0.56
Q9	0.80	0.76	0.76	0.74	0.67	0.67	0.84	0.78	1.00	0.83	0.63	0.61	0.69	0.55
Q10	0.79	0.73	0.73	0.71	0.66	0.66	0.85	0.75	0.83	1.00	0.64	0.60	0.67	0.53
Q11	0.65	0.57	0.62	0.62	0.73	0.75	0.65	0.66	0.63	0.64	1.00	0.77	0.81	0.63
Q12	0.66	0.60	0.63	0.63	0.72	0.77	0.64	0.65	0.61	0.60	0.77	1.00	0.79	0.69
Q13	0.70	0.65	0.66	0.65	0.77	0.77	0.71	0.72	0.69	0.67	0.81	0.79	1.00	0.69
Q14	0.57	0.51	0.53	0.53	0.65	0.61	0.54	0.56	0.55	0.53	0.63	0.69	0.69	1.00

Table 3.12. Unidimensional GRM – 14 items

	a	b1	b2	b3	b4	b5
q1r2	4.033	-1.872	-1.276	-0.494	0.090	0.785
q1r5	2.717	-1.762	-1.146	-0.427	0.098	0.782
q1r6	2.733	-1.993	-1.478	-0.685	0.009	0.770
q1r8	3.214	-2.190	-1.624	-0.863	-0.235	0.492
q1r9	2.850	-1.589	-0.728	0.013	0.576	1.332
q1r10	3.013	-1.668	-0.990	-0.285	0.338	0.983
q2r6	3.258	-1.894	-1.317	-0.549	0.033	0.793
q2r8	2.994	-1.967	-1.419	-0.610	-0.011	0.675
q2r9	3.322	-1.847	-1.307	-0.461	0.159	0.889
q2r10	3.256	-1.684	-1.089	-0.309	0.233	0.917
q2r13	2.506	-1.411	-0.642	-0.025	0.576	1.265
q3r14	2.474	-1.420	-0.765	-0.111	0.492	1.191
q3r15	2.818	-1.600	-0.850	-0.122	0.438	1.125
q3r17	1.490	-1.533	-0.672	0.036	0.802	1.803

Table 3.13. Bi-Factor GRM – 14 items

	a1	a2	a3	d1	d2	d3	d4	d5
q1r2	4.358	0.415	0.000	7.978	5.452	2.115	-0.415	-3.451
q1r5	2.879	0.048	0.000	4.924	3.217	1.213	-0.273	-2.245
q1r6	2.927	0.130	0.000	5.659	4.212	1.958	-0.043	-2.251
q1r8	4.932	-0.958	0.000	9.994	7.487	3.984	1.062	-2.338
q1r9	2.960	0.000	1.403	4.932	2.229	-0.135	-1.935	-4.305
q1r10	3.244	0.000	1.376	5.575	3.272	0.870	-1.233	-3.423
q2r6	3.715	1.054	0.000	6.959	4.847	2.022	-0.150	-3.016
q2r8	3.162	0.044	0.000	6.050	4.395	1.904	0.040	-2.138
q2r9	3.973	1.196	0.000	7.275	5.151	1.815	-0.671	-3.583
q2r10	4.359	1.753	0.000	7.291	4.742	1.297	-1.105	-4.144
q2r13	3.390	0.000	2.607	5.273	2.300	-0.111	-2.379	-4.919
q3r14	2.914	0.000	1.951	4.487	2.359	0.206	-1.755	-3.933
q3r15	3.103	0.000	1.720	5.283	2.726	0.260	-1.644	-3.909
q3r17	1.483	0.000	1.145	2.501	1.050	-0.154	-1.446	-3.075

Table 3.14. Bi-factor GRM – 14 Items (Marginal Slopes)

	marginal	d1	d2	d3	d4	d5
q1r2	4.19299558	-1.8403518	-1.1650791	-0.4548816	0.15073369	0.84770523
q1r5	2.94835495	-1.7065278	-1.1154194	-0.4334351	0.08534201	0.74545298
q1r6	3.1018877	-2.0982899	-1.4952164	-0.6334292	-0.0345983	0.67412473
q1r8	4.12795016	-2.0897258	-1.5685756	-0.7651681	-0.1958322	0.53035534
q1r9	2.3265094	-1.5240357	-0.556837	0.19041365	0.82486429	1.51449168
q1r10	2.76384629	-1.7391842	-0.9111478	-0.2398135	0.29398228	0.98775063
q2r6	2.81042796	-1.8403224	-1.2799517	-0.5431199	0.03221961	0.82739724
q2r8	3.20313769	-1.9055863	-1.3726449	-0.6012423	0.04397417	0.7109618
q2r9	2.72043	-2.0240883	-1.3489018	-0.4962054	0.21764275	0.95525118
q2r10	2.4694591	-1.8113866	-1.1406981	-0.3893025	0.24094289	1.06927499
q2r13	1.82491507	-1.5683327	-0.6266866	0.06594387	0.71324716	1.40584493
q3r14	1.86643163	-1.5844513	-0.7924767	-0.0204781	0.55828427	1.3688185
q3r15	2.13008405	-1.5763006	-0.7623243	-0.0216256	0.60350935	1.32090411
q3r17	1.3758544	-1.6417106	-0.6691519	0.21732268	0.92952641	1.73553376

Table 3.15 CFA -- MODEL FIT – 14 items (Study 2)

	Chi-Square	CFI	SRMR	RMSEA	RMSEA (confidence intervals)
One Factor Model	1729.308 (df 77)	.878	.05	.146	.141 - .153
Two Correlated Factors Model	686.854 (df 76)	.955	.03	.09	.084 - .096
Bi-Factor Model - Two Group factors	341.867 (df 63)	.979	.02	.067	.060 - .074

Table 3.16. 8-Item Scale (Study 2)

Closeness:

My friends celebrate my good news

I have fun with my friends

I like to hang out with my friends

I feel close to my friends

Socializing:

My friends and I go out and do things together

I spend a lot of time socializing with my friends

I attend social events with my friends

I spend free time with my friends

Table 3.17. CFA -- MODEL FIT – 8 items (Study 2)

	Chi-Square	CFI	SRMR	RMSEA	RMSEA (confidence intervals)
One Factor Model	549.188 (df 20)	.923	.04	.163	.151 - .175
Two Correlated Factors Model	179.407 (df 19)	.977	.02	.09	.080 - .104
Bi-Factor Model - Two Group factors	118.604 (df 12)	.984	.01	.09	.079 - .110

Figure 3.1. Histogram: 14 items – Unidimensional

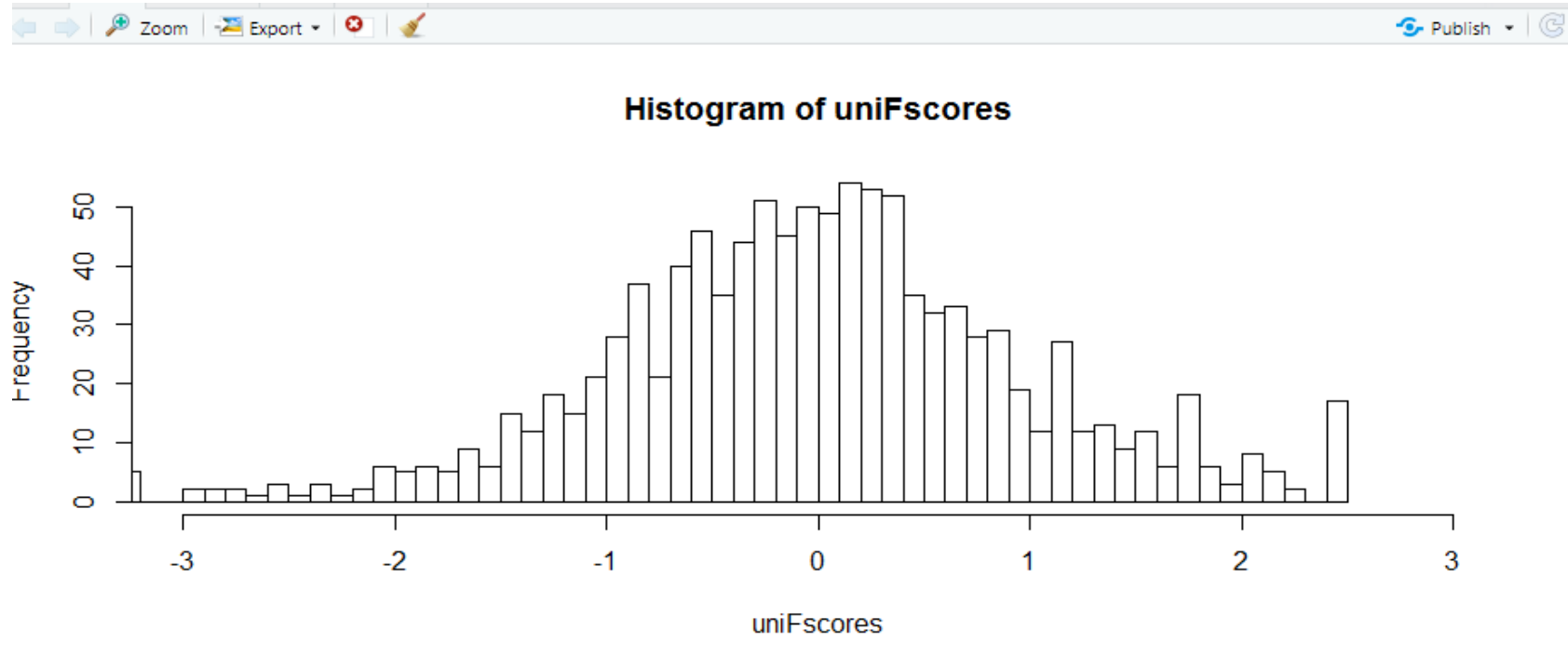


Figure 3.2. Histogram: 14 items – Bi-factor

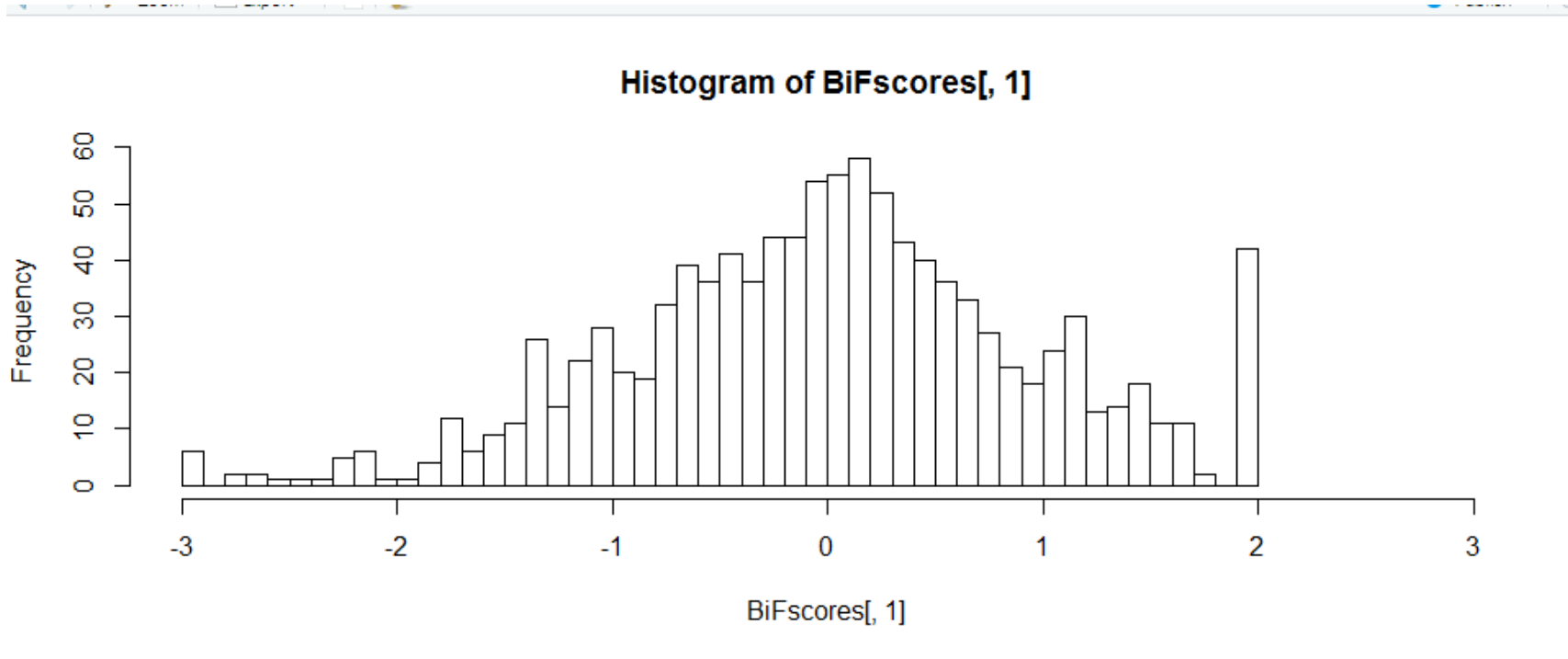


Figure 3.3. Test Information and Standard Errors

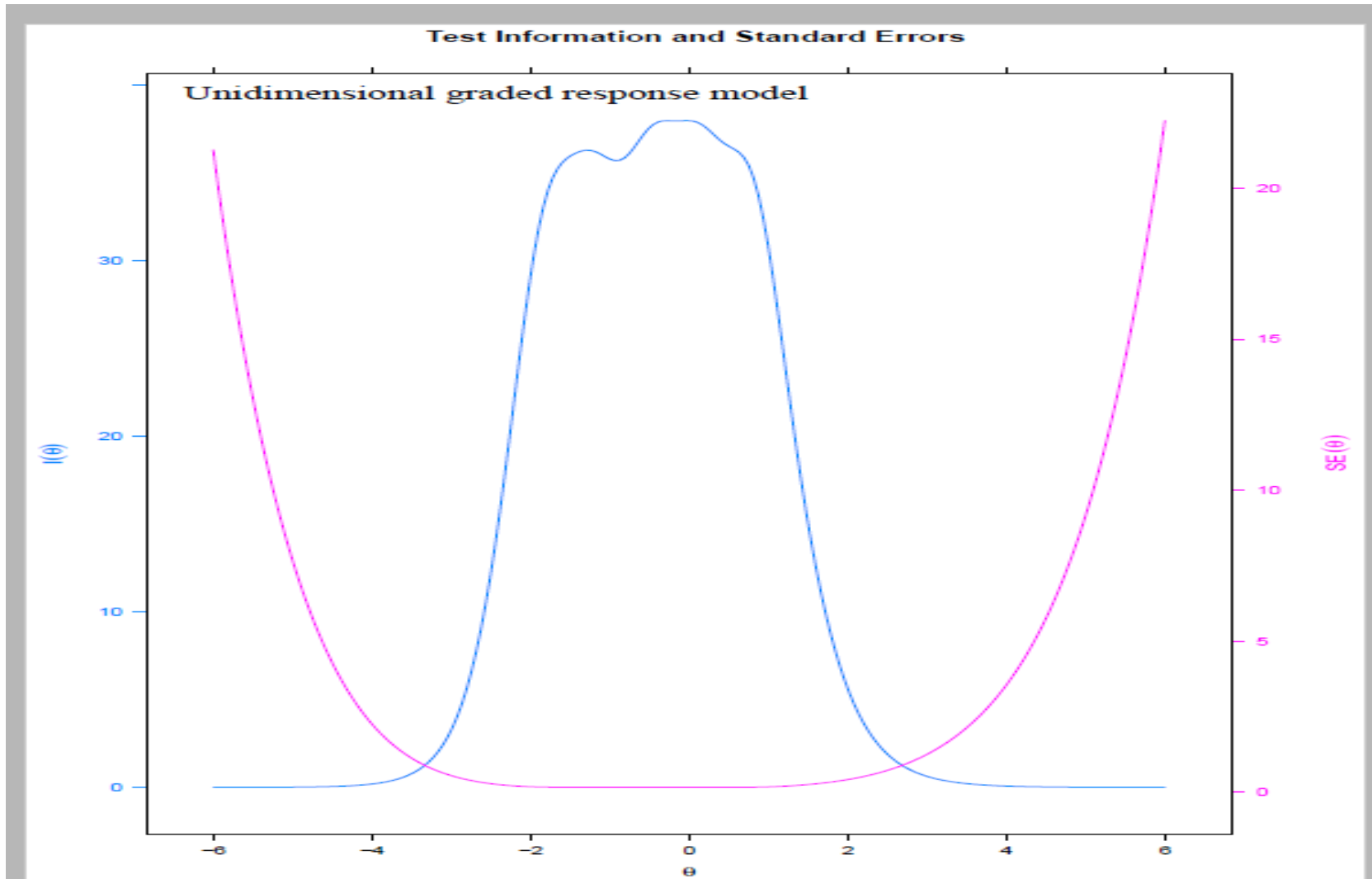


Figure 3.4. Marginal “Collapsed” IRT model

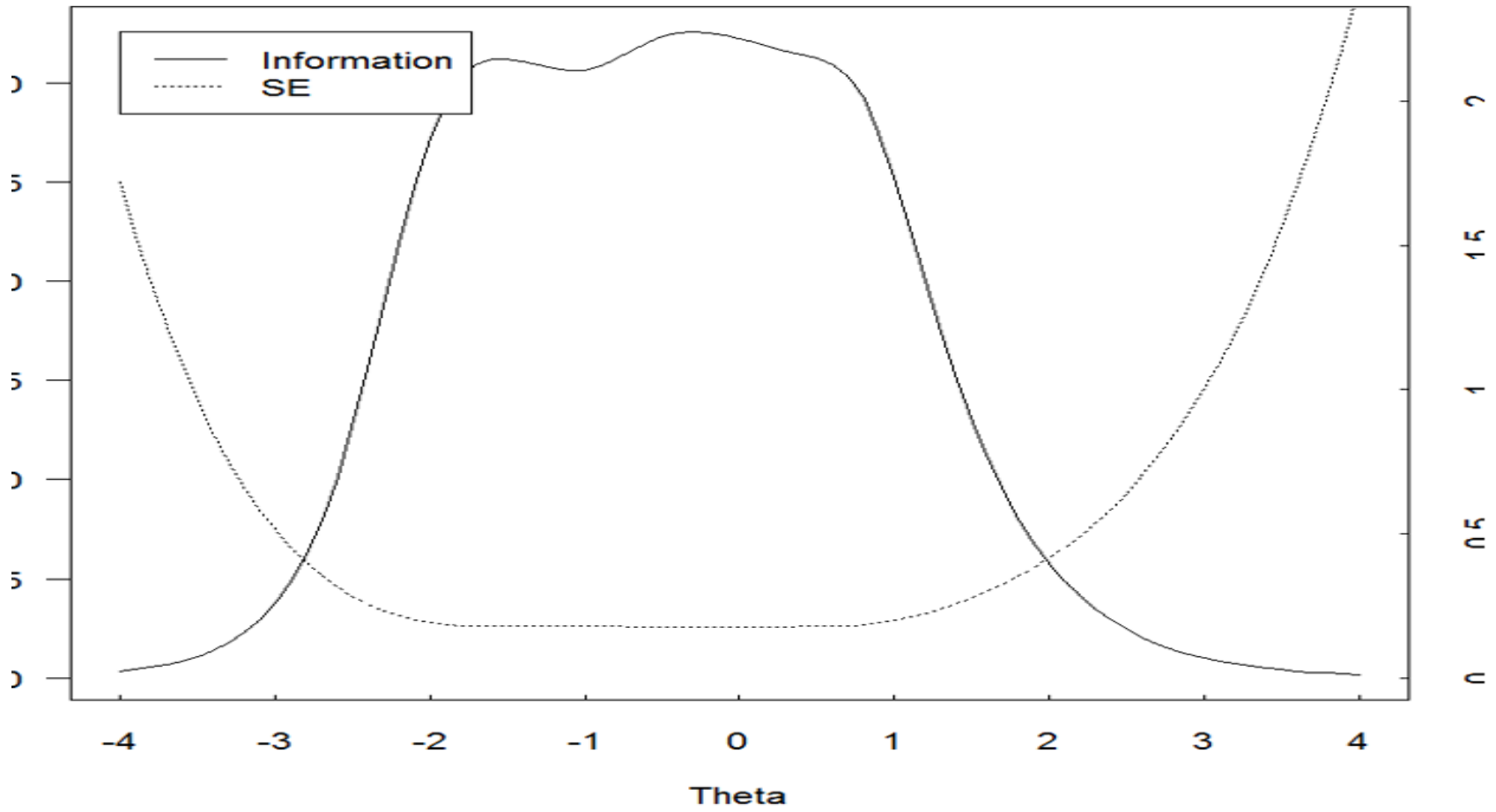
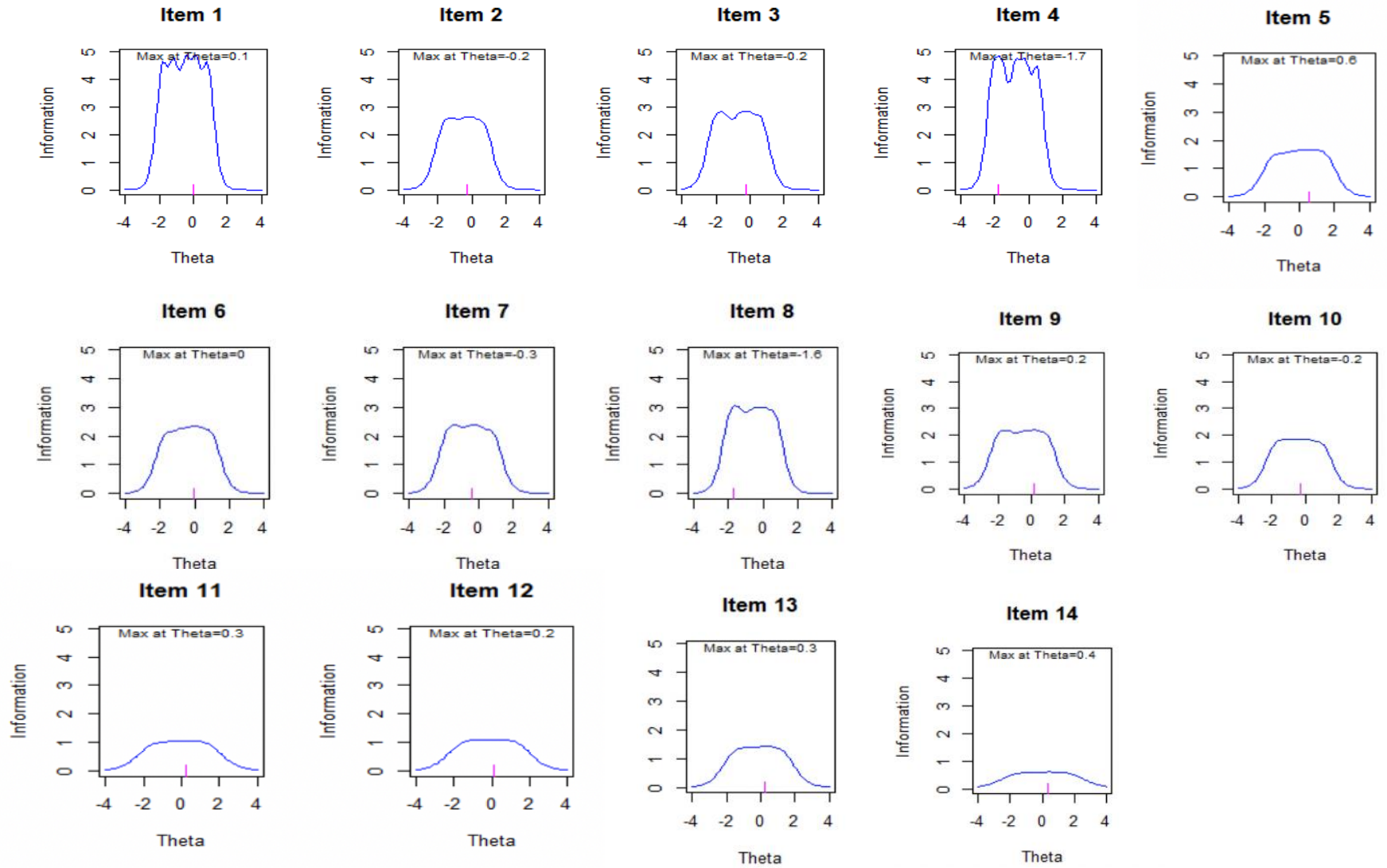


Figure 3.5. IRT 14 items -- Information

(See [Table 3.10](#) for Item content by Item number in **RED**)



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