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Friendship Networks, Perceived Reciprocity of Support, and Depression

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Friendship Networks, Perceived Reciprocity of Support, and Depression

by

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ABSTRACT

Using social network analysis as a theoretical framework, the current study examined the associations between self-reported egocentric network characteristics and depression among a sample of United States college students. It is important to understand factors related to depression among this population due to the severity of its potential outcomes (e.g., suicide and interpersonal problems at school). Drawing inspiration from a recent study conducted by Christina Falci and Clea McNeely (2009), the current investigation used OLS regression to test for both linear and curvilinear relationships between egocentric network size and depression. Potential interactions between network size, density, and gender were also explored. As an additional line of inquiry, this project examined whether or not (and to what extent) perceptions of reciprocity mediate the relationships between network characteristics and depression. Data were collected using an online survey, which was proctored to students enrolled in three large undergraduate sociology courses during the fall 2010 semester. In contrast to findings reported by Falci and McNeely (2009), no significant relationships were observed between network characteristics and mental health. However, support reciprocity was found to be a significant predictor of depression at the multivariate level. Additional research will be necessary in order to confirm (or refute) the results of Falci and McNeely (2009) and to further assess the mediating effects of perceived equity.

CHAPTER 1:

INTRODUCTION

Approximately 15% of those completing the spring 2008 American College Health Association-National College Health Assessment (ACHA-NCHA), which is a national survey of over 80,000 students located on 106 college campuses, indicated that they had been diagnosed with depression at some point during their respective lifetimes (American College Health Association 2009). Of these individuals, 32% reported having been diagnosed within the past school year, 25% reported currently being in therapy for depression, and 36% reported taking depression-related medications (American College Health Association 2009). These findings raise explicit concerns related to the health and well-being of students attending institutions of higher education.

At the extreme, *depression*, which may be defined as the experience of "depressed mood or the loss of interest or pleasure in nearly all activities" (American Psychiatric Association 2000:349), is associated with suicide (Hockenbury and Hockenbury 2003). Far from being limited to the adult population, research has clearly demonstrated that there is a strong relationship between depression and suicidal behavior among adolescents (Spirito et al. 2003; Sadowski and Kelley 1993). Although this outcome may seem to be a marginal possibility, the National Center for Injury Prevention and Control (2006) lists suicide as the third leading cause of death in the United States among those

age 15-24 and the second leading cause of death among those age 25-34. Notably, these age groups account for over 92% of those enrolled at scholarly institutions in America (U.S. Census Bureau 2008). In addition to this extreme outcome, depression has been connected to decreased academic productivity, interpersonal problems at school, and truancy among college students (Heiligenstein and Guenther 1996). Moreover, depression is associated with difficulty concentrating, reduced energy, changes in weight, and changes in the quality or quantity of sleep among those in the general population (Lackey 2008; Hockenbury and Hockenbury 2003). Due of the severity of these potential outcomes, it is important to understand factors which are related to depression among the national collegiate student body.

Using social network analysis as a theoretical framework, the current study will examine the associations between self-reported egocentric network characteristics and depression among a sample of United States college students. For the purposes of this investigation, specific focus will be placed on egocentric network size and density, and on the perceived reciprocity of social support exchanges that occur within personal friendship networks.[1] Although not limited to this line of inquiry, social network analysis has been used to study a broad spectrum of mental health outcomes including depression, anxiety, and negative affect (Fiori, Antonucci, and Cortina 2006; Lin, Ye, and Ensel 1999; Lin and Peek 1999). However, several key subject areas within this field remain largely unexplored and/or require further investigation. To elaborate, while numerous benefits (e.g., reduced levels of depression, unhappiness, and suicidal ideation) have been attributed to large egocentric networks (Ueno 2005; Moody 2004; Cannuscio et al. 2004;

[1]Definitions of network terms are presented in CHAPTER 2.

Field, Diego, and Sanders 2001; Burt 1987; Cohen and Wills 1985; Coates 1985; Fischer and Phillips 1982), relatively few studies have entertained the theoretical notion that over-integration may actually result in greater mental health problems (Pescosolido and Levy 2002) and a sense of obligation that negatively affects the individual (Durkheim 1897/2006).[2] Additionally, while some scholars have reported observing positive associations between network density and mental health (Ueno 2005; Kadushin 1983; Fischer 1982), findings related to this subject have been both inconsistent and inconclusive (Lin and Peek 1999).

Providing much of the basis for the current investigation, a recent study conducted by Christina Falci and Clea McNeely (2009) attempted to address several of the gaps and inconsistencies present in the literature. More specifically, using secondary data taken from the National Longitudinal Study of Adolescent Health (Add Health), Falci and McNeely (2009) examined the associations between various egocentric network characteristics and depression among a nationally representative sample of American adolescents.[3] Of particular relevance to this discussion, the authors found that individuals with small or large personal friendship networks both reported experiencing higher levels of depression than those with average-sized networks (Falci and McNeely 2009). Additionally, female adolescents with dense egocentric networks reported lower levels of depressive symptomology than those with fragmented networks; no significant

[2]Although relatively few studies have entertained the possibility that over-integration may actually have a negative impact on mental health, a recent investigation conducted by Kathy Charles is a notable exception. To elaborate, Charles surveyed 200 students at a Scottish university and found that "the more Facebook friends people [had], the more likely they [were] to feel stressed out" (as cited in Sachoff 2011:1). The anxiety associated with using Facebook "outweighed the benefits of staying in touch with [. . .] friends and family" (as cited in Sachoff 2011:1).

[3]The Add Health project consists of survey and interview data collected from a nationally representative sample of American adolescents in grades 7-12 (Add Health 2010).

relationship was found among males of the same age (Falci and McNeely 2009). Finally, it should be noted that females with large, cohesive networks reported experiencing lower levels of depressive symptoms than those with large, fragmented networks; the opposite pattern was found among males (Falci and McNeely 2009). These results are quite unique, as most scholars have focused on delineating independent associations between network variables and depression, rather than searching for interaction effects.[4]

In light of the numerous precedents set by Falci and McNeely (2009), the current project will further investigate the relationships between egocentric network size, network density, gender, and depression. As an additional line of inquiry, this study will also examine the relationship between perceived reciprocity of support and mental health.[5] To elaborate, although previous studies have examined egocentric network size and density in relation to depression, and it has been suggested that the observed effects of these characteristics are at least partially related to exchanges of social support, such exchanges have not been investigated directly by network researchers. More specifically, those relatively few network studies which have considered the relationship between social support and depression have focused exclusively on that support which is received by participants, and ignored that support which is given. Using equity theory and social exchange theory as competing frameworks, the current study will expand upon the existing literature by examining the extent to which perceptions of reciprocity mediate

[4]A more detailed account of these findings will be presented in the next chapter.

[5]Scholars have claimed that those with small egocentric networks may suffer from inadequate levels of social support; it is believed that without this provision, individuals are left to "experience feelings of melancholy and a lack of purpose" (Thorlindsson and Bjarnason 1998:96). It has also been suggested that the effort which must be exerted to maintain a large network may come to outweigh any benefits or support received from it (Haines et al. 2008; Kessler and McLeod 1984). Moreover, highly cohesive networks are thought to minimize the effort required to maintain individual relationships and to result in the sharing of social burdens (Forrester and Tashchian 2004).

the relationships which have been observed between egocentric network characteristics (i.e., egocentric network size and density) and depression.

CHAPTER 2:

LITERATURE REVIEW

Social Network Analysis as a Theoretical Framework

Although not limited to this line of inquiry, social network analysis has been used to study a broad spectrum of mental health outcomes including depression, anxiety, and negative affect (Fiori, Antonucci, and Cortina 2006; Lin, Ye, and Ensel 1999; Lin and Peek 1999). For the purposes of this discussion, *social networks* may be described as finite sets of actors who are connected by specific relationships, and *social network analysis* can be thought of as the study of such networks (Wasserman and Faust 1994). Specifically, network analysts focus on the relationships which are present "among social entities, and on the patterns and implications of [those] relationships" (Wasserman and Faust 1994:3). Rather than treating actors and their actions as independent, autonomous units; researchers guided by this perspective view individuals as interdependent, or reliant upon one another for opportunities and resources (Wasserman and Faust 1994). As a justification for this perspective, James Coleman states that "individuals do not act randomly with respect to one another. They form attachments to certain persons, they group together in cliques, [and] they establish institutions" (as cited in Wellman 1988:31). Furthermore, it is argued that these interactions promote the differential flow of information, influence, and social capital (Wasserman and Faust 1994; Coleman

1990). Therefore, it is important to examine the structure, or the patterns of relationships in which people are embedded, rather than assuming that "social behavior is a result of the fact that individuals possess common attributes" (Wellman 1988:31).

Social Integration and Depression

The relationship between social integration and depression has been investigated quite extensively since Durkheim (1897/2006) first proposed an association between integration and suicide during the 19th century.[6] Essentially, *social integration* refers to the "degrees to which people are connected to each other in society or in small groups" (Ueno 2005:485). In order to measure this construct, researchers commonly use network variables, one of which is egocentric network size. To elaborate, an *egocentric network* may be defined as a network "composed of actors with whom [a] focal person (ego) is directly connected (alters) and the ties among them" (Ueno 2005:485). For the purposes of this discussion, direct connections can be thought of as unmediated social ties. In accordance with this description, *egocentric network size* simply refers to the total number of alters present in an egocentric network (Haines et al. 2008).

It should be noted that researchers also typically examine the specific types of ties which are present in a given network. For instance – friendship, family, and acquaintanceship ties are commonly distinguished from one another and measured as separate entities or *relations* (Wasserman and Faust 1994; House, Landis, and Umberson

[6]According to Durkheim (1897/2006), there are four specific types of suicide: egoistic, anomic, altruistic, and fatalistic. Relevant to the current discussion, *egoistic suicide* is thought to result from "a pathological weakening of the bonds" between an individual and society (Edles and Appelrouth 2005:106). At the opposite end of the spectrum, *altruistic suicide* results from over-integration, or an overload of obligations that take prevalence over an individual's own needs (Edles and Appelrouth 2005). In addition, it should be noted that *anomic suicide* is thought to result from a lack of moral regulation, or normlessness, while *fatalistic suicide* occurs as a result of oppression or over-regulation (Durkheim 1897/2006).

1988).[7] Network studies which examine mental health customarily focus on those ties between kin, friends, neighbors, or co-workers due to the assertion that these types of relations are a medium through which social support is transferred (Haines et al. 2008). *Social support*, which has a negative association with depression, may be defined as the information, emotional relief, material aid, and self-reliance that people retrieve from interpersonal relationships (Bozo, Toksabay, and Kurum 2009). It is believed that friends and family members are especially likely to promote the transfer of social support due to cultural norms which encourage "altruism toward intimates" and the sharing of resources among kin (Wellman and Wortley 1990:559). Furthermore, frequent contact between individuals, as is anticipated with neighbors and co-workers, increases the likelihood that supportive relationships will develop (Wellman and Wortley 1990).

For the purposes of this investigation, specific focus will be placed on the significance of friendship ties. Friendships are a key source of *social capital*, which may be thought of as "the consequence of investment in and cultivation of social relationships allowing an individual access to resources that would otherwise be unavailable" (Glover, Shinew, and Parry 2005:87). The social capital which is developed as a result of friendship is especially "important to an individual's well-being" because it allows for increased access to social support (Glover and Parry 2008:211). Reinforcing this point, research has suggested that friendship ties are more likely to transfer emotional aid and companionship than any other relation (Wellman and Wortley 1990). As individuals approach adulthood, it is believed that their friends become increasingly more important

[7]It is important to acknowledge that network-study participants are generally responsible for subjectively determining what exactly it is that constitutes a particular type of relation, as specific definitions of friendship and family, for instance, are not always given (Marin and Hampton 2007).

in comparison to family members (Monsour 2002), and studies which have examined depression among adults have found that "the absence of family in the context of friends is less detrimental than the absence of friends in the context of family" (Fiori et al. 2006:25).[8]

A noticeable trend in the literature concerning social integration and depression is the relatively consistent association between small egocentric networks, or low levels of integration, and negative emotional arousal.[9] For instance, in a recent study, Ueno (2005) investigated adolescents and found that those with few friendship ties experienced more depressive symptoms than those who were more socially integrated. Additional research, utilizing General Social Survey data, has demonstrated that there is a negative association between the number of people an individual has to discuss important matters with and reported unhappiness (Burt 1987). An association has also been found between social integration and depressive symptomology among college students; those who are well-integrated with friends tend to report lower levels of depression than less integrated individuals (Fagan 1994).[10] Theoretically, these findings reinforce the Durkheimian notion that social integration provides a form of "mutual moral support, which instead of throwing [an] individual on his own resources, leads him to share in [. . .] collective energy" (Thorlindsson and Bjarnason 1998:96). Without this support, individuals are left

[8]There is reason to suspect that many of the benefits which are associated with friendship might emerge prior to both adolescence and adulthood. For instance, research has indicated that having a large number of friends is associated with good mental health during childhood (Gest, Graham-Bermann, and Hartup 2001).

[9]What constitutes a small or a large egocentric network is generally dependent upon the size of the average network in the sample or population under consideration.

[10]It should also be noted that Bearman and Moody (2004), using data collected in conjunction with the Add Health project, found that female adolescents without any friendship ties were relatively more likely than their counterparts to think about committing suicide. However, no relationship was found between these two variables (i.e., social isolation and suicidal ideation) among males.

to "experience feelings of melancholy and a lack of purpose" (Thorlindsson and Bjarnason 1998:96).

There is also some evidence which suggests that relatively large egocentric networks are associated with high levels of depression, although this relationship has not been as extensively investigated. For example, Falci and McNeely (2009) found that adolescents with "very large [friendship] networks" reported "higher levels of depressive symptoms" than those with average-sized networks (2044).[11] More specifically, a curvilinear relationship was found between egocentric network size and depression, with depressive symptoms declining as network size increased until a specific threshold was reached and this trend reversed (Falci and McNeely 2009). These findings coincide with the theoretical notion that over-integration can result in greater mental health problems (Pescosolido and Levy 2002) and a sense of obligation that negatively affects the individual (Durkheim 1897/2006). In essence, it is believed that the effort which must be exerted to maintain a large network may come to outweigh any benefits or support received from it (Haines et al. 2008). There are few (if any) studies which corroborate this hypothesis, however, and the subject "has not been adequately explored" (Falci and McNeely 2009:2032).

Notably, methodological issues may account for the lack of clarity concerning this topic in the literature. One important matter which should be addressed is that many previous studies have only tested for, and accordingly found, linear relationships between egocentric network size and depression, with larger network sizes being associated with lower levels of depressive symptoms (Ueno 2005; Cannuscio et al. 2004; Burt 1987). In

[11]As stated prior, the research of Falci and McNeely (2009) has provided much of the basis for the current investigation.

some instances, these studies have gone so far as to explicitly discount the importance of assessing curvilinearity, referring to it as only relevant in extreme situations (Ueno 2005). However, there seems to be little empirical support for this claim. Also, failure to test for a relationship does not necessarily imply its absence, and due to the nature of what is being investigated, findings of linearity do not refute the possibility that curvilinear relationships exist. In order to expand upon the existing literature, the current study will test for both linear and curvilinear relationships between egocentric network size and depression among United States college students.

Network Cohesion and Depression

Social cohesion may be defined as the "closeness, commitment, and harmony" characteristic of tightly-knit groups and their members (Schaefer and Kornienko 2009:385). Although conceptually similar, *network cohesion* refers to the "degree of *interconnections* within a social network" (Falci and McNeely 2009:2033; italics in original). To elaborate, when examining an *egocentric friendship network*, which is simply an egocentric network composed exclusively of friendship ties, network cohesion can be thought of as the extent to which an ego's friends are friends with one another.[12] Researchers generally measure cohesion by examining another network characteristic, *density*, which is "calculated by dividing the number of existing ties among alters by the number of all possible ties" (Ueno 2005:486). Networks with low levels of density are

[12]The definitions that are presented for network terms were chosen both due to convention and in order to maintain consistency with the research of Falci and McNeely (2009). However, there are a few minor differences which should be addressed. First, in their own study, Falci and McNeely (2009) used the term "alter-density" in lieu of "network density." This is purely a matter of semantics. Also, focal adolescents (i.e., egos) were included in their definition of "egocentric network size" (Falci and McNeely 2009). The current investigation excluded focal persons so that egocentric network size would represent the total number of friends present in an individual's network, rather than the total number of friends plus one. Again, this distinction is arbitrary. See Wasserman and Faust (1994) for a more comprehensive discussion of network concepts and terminology.

fragmented, with few connections between alters, while those with high levels of density are characterized by many interconnections. This concept is visualized in FIGURE 1.

The relationship between network density and mental health has been investigated extensively by researchers, but findings have been inconsistent (Lin and Peek 1999). Moreover, few scholars have focused directly on the relationship of interest: the association between network density and depression. However, there are a few relevant studies present in the literature. For instance, when Falci and McNeely (2009) examined the egocentric friendship networks of adolescents, they found a negative association between network density and depressive symptoms among females, but no significant relationship was found among males of the same age (Falci and McNeely 2009). In a similar study, Ueno (2005) found a general relationship between low network density and high levels of depression among adolescents, but potential gender differences were not examined. Another recent investigation, using an indirect measure of network density, failed to reveal a statistically significant association between this construct and depression among adults of either sex when controlling for other factors (Haines et al. 2008). Although only tangentially related to this discussion, it should be noted that research conducted by Bearman and Moody (2004) revealed an independent, negative association between network cohesion and suicidal ideation among adolescent girls; no significant relationship was found among those of the opposite sex. So, while there is some evidence which suggests that network density is negatively associated with depression, at least among females, findings have been inconclusive.

In previous studies, various egocentric network characteristics (e.g., egocentric network size and density) have generally been treated as "theoretically independent

constructs" (Falci and McNeely 2009:2033). This has entailed testing for independent associations between these characteristics and depression (i.e., additive effects), rather than searching for interactions (i.e., multiplicative effects). However, this approach would seem to be counterintuitive, as network constructs do not occur independently in the social world. For instance, it does not matter whether an egocentric network is dense or fragmented; in either case, it must have a specific size or degree. Moreover, regardless of a network's size, it must have some level of density; these characteristics cannot be separated. Stated more directly, it is certainly possible (for example) that large, dense egocentric networks influence mental health in different ways than large, fragmented networks. The failure to take this into account may partially explain the lack of clarity that has been observed in network studies which have examined depression and its correlates.

While most studies have failed to examine potential interactions between network characteristics, there is at least one notable exception present in the literature: Falci and McNeely (2009) investigated whether or not "the association between social integration and depressive symptoms varies as a function of [network] cohesiveness" (2033). The findings of their study indicated that for girls, having a large, fragmented egocentric network was associated with relatively higher levels of depression (Falci and McNeely 2009). In contrast, large network size was "not associated with elevated levels of depressive symptoms for girls whose friends [were] friends with each other" (Falci and McNeely 2009:2048). There was a different pattern found among boys: large, fragmented networks were associated with low levels of depressive symptoms (Falci and McNeely 2009). However, a curvilinear relationship was found between egocentric

network size and depression among those with cohesive networks – large and small networks were both associated with high levels of depression (Falci and McNeely 2009).

The above findings have several theoretical implications. To elaborate, it has been suggested by scholars that interactions in dense networks may lead people to "develop a sense that they are part of a group rather than having multiple relationships with people who do not know each other" (Ueno 2005:486). In accordance with this stance, highly cohesive networks are thought to minimize the effort required to maintain individual relationships and to result in the sharing of social burdens (Forrester and Tashchian 2004). However, in conjunction with the results of their study, Falci and McNeely (2009) have speculated that the effects of network density may vary by gender. As Friedkin (2004) purports, identical network structures may differentially influence "attitudes and behaviors" if the interactions within those networks are qualitatively distinct (413).

Providing support for this position, research has demonstrated that females are more likely to engage in mutually supportive interactions with friends than are males, who tend to be more acceptant of negative events and to exhibit relatively independent coping behaviors (Frydenberg and Lewis 1993). Furthermore, males have historically reported friendships which are characterized by impersonal contact and comparatively low levels of emotional involvement; this stands in contrast to females, who are more likely to put the needs of others before their own (Rosenfield, Lennon, and White 2005; Umberson et al. 1996; Frydenberg and Lewis 1993). Because of these characteristics, specifically the tendency to seek out and to give social support, it is possible that females are more likely to benefit from dense egocentric networks than are males. Also, due to

their aforementioned tendency to deal with problems independently, males may actually be more likely to find large, cohesive networks burdensome.

In addition to these factors, research has shown that males generally face more pressure to meet the expectations of their peer groups than females (Zucker et al. 1995). More specifically, adolescents and young adults are compelled to "adopt the styles, values, and interests" of their colleagues (Steinberg and Monahan 2007:1531). Males who fail to meet these expectations are especially susceptible to social rejection (Zucker et al. 1995). In contrast, females are "more resistant to peer influence than males [. . .], and they are so after as well as during adolescence" (Steinberg and Monahan 2007:1540). Of further significance, research has suggested that dense egocentric networks tend to exert more normative pressure on individuals than fragmented networks: At least one study has found a positive association between egocentric network density and behavioral accordance among adolescents (Haynie 2001). Stated more directly, research has indicated that adolescents in dense networks are more likely than those in fragmented networks to emulate the (delinquent) behaviors of their peers (Haynie 2001).

The above findings, in conjunction with the Durkheimian notion that over-regulation can have a negative impact on the individual, further support the claim that males may find large, dense egocentric networks especially burdensome. So, although this topic requires further investigation, there is some empirical and theoretical support for the assertion that large, dense egocentric networks are related to reduced levels of depression among females and elevated levels of depression among males. The current study will expand upon the existing literature by further exploring the relationship

between network density and depression among United States college students. Potential interactions between egocentric network size, density, and gender will also be examined.

Perceived Reciprocity of Support

Although previous studies have examined egocentric network size and density in relation to depression, and it has been speculated that the observed effects of these characteristics are at least partially related to exchanges of social support, such exchanges have not been investigated directly by network researchers. More specifically, those relatively few network studies which have considered the relationship between social support and depression have focused exclusively on that support which is received by participants, and ignored that support which is given. Despite this shortcoming, it is important to consider relevant findings. For example, Falci and McNeely (2009) found that adolescents who reported, or perceived, receiving high levels of social support from their friends had low levels of depressive symptoms; in addition, this support was found to mediate the aforementioned relationship between small egocentric network size and depression. These results coincide with the existing body of literature related to this subject: Negative associations between social support and depression have commonly been found in other network (Haines et al. 2008) and non-network studies (Symister and Friend 2003).

While the mediating effects of support reciprocity have not been investigated directly by network researchers, there is much theoretical and empirical evidence which implies that this line of inquiry is important and should not be overlooked. For example, *social exchange theory* predicts that in most instances, individuals will "seek to gain valuable resources in excess of the resources that they must give up" in return (Turner

and Stets 2005:213). In accordance with this perspective, it is has been asserted that people "will experience positive emotions when their exchanges yield profits," and they will experience negative emotions when "their costs and investments are too high relative to rewards" (Turner and Stets 2005:213). Also, when alternative suppliers of resources are few, exchange theory predicts that those holding such resources are able to "extract ever more [. . .] from those who are dependent on them, thus generating [. . .] negative emotional arousal" (Turner and Stets 2005:214). These principles, when applied to exchanges of social support, seem to indicate that those individuals who receive more support than they give should experience lower levels of depression than those individuals who give more than they receive. It may also be inferred from this line of thought that because people with small egocentric networks have relatively fewer options to turn to when attempting to acquire social support, they are more likely to be in non-reciprocal exchange relationships in which they give more than they get.

In contrast to this perspective, *equity theory* states that individuals generally "seek to maintain symmetry in their relationships with others, and that perceptions of being deprived as well as perceptions of being advantaged are associated with distress" (Vaananen et al. 2008:1908). In essence, equity theorists propose that giving more than one receives may lead to feelings of resentment, while receiving more than one gives may lead to feelings of guilt or shame (Vaananen et al. 2008). Again, if these principles are applied to exchanges of social support, one would expect individuals who benefit significantly more or less than their alters, or who perceive a lack of equity in their relationships, to experience relatively higher levels of depression.

There is a considerable amount of support for equity theory in the existing literature. For instance, Buunk and Schaufeli (1999) found that individuals who perceived a lack of equity in their relationships with co-workers or superiors were more likely to experience negative affect than those engaged in more mutually supportive interactions. Along the same lines, research by Taniguchi and Ura (2002) indicates that high school students who report inequitable relationships with their closest friends tend to experience higher levels of depression than their counterparts. Additionally, high school teachers who report underbenefiting in comparison to their romantic partners have been found to experience higher levels of depression than teachers in more equitable relationships (Bakker et al. 2000). Studies of this variety have produced more or less consistent results: When considering social support, perceptions of overbenefiting or underbenefiting are both associated with relatively high levels of depression.

In light of these findings, the current investigation will further explore the relationship between social support and depression among United States college students. More clearly, when considering the relationship between egocentric network size and depression, specific focus will be placed on the mediating effects of social support. Additionally, using social exchange theory and equity theory as competing frameworks, this study will examine the extent to which perceptions of reciprocity mediate the relationships which have been observed between egocentric network characteristics (i.e., egocentric network size and density) and depression. Since it has been suggested that the effort which must be exerted to maintain a large network may come to outweigh any benefits or support received from it (Haines et al. 2008), there is reason to suspect that perceptions of equity may mediate the relationship between large egocentric network size

and depression. Also, highly cohesive networks are thought to minimize the effort required to maintain individual relationships and to result in the sharing of social burdens (Forrester and Tashchian 2004). Therefore, perceptions of reciprocity may also mediate the relationship between network density and depressive symptomology, especially among females, who are more likely than males to seek out and to give social support (Rosenfield, Lennon, and White 2005; Umberson et al. 1996; Frydenberg and Lewis 1993). The current investigation will explore each of these possibilities.

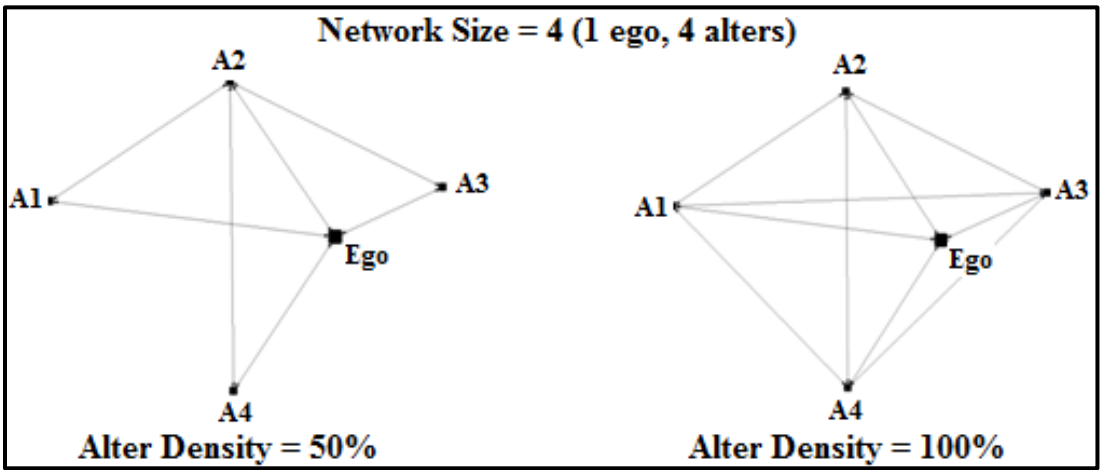

FIGURE 1: Egocentric Networks with Varying Levels of Density

CHAPTER 3:

SPECIFIC AIMS

The current study will use social network analysis to examine the associations between self-reported egocentric network characteristics and depression among a sample of United States college students. As stated prior, it is important to understand factors related to depression among this population due to the severity of its potential outcomes (e.g., suicide, difficulty concentrating, interpersonal problems, changes in weight, and reduced energy). For the purposes of this investigation, measures of egocentric network size and density, social support, and perceived reciprocity of support will be utilized.

In light of the numerous precedents set by Falci and McNeely (2009), this study will test for both linear and curvilinear relationships between egocentric network size and depression. Potential interactions between network size, density, and gender will also be explored. Again, in keeping with the findings of these two scholars (Falci and McNeely 2009), it is anticipated that large and small personal friendship networks will be associated with higher levels of depression than average-sized networks. Moreover, it is predicted that there will be a negative association between network density and depression among females, but no significant relationship is expected to be found among males. It is also hypothesized that females in large, cohesive networks will report lower

levels of depressive symptoms than those in large, fragmented networks. Males are expected to demonstrate the opposite tendency.

In addition to focusing on egocentric network size and density, this investigation will further explore the relationship between social support and mental health. Specific attention will be given to whether or not perceptions of reciprocity mediate the relationships which have been observed between egocentric network characteristics (i.e., egocentric network size and density) and depression. While it is acknowledged that the amount of social support received by an individual is important, perceptions of equity, or the lack thereof, may further explain the topic of interest. For instance, if an individual receives little social support from his or her friends, but perceives giving little in return, it is reasonable to speculate that such an exchange may have less of an influence on subjective well-being than if that individual perceives contributing a great deal to his or her friendship network.

Stated more clearly, it is anticipated that a negative association will be found between social support and depression – and that this support will mediate the relationship between egocentric network size and depressive symptomology. Also, in accordance with the principles of equity theory, it is predicted that there will be a curvilinear relationship between reciprocity of support and depression: Individuals who perceive underbenefiting or overbenefiting in their relationships with friends will have higher levels of depression than those in more equitable networks. It is further hypothesized that perceptions of equity will mediate the relationships that have been observed between egocentric network characteristics (i.e., egocentric network size and density) and depression.

CHAPTER 4:

METHODS

Data Collection and Sample

In order to collect data for this project, an anonymous online survey was created, pilot tested, and then made available to a group of college students at a large, public Florida university during the first eight weeks of the fall 2010 semester.[13] More specifically, participants were recruited from three undergraduate sociology courses: Social Psychology, Introduction to Sociology, and Contemporary Social Problems.[14] Students in each course were told that their participation would allow the primary investigator to gain a better understanding of student friendship networks and their relationship with student attitudes, feelings, and behaviors. In return for taking part in this study, respondents were offered 5 points of extra credit by their respective instructors. As an alternative method of earning these points, individuals were permitted to complete a short, two-page writing assignment.

Survey materials were administered using *SelectSurvey* – an online survey interface that was made accessible to students via their respective *Blackboard* accounts. *Blackboard* was used to track student participation; this allowed for the allocation of

[13]A full, text-based version of this survey is presented in Appendix A.

[14]Individuals enrolled in more than one of these courses were only permitted to complete the questionnaire for a single class.

extra credit despite the anonymity of survey responses.[15] It should also be noted that an online consent form was utilized during this investigation. This form preceded survey materials, and it required students to acknowledge that they were over the age of eighteen (minors were not permitted to take part in this study due to their designation as a vulnerable population) and that they were willing participants.

A total of 747 students (less an unknown number of individuals enrolled in multiple courses) were given the opportunity to participate in this study. Data were collected from 706 respondents, but 13 minors and 22 individuals who failed to provide any information were excluded from all analyses. This resulted in a final sample size of n = 671 students. While clearly a convenience sample, this method of data collection was deemed appropriate since it taps into the population of interest (i.e., individuals currently enrolled as students at institutions of higher education) and no attempt at generalization will be made. In essence, this may be considered exploratory research – it is believed that results will provide meaningful insight and direction for future investigation. Furthermore, the use of convenience sampling is consistent with a long line of mental health research (Hyun et al. 2009; Bailey et al. 2007; Low and Feissner 1998).

Measures

Depressive Symptoms: For the purposes of this investigation, the Center for Epidemiologic Studies Depression Scale (CES-D) was used to assess depression. The CES-D is a "short self-report scale designed to measure depressive symptomatology in the general population" (Radloff 1977:385). More specifically, it consists of 20 questions that ask individuals to report the frequency with which they have experienced certain

[15]More detailed information about *Blackboard* (http://www.blackboard.com) and *SelectSurvey* (http://selectsurvey.net) can be retrieved from their official websites.

thoughts, feelings, and physical conditions during the past week; these conditions represent symptoms associated with depression (Radloff 1977). Each question has four response categories ranging from (0) "rarely or none of the time" to (3) "most or all of the time" (Radloff 1977:387).[16] Overall depression scores are calculated by adding up the values reported for each of the 20 CES-D items (Prescott et al. 1998; Radloff 1977). Possible scores range from 0 to 60, with larger scores representing higher levels of depressive symptomology.[17] Notably, the CES-D has been shown to have high test-retest reliability among samples of diverse ages and ethnic backgrounds (Prescott et al. 1998). It has been tested in both general and psychiatric settings, and its internal consistency and construct validity are well established (Prescott et al. 1998; Radloff 1977).

Network Structure: The "*name generator* has become the standard method to enumerate networks and delineate network characteristics" (Marin and Hampton 2007:163; italics in original). To elaborate, name generators are typically administered through surveys or interviews and consist of a prompt which is intended to obtain a list of alters from respondents (Marin and Hampton 2007). This method is especially useful when attempting to measure specific subsets of an individual's personal network (Marin and Hampton 2007). The current investigation utilized a name generator with the following prompt: "Consider who the closest and most important friends in your life are. Put the initials of these people, maximum 5, in the following blanks. Then select the proper alternative suited to these people in the questions that follow."

[16]Four CES-D items are scored in reverse: "I felt that I was just as good as other people," "I felt hopeful about the future," "I was happy," and "I enjoyed life." The response categories for these questions range from (0) "most or all of the time" to (3) "rarely or none of the time." See Appendix A for the exact wording of all survey questions.

[17]In practice, it is widely accepted that CES-D values ≥ 16 represent clinical levels depression **(**Cyranowski 2011; SCIRE Project 2010).

Respondents were permitted to list up to 5 alters, who were to be identified by their first and last initials. Initials were reported, rather than full names, in order to ensure the anonymity of those being described. The number of recorded friendships was limited in order to maintain the clarity and manageability of survey documents. This practice is common in network studies, and a cutoff of 5 alters is consistent with guidelines utilized by the General Social Survey (Wellman 2007; Burt 1984). Although this method generally underestimates the total number of alters who are present in a given network, there is a high correlation between the number of ties that are reported by participants and the size of their personal networks as determined by more extensive measurement techniques (Marin and Hampton 2007). In essence, name generators and their related follow-up questions may be thought of as providing an adequate, although limited, estimation of egocentric network characteristics.[18]

Participants were also asked to indicate whether or not any of their alters could be further categorized as family members or partners. Because friendship is subjective, name generators will not necessarily exclude these relations. However, it is generally believed that each of these categories (i.e., friends, family members, and partners) represents a qualitatively distinct set of relationships (Wellman and Wortley 1990). As a way of accounting for this issue, family members and partners were excluded when calculating network measures. Therefore, the total number of friends reported – less the

[18]While egocentric network size is most commonly assessed using self-reports, measurements relying upon multiple perspectives (i.e., those of egos and their respective alters) are believed to provide more accurate representations of structural network characteristics (Wellman 1988). Notably, because their data were collected from a series of closed networks (i.e., high schools), Falci and McNeely (2009) were able to count both those friendship nominations that were made and those that were received by focal adolescents when calculating personal network size.

number of alters categorized as family members and partners – was used as a measure of egocentric network size; potential values ranged from 0 to 5.[19]

For purposes of this investigation, respondents were also asked to describe the relationships between their closest and most important friends. More specifically, participants were given the opportunity to describe each of their friendship pairs using one of the following statements: they "are strangers," they "are as close to each other as I am to them," or "neither." When assessing network density, friendship pairs described as being "close" were counted as 1 friendship tie. Those that were labeled "neither" were assigned a value of 0.5, and friendship pairs that were described as being "strangers" were assigned a value of 0.[20] The total number of reported ties was then divided by the total number of possible ties in order to determine egocentric network density.[21] This method of assessing network density is consistent with guidelines suggested in conjunction with the General Social Survey (Burt 1987; Burt and Guilarte 1986).[22] Density scores ranged from 0 (i.e., none of an ego's friends were friends with each other) to 1 (i.e., all of an ego's friends were friends with each other). Notably, it is impossible to calculate the density of a personal network that does not have at least two alters.

[19]Although family members and partners were not directly excluded by Falci and McNeely (2009), their sample (as stated prior) was comprised of a series of closed networks (i.e., high schools). Therefore, in their own study, family members and partners were unlikely to have constituted a large number of the alters who were reported by participants.

[20]Alters categorized as partners or family members were excluded when calculating network density.

[21]The total number of possible ties was determined by the size of each participant's egocentric network [Egocentric Network Size/Possible Number of Ties between Alters: 0/0; 1/0; 2/1; 3/3; 4/6; 5/10].

[22]Again, because Falci and McNeely (2009) used data collected from a series of closed networks, they were able to calculate network density by examining the friendship nominations of each focal adolescent's respective alters. Therefore, in their own study, friendship ties between alters were either present or absent. In the current investigation, a dichotomous method for calculating network density was also considered (i.e., friendship pairs described as being "close" were assigned a value of 1, and all other responses were assigned a value of 0), but this method was ultimately rejected since it failed to significantly influence results.

Therefore, in order to maintain consistency with the research of Falci and McNeely (2009), all participants with an egocentric network size of 0 or 1 were assigned a density value of 0.

Social Support: The Multidimensional Scale of Perceived Social Support (MSPSS) is a "self-report scale designed to tap perceived social support from family, friends, and significant others" (Cecil et al. 1995:595). More specifically, this instrument includes three subscales, one for each relation (Cecil et al. 1995). This study utilized the four items which comprise the friendship subscale: "my friends really try to help me," "I can count on my friends when things go wrong," "I have friends with whom I can share my joys and sorrows," and "I can talk about my problems with my friends" (Dahlem, Zimet, and Walker 1991:757). Answer choices for each item range from 1 (very strongly disagree) to 7 (very strongly agree); in order to determine a total score, values for these items are added together and then divided by 4 (Cecil et al. 1995; Dahlem et al. 1991). Scores on the friendship subscale range from 1 to 7, with larger scores representing higher levels of perceived support (Kazarian and McCabe 1991).

Reciprocity of Support: Although social support is a multidimensional construct, research has demonstrated that individuals tend to assess the reciprocity of their relationships holistically (Van Horn, Schaufeli, and Taris 2001). Therefore, it has been suggested that researchers investigating equity "would be well advised to use self-rated [global] indices instead of very specific" measures (Van Horn et al. 2001:211). Serving as an example, the Hatfield Global Reciprocity Measure is based on a single item and has been used by scholars to assess the perceived reciprocity of individual relationships (Hatfield et al. 1985); a modified version of this instrument has been used to measure the

reciprocity of an entire network (Vaananen et al. 2008; Vaananen et al. 2005). For the purposes of this investigation, a modified version of the Hatfield Global Reciprocity Measure was constructed and then used to assess the perceived equity of each participant's egocentric friendship network.

Specifically, respondents were asked to consider the following question for each of their alters: "In your relationship with this person, which of you gives or receives more support and help (for example: emotional support, companionship, information, services, or financial help)? How would you describe your relationship in this respect?" Potential answers included the following: (-1) "I give support and help more than I receive," (0) "I receive support and help as much as I give," and (1) "I receive support and help more than I give." Reported values were added together and then divided by egocentric network size; reciprocity scores ranged from -1 to 1, with negative scores representing perceived underbenefiting and positive scores representing perceived overbenefiting. Because division by 0 is undefined, those participants who failed to report any friendships whatsoever (i.e., those with an egocentric network size of 0) were assigned a reciprocity score of 0.[23] Theoretically, this method was deemed appropriate since individuals without any friends lack the ability to overbenefit or underbenefit in comparison to their alters.

Demographic Controls and Contextual Questions: Standard demographic information was also collected from respondents. Specifically, each participant was asked to indicate his or her age, gender, race/ethnicity, and current relationship status. *Gender* and *relationship status* were treated as dichotomous variables: Individuals were

[23]Again, family members and partners were excluded when calculating network reciprocity scores.

classified as either (0) male or (1) female and as (0) single or (1) partnered.[24] *Age* was measured in years. Five categories were constructed for *race/ethnicity*: "White," "Black or African American," "Hispanic or Latino," "Asian," and "Other."[25] These categories were treated as polytomous dummy variables when conducting multivariate analyses.

The following information was also collected from participants: *high school GPA* (rounded to two decimal places), *current class standing* (freshman, sophomore, junior, senior, or other), and *distance to campus from current residence* (0 miles, 0.1 - 5 miles, 5.1 - 10 miles, 10.1 - 20 miles, 20.1 - 50 miles, or more than 50 miles).[26] In addition, respondents were asked to indicate how often they had *trouble paying for things* (never, rarely, sometimes, or always) and the highest level of education completed by either of their parents (*highest level of parental education* – grade school or less, some high school, high school diploma or GED, some college or associate's degree, bachelor's degree, or some post-graduate education/professional degree). Both of these questions can be thought of as indirect measures of socioeconomic status (Miech and Shanahan 2000; Goodman 1999), which has been found to have an inverse relationship with depression and negative affect (Lorant et al. 2003; Fryers, Melzer, and Jenkins 2003; Hao and Johnson 2000; Link, Lennon, and Dohrenwend 1993). Respective answer choices for "highest level of parental education," "trouble paying for things," "current class

[24]It should be noted that the "single" category consists of individuals who reported that they were "single," "casually dating," "divorced," "widowed," or "separated." The "partnered" category consists of respondents who indicated that they were "involved in a steady relationship," "engaged," or "married."

[25]The "Other" category consists of individuals who placed themselves into one of the following groups: "American Indian or Alaska Native," "Hawaiian or Other Pacific Islander," or "Other." These three groups were ultimately combined since they accounted for less than 6% of all respondents.

[26]The specific name of the university where this study was conducted has been omitted in order to maintain the anonymity of respondents.

standing," and "distance to campus from current residence" were treated as dummy variables when conducting multivariate analyses.[27]

Respondents were also asked to describe the gender (male or female) of their alters. Notably, this made it possible to calculate the total *number of female friends* present in each individual's egocentric network.[28] Because research suggests that females are more likely than males to provide social support to their friends (Haines et al. 2008), it may be important to control for this measure. Potential values ranged from 0 to 5 (female friends). Finally, for contextual reasons, several questions from the General Social Survey (see both Appendix A and TABLE A3) were included in the survey materials presented to respondents. For the purposes of this investigation, none of these items will be considered; however, it should be noted that they were taken from the official GSS website (http://www.norc.org/GSS+Website).

Analytic Strategy

SPSS Statistics 19 was used for all statistical procedures. No key variables were missing more than 3.7% (n = 25) of their respective values, so listwise deletion of cases was deemed appropriate when conducting multivariate analyses.[29] Specifically, OLS regression models were used to examine the relationships between self-reported egocentric network characteristics (i.e., egocentric network size and density) and depression. Potential interactions between network characteristics and gender were also

[27]When conducting multivariate analyses, "0 miles" was used as the reference group for *distance to campus from current residence*.

[28]Consistent with all other network variables, family members and partners were excluded when calculating the total "number of female friends" present in each participant's egocentric network.

[29]On average, key variables were missing approximately 1% (n = 7) of their respective values.

explored. Additional models examined social support and perceived reciprocity of support in relation to depression. All regression models included "age," "gender," "race/ethnicity," "current relationship status," "trouble paying for things," "highest level of parental education," and "current class standing" as control variables.[30] Several other measures were considered as potential controls, but they were ultimately excluded since they failed to explain any additional model variance (as determined by F-tests), they had no impact on observed results, and they were not significant predictors of depression. These variables included "high school GPA," "distance to campus from current residence," and "number of female friends."[31]

No problems with multicollinearity were detected. For all models, VIFs fell well below the acceptable threshold of 10 (Hair et al. 2006). Moreover, in order to avoid potential complications, only those interaction terms that explained additional variance (as determined by F-tests) were kept in subsequent regression models (Kromrey and Foster-Johnson 1998). Skewness (0.92) and kurtosis (0.47) values for the dependent variable (i.e., depression) were also examined and fell within acceptable ranges (Illinois State University 2008).[32] To clarify, a "kurtosis value of +/- 1 is considered very good for most psychometric uses, but +/- 2 is also usually acceptable" (Illinois State University 2008:1). Acceptable values for skewness "(+/- 1 to +/- 2) are the same as with kurtosis" (Illinois State University 2008:1).

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[30]OLS regression was used in order to maintain consistency with the methods of Falci and McNeely (2009).

[31]Other potential control variables included *recruitment course* (Introduction to Sociology, Social Problems, or Social Psychology), *total number of family members reported* (range = 0 to 5), *total number of partners reported* (range = 0 to 5), *number of same-sex friendships* (range = 0 to 5), and *having at least one friend* (0 = no friends; 1 = one or more friend/s).

[32]Since the distribution of depression scores was positively skewed, all regression models were rerun using the natural log of depression as the dependent variable. Results did not differ significantly.

CHAPTER 5:

RESULTS

Descriptive Statistics

Descriptive statistics are presented in TABLE 1. The sample had a mean age of 20.9, with a standard deviation of 5.0 years. Approximately 97% of all respondents were under the age of 35, and 92% were under the age of 26. These percentages are consistent with national figures: According to the U.S. Census Bureau (2008), over 92% of those enrolled at scholarly institutions in America are between the ages of 15 and 34. Also, the distribution of respondents by race/ethnicity – "White" (61.7%), "Black or African American" (12.0%), "Hispanic or Latino" (14.5%), "Asian" (6.3%), and "Other" (5.5%) – was similar to the overall distribution of students enrolled at the university where this study was conducted. Official enrollment figures for the fall 2010 semester were as follows: "White" (62.3%), "Black or African American" (11.4%), "Hispanic or Latino" (15.9%), "Asian" (5.9%), and "Other" (4.5%).[33]

A slightly higher percentage of respondents were single (52.9%), rather than partnered, and a sizeable majority of participants were female (71.5%).[34] Because of the relatively high proportion of females who took part in this investigation, it will be

[33]In order to maintain the anonymity of study participants, source material will not be reported for these figures. Additional data are available upon request.

[34]During the fall 2010 semester, females made up 57.5% of the student body at the university where this study was conducted.

necessary to interpret findings (especially those related to gender) with caution.[35] Of further significance, there was considerable diversity with regards to the current class standing of respondents. Approximately 33% were freshmen, 24% were sophomores, 19% were juniors, and 22% were seniors. An additional 2% were categorized as "Other." Notably, while a small minority of participants (2.6%) indicated that they always had "trouble paying for things," there was a high degree of variability among the remaining three categories for this variable (i.e., never, rarely, and sometimes). Similar findings were observed for "highest level of parental education," as only 3.1% of respondents indicated that both of their parents had failed to obtain at least a high school diploma or GED.

On average, students reported having 2.2 friends (excluding family members and partners). The largest friendship network that was observed consisted of 5 alters, and the smallest network consisted of 0 individuals. Over 80% of the sample had an egocentric network size of 1 or greater. The mean value for network density was 0.3; this indicates that on average, 30% of an ego's friends were friends with each other. Roughly 54.8% of respondents had density values that fell below the mean; 44.9% had values higher than the average score. The mean value for support received (MSPSS friendship subscale) was 5.3; over 78% of all participants had a score that was > 4 (i.e., the "neutral" midpoint of the friendship subscale).

Additionally, it should be noted that the average score for "perceived reciprocity of support" (Hatfield Global Reciprocity Measure) was -0.1, which is slightly below the neutral value (0) for this measure and represents perceived underbenefiting. Of further

[35]However, it should be made clear that the relatively high proportion of females who took part is this investigation was expected given the courses that students were recruited from.

significance, roughly 10.5% of respondents reported overbenefiting in comparison to their alters, 28% reported underbenefiting, and 61.5% claimed to be in equitable networks. Finally, the mean value for depression (CES-D) was 14.5; approximately 38% of all participants had a depression score ≥ 16, which is commonly used as a threshold for identifying clinical levels depression **(**Cyranowski 2011; SCIRE Project 2010).

Bivariate Correlations

TABLE 2 presents bivariate correlations between key variables (i.e., egocentric network size, network density, social support, reciprocity of support, and depression). Consistent with expectations – a weak, negative association was found between social support and depression. Stated more directly, those who reported receiving high levels of support also reported low levels of depressive symptomology. This result coincides with the theoretical notion that insufficient levels of support are associated with "feelings of melancholy and a lack of purpose" (Thorlindsson and Bjarnason 1998:96). However, no significant relationships were found between egocentric network size, network density, or reciprocity of support and depression. Notably, the lack of a linear association between egocentric network size and depressive symptomology contradicts previous research which has suggested that there is an inverse relationship between social integration and negative emotional arousal (Ueno 2005; Bearman and Moody 2004; Field et al. 2001; Fagan 1994; Burt 1987). This finding, as well as the possibility that there is a curvilinear relationship between egocentric network size and depression (Falci and McNeely 2009), will be further explored using multivariate techniques.

The existing literature also suggests that there is a negative association between network density and depressive symptomology (Ueno 2005; Lin and Peek 1999).

However, recent findings have indicated that this relationship may be stratified by gender, with highly cohesive networks benefiting females exclusively (Falci and McNeely 2009; Bearman and Moody 2004). Therefore, the lack of an observed, linear relationship between these two variables (i.e., network density and depression) is not necessarily surprising. Additionally, it may be necessary to control for egocentric network size when attempting to observe the relationship between network density and depression. To elaborate, for the purposes of this investigation, all respondents with an egocentric network size of 0 or 1 were assigned a density value of 0. This method resulted in a strong correlation between egocentric network size and density, and it limited the extent to which density values were free to vary among those with network sizes less than 2. Stated more directly, it was not possible for there to be an inverse association between network density and depression among those with small egocentric networks. Accordingly, holding network size constant may allow for more accurate results. The relationship between network density and depression will be further explored at the multivariate level.

The lack of an observed relationship between perceived reciprocity of support and depression was not unexpected. To elaborate, values for support reciprocity ranged from -1 (perceived underbenefiting) to 1 (perceived overbenefiting). Rather than predicting a linear relationship between this variable and depression, the existing literature suggests that individuals who underbenefit or overbenefit in comparison to the peers are both more likely to experience heightened levels of depressive symptomology (Taniguchi and Ura 2002; Bakker et al. 2000; Buunk and Schaufeli 1999). Therefore, one might expect there

to be a curvilinear relationship between reciprocity of support and depression. In the next section, this possibility will be explored using multivariate techniques.

Multivariate Models

OLS regression models are presented in TABLE 3. All models control for "age," "gender," "race/ethnicity," "current relationship status," "trouble paying for things," "highest level of parental education," and "current class standing." However, regression coefficients are not reported for "gender," "current relationship status," or "current class standing" since these variables were not found to be significant predictors of depression.

Models 1 and 2 were used to examine the relationship between egocentric network size and depressive symptomology.[36] More specifically, Model 1 tested for a linear relationship between these two variables, and Model 2 tested for a curvilinear relationship. Consistent with the approach of Falci and McNeely (2009), the squared term for network size was used to assess curvilinearity. Contrary to expectations, egocentric network size and curvilinear network size both failed to significantly predict depression at the multivariate level. As stated prior, there is a long line of mental health research which suggests that there is an inverse relationship between social integration and depression. However, for the purposes of this investigation, specific focus was placed on replicating the results of Falci and McNeely (2009), who found a curvilinear relationship between egocentric network size and depression among adolescents (i.e., depressive symptoms declined as network size increased until a specific threshold was reached and this trend reversed). The results of the current investigation failed to support the findings of these two scholars.

[36]Depression was the dependent variable in all OLS regression models.

Models 3, 4, 5, and 6 were used to explore the relationship between network density and depression. To elaborate, Model 3 tested for a linear relationship between network density and depressive symptomology; Model 4 explored the same relationship while controlling for egocentric network size. Because research has suggested that the effects of network cohesion may vary by gender (Falci and McNeely 2009; Bearman and Moody 2004), an interaction term for these two variables (i.e., network density and gender) was constructed. More specifically, Model 5 was used to assess the relationship between network density and depression among females. Again, Model 6 explored the same relationship while controlling for egocentric network size. Contrary to expectations, network density failed to significantly predict depression in all four regression models. So, while Falci and McNeely (2009) found a negative association between network density and depression among female adolescents, the current investigation failed to confirm the presence of such a relationship among United States college students. However, it should be noted that scholars investigating network density and mental health have commonly produced inconsistent results (Haines et al. 2008; Ueno 2005; Lin and Peek 1999). Because gender, egocentric network size, and network density were not found to be significant predictors of depression at the multivariate level, further interactions between these three variables were not assessed in subsequent regression models.

Models 7 and 8 were used to examine the relationship between social support and depressive symptomology. More specifically, Model 7 tested for a linear relationship between social support and depression. Model 8 assessed the same relationship while controlling for egocentric network size and density. Consistent with expectations (Falci

and McNeely 2009; Haines et al. 2008; Symister and Friend 2003), social support was found to be a significant predictor of depression in both regression models. Notably, controlling for egocentric network size and density had little effect on the regression coefficient for social support, which maintained a negative association with depressive symptomology. To elaborate, the unstandardized coefficient for social support was -0.35 in Model 7, and -0.37 in Model 8. Put into context, a 3-point increase on the MSPSS friendship subscale equated to a 1-point decrease on the CES-D. In comparison, antidepressants such as Prozac (fluoxetine), Paxil (paroxetine), Zoloft (sertraline), Effexor (venlafaxine), Serzone (nefazodone), and Celexa (citalopram) have been found to produce improvement scores of approximately 2 points on the 62-point Hamilton Depression Scale, which is roughly equivalent to the depression measure used in this study (Kirsch et al. 2008). Finally, it should be noted that the potential mediating effects of social support were not assessed since egocentric network size was not found to be significant predictor of depression in previous models.

Models 9, 10, 11, and 12 were used to examine the relationship between perceived reciprocity of support and depression – Model 9 tested for a linear relationship between these two variables, and Model 11 tested for a curvilinear relationship. Again, the squared term for reciprocity of support was used to assess curvilinearity. Models 10 and 12 explored the same relationships as Models 9 and 11, respectively, while controlling for egocentric network size, network density, and social support. Consistent with expectations, the squared term for reciprocity of support was found to be a significant predictor of depressive symptomology; the unstandardized coefficient for this variable was stable across models (Model 11 = 2.47 and Model 12 = 2.46). In general

terms, individuals who perceived overbenefiting or underbenefiting in comparison to their alters experienced higher levels of depression than those in more equitable networks. These findings are consistent with equity theory, which states that individuals generally "seek to maintain symmetry in their relationships with others, and that perceptions of being deprived as well as perceptions of being advantaged are associated with distress" (Vaananen et al. 2008:1908). It should also be noted that the unstandardized coefficient for social support (Model 8 = -0.37 and Model 12 = -0.37) was unaffected by the inclusion of curvilinear reciprocity in regression models. This suggests that social support and perceived reciprocity of support have unique and independent relationships with depression. Again, the potential mediating effects of support reciprocity were not assessed since egocentric network size and density were not found to be significant predictors of depression in previous models.[37]

It should also be noted that several demographic control variables were found to have significant relationships with depression. In all twelve OLS regression models, being "Black or African American" and increased age were associated with relatively low levels of depressive symptomology. Additionally, having trouble paying for things (sometimes or always) and being "Asian" were both associated with poor mental health. In Models 1-6 and 8-12, individuals reporting that the highest level of education obtained by either of their parents was "some college or associate's degree" experienced higher levels of depression than those answering "high school diploma or GED." Finally, in all models that did not include social support as a predictor variable, participants who

[37]However, the interaction term for curvilinear reciprocity and gender was constructed in order to determine whether or not equity was particularly important for females. This variable failed to significantly predict depression in additional, unreported regression models.

indicated that they "rarely" had trouble paying for things had significantly higher levels of depression than those who reported "never" having such difficulties. Although not the focus of this investigation, these results were generally consistent with the findings of previous mental health research (Lorant et al. 2003; Fryers et al. 2003; Miech and Shanahan 2000; Hao and Johnson 2000; Goodman 1999; Kelly et al. 1999; Okazaki 1997; Link et al. 1993).

TABLE 1: Descriptive Statistics for College Students at a Large Florida University

	Variable	*n* / Mean	% / SD	Min	Max
Independent Variables					
Ego Demographics & Control Variables	Recruitment Course				
	Introduction to Sociology	233	34.7		
	Social Problems	220	32.8		
	Social Psychology	218	32.5		
	Age (Years)	20.9	5.0	18	63
	Gender				
	Male	191	28.5		
	Female	479	71.5		
	Race/Ethnicity				
	White	413	61.7		
	Black or African American	80	12.0		
	Hispanic or Latino	97	14.5		
	Asian	42	6.3		
	Other	37	5.5		
	Current Relationship Status				
	Single	355	52.9		
	Partnered	316	47.1		
	High School GPA	3.8	0.7	0.0	6.4

TABLE 1: Descriptive Statistics for College Students at a Large Florida University (Continued)

	Variable	*n* / Mean	% / SD	Min	Max
Independent Variables					
Ego Demographics & Control Variables	Distance to Campus from Current Residence				
	0 Miles (Campus Housing)	133	19.8		
	0.1 - 5 Miles	198	29.5		
	5.1 - 10 Miles	59	8.8		
	10.1 - 20 Miles	104	15.5		
	20.1 - 50 Miles	92	13.7		
	More than 50 Miles	85	12.7		
	Current Class Standing				
	Freshman	221	33.0		
	Sophomore	162	24.2		
	Junior	127	19.0		
	Senior	145	21.6		
	Other	15	2.2		
	Highest Level of Parental Education				
	Grade School or Less	4	0.6		
	Some High School	17	2.5		
	High School or GED	136	20.3		
	Some College or Associate's Degree	230	34.5		
	Bachelor's Degree	158	23.6		
	Some Post-Graduate Education or Professional Degree	124	18.5		

TABLE 1: Descriptive Statistics for College Students at a Large Florida University (Continued)

	Variable	*n* / Mean	% / SD	Min	Max
Independent Variables					
Ego Demographics & Control Variables	Trouble Paying for Things (Frequency)				
	Never	169	25.4		
	Rarely	261	39.2		
	Sometimes	218	32.8		
	Always	17	2.6		
Network Structure	Egocentric Network Size (Excluding Family Members and Partners)	2.2	1.6	0	5
	Network Density	0.3	0.3	0.0	1.0
Alter Demographics	Number of Female Friends	1.4	1.4	0	5
Social Support	Support Received (MSPSS Friendship Subscale)	5.3	1.9	1.0	7.0
	Perceived Reciprocity of Support (Hatfield Global Reciprocity Measure)	-0.1	0.4	-1.0	1.0
Dependent Variable					
	Depression (CES-D)	14.5	9.8	0	54

Notes: (N = 671)

TABLE 2: Bivariate Correlations (Spearman's rho / Pearson's *r*)

Variables	Egocentric Network Size	Network Density	Social Support	Reciprocity of Support	Depression
Egocentric Network Size	----------	0.71*** / 0.61***	0.07ǂ / 0.06	-0.14*** / -0.07ǂ	0.01 / 0.00
Network Density	----------	----------	0.10** / 0.08ǂ	-0.11** / -0.06	0.01 / 0.00
Social Support	----------	----------	----------	0.10** / 0.09*	-0.12** / -0.05
Reciprocity of Support	----------	----------	----------	----------	-0.02 / 0.00
Depression	----------	----------	----------	----------	----------

Notes: ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001 (N = 671)

TABLE 3: OLS Regression Models with Depression as the Dependent Variable

	MODEL 1 (*N* = 641)			**MODEL 2 (*N* = 641)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure						
Egocentric Network Size	-0.11	0.23	-0.02	0.69	0.81	0.12
Network Size * Network Size				-0.17	0.17	-0.14
Network Density						
Network Density * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
Ego Demographics & Control Variables						
Age	-0.21*	0.09	-0.11	-0.22*	0.09	-0.11
Race/Ethnicity						
White (Reference Group)						
Hispanic or Latino	0.25	1.11	0.01	0.29	1.11	0.01
Black or African American	-2.41*	1.18	-0.08	-2.29ǂ	1.19	-0.08
Asian	3.82*	1.64	0.09	3.98*	1.65	0.10
Other	0.41	1.69	0.01	0.41	1.69	0.01
Trouble Paying for Things						
Never (Reference Group)						
Rarely	1.61ǂ	0.95	0.08	1.68ǂ	0.95	0.08
Sometimes	4.55***	1.00	0.22	4.61***	1.00	0.22
Always	11.03***	2.49	0.18	11.08***	2.49	0.18
Highest Level of Parental Education						
Grade School or Less	-7.69	5.55	-0.05	-7.46	5.56	-0.05
Some High School	1.80	2.52	0.03	2.12	2.54	0.03
High School Diploma/GED (Reference Group)						
Some College or Associate's Degree	2.11*	1.06	0.10	2.16*	1.06	0.11
Bachelor's Degree	1.00	1.14	0.04	1.09	1.14	0.05
Some Post-Graduate Education/ Professional Degree	0.15	1.21	0.01	0.30	1.22	0.01
	(R^2 = 0.10; F = 3.51; p < 0.001)			(R^2 = 0.10; F = 3.39; p < 0.001)		

Notes: All models control for Gender, Current Relationship Status, and Current Class Standing.
ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

TABLE 3: OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 3 (*N* = 640)			MODEL 4 (*N* = 638)		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure						
Egocentric Network Size				-0.24	0.29	-0.04
Network Size * Network Size						
Network Density	0.15	1.10	0.01	0.81	1.39	0.03
Network Density * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
Ego Demographics & Control Variables						
Age	-0.22*	0.09	-0.11	-0.22*	0.09	-0.12
Race/Ethnicity						
White (Reference Group)						
Hispanic or Latino	0.36	1.10	0.01	0.25	1.11	0.01
Black or African American	-2.37*	1.19	-0.08	-2.46*	1.19	-0.08
Asian	3.87*	1.64	0.09	3.87*	1.64	0.09
Other	0.54	1.69	0.01	0.47	1.69	0.01
Trouble Paying for Things						
Never (Reference Group)						
Rarely	1.66ǂ	0.95	0.08	1.63ǂ	0.95	0.08
Sometimes	4.54***	1.00	0.22	4.52***	1.00	0.22
Always	10.65***	2.55	0.17	10.58***	2.56	0.17
Highest Level of Parental Education						
Grade School or Less	-7.36	5.54	-0.05	-7.57	5.56	-0.05
Some High School	2.05	2.53	0.03	2.05	2.53	0.03
High School Diploma/GED (Reference Group)						
Some College or Associate's Degree	2.21*	1.06	0.11	2.27*	1.07	0.11
Bachelor's Degree	1.15	1.14	0.05	1.13	1.14	0.05
Some Post-Graduate Education/ Professional Degree	0.30	1.21	0.01	0.29	1.22	0.01
	(R^2 = 0.10; F = 3.41; p < 0.001)			(R^2 = 0.10; F = 3.27; p < 0.001)		

Notes: All models control for Gender, Current Relationship Status, and Current Class Standing.
ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

TABLE 3: OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 5 (*N* = 640)			MODEL 6 (*N* = 638)		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure						
Egocentric Network Size				-0.22	0.30	-0.04
Network Size * Network Size						
Network Density	-1.14	1.89	-0.04	-0.42	2.13	-0.02
Network Density * Female	1.95	2.31	0.06	1.79	2.32	0.06
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
Ego Demographics & Control Variables						
Age	-0.22*	0.09	-0.12	-0.22*	0.09	-0.12
Race/Ethnicity						
White (Reference Group)						
Hispanic or Latino	0.33	1.10	0.01	0.23	1.11	0.01
Black or African American	-2.42*	1.19	-0.08	-2.50*	1.19	-0.08
Asian	3.79*	1.64	0.09	3.80*	1.64	0.09
Other	0.53	1.69	0.01	0.46	1.69	0.01
Trouble Paying for Things						
Never (Reference Group)						
Rarely	1.61ǂ	0.95	0.08	1.58ǂ	0.95	0.08
Sometimes	4.54***	1.00	0.22	4.51***	1.01	0.22
Always	10.66***	2.55	0.17	10.60***	2.56	0.17
Highest Level of Parental Education						
Grade School or Less	-7.55	5.55	-0.05	-7.73	5.56	-0.05
Some High School	2.15	2.53	0.04	2.14	2.54	0.03
High School Diploma/GED (Reference Group)						
Some College or Associate's Degree	2.19*	1.06	0.11	2.25*	1.07	0.11
Bachelor's Degree	1.15	1.14	0.05	1.14	1.15	0.05
Some Post-Graduate Education/ Professional Degree	0.32	1.21	0.01	0.32	1.22	0.01
	(R^2 = 0.10; F = 3.28; p < 0.001)			(R^2 = 0.10; F = 3.14; p < 0.001)		

Notes: All models control for Gender, Current Relationship Status, and Current Class Standing.
ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

TABLE 3: OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 7 (*N* = 645)			MODEL 8 (*N* = 632)		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure						
Egocentric Network Size				-0.23	0.29	-0.04
Network Size * Network Size						
Network Density				1.09	1.39	0.04
Network Density * Female						
Social Support						
Support Received	-0.35ǂ	0.20	-0.07	-0.37ǂ	0.20	-0.07
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
Ego Demographics & Control Variables						
Age	-0.22*	0.09	-0.12	-0.23*	0.09	-0.12
Race/Ethnicity						
White (Reference Group)						
Hispanic or Latino	-0.23	1.10	-0.01	-0.03	1.12	0.00
Black or African American	-2.52*	1.19	-0.08	-2.59*	1.20	-0.09
Asian	3.87*	1.64	0.09	4.00*	1.64	0.10
Other	0.01	1.69	0.00	0.02	1.71	0.00
Trouble Paying for Things						
Never (Reference Group)						
Rarely	1.40	0.95	0.07	1.41	0.96	0.07
Sometimes	4.62***	1.00	0.22	4.39***	1.00	0.21
Always	11.35***	2.42	0.19	10.46***	2.55	0.16
Highest Level of Parental Education						
Grade School or Less	-8.13	5.55	-0.06	-8.00	5.55	-0.06
Some High School	0.04	2.53	0.00	1.16	2.60	0.02
High School Diploma/GED (Reference Group)						
Some College or Associate's Degree	1.71	1.06	0.08	2.08ǂ	1.07	0.10
Bachelor's Degree	0.76	1.13	0.03	1.11	1.15	0.05
Some Post-Graduate Education/ Professional Degree	-0.14	1.21	-0.01	0.22	1.22	0.01
	(R^2 = 0.11; F = 3.69; p < 0.001)			(R^2 = 0.10; F = 3.21; p < 0.001)		

Notes: All models control for Gender, Current Relationship Status, and Current Class Standing.
ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

TABLE 3: OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 9 (*N* = 644)			MODEL 10 (*N* = 631)		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure						
Egocentric Network Size				-0.23	0.29	-0.04
Network Size * Network Size						
Network Density				1.09	1.40	0.04
Network Density * Female						
Social Support						
Support Received				-0.37ǂ	0.20	-0.07
Perceived Reciprocity of Support	-0.23	0.97	-0.01	0.08	0.98	0.00
Reciprocity of Support * Reciprocity of Support						
Ego Demographics & Control Variables						
Age	-0.21*	0.09	-0.11	-0.23*	0.09	-0.12
Race/Ethnicity						
White (Reference Group)						
Hispanic or Latino	0.22	1.10	0.01	-0.03	1.12	0.00
Black or African American	-2.33*	1.18	-0.08	-2.59*	1.21	-0.09
Asian	3.88*	1.64	0.09	4.00*	1.64	0.10
Other	0.57	1.69	0.01	0.06	1.74	0.00
Trouble Paying for Things						
Never (Reference Group)						
Rarely	1.64ǂ	0.95	0.08	1.41	0.96	0.07
Sometimes	4.64***	1.00	0.22	4.39***	1.01	0.21
Always	11.14***	2.49	0.18	10.44***	2.56	0.16
Highest Level of Parental Education						
Grade School or Less	-7.37	5.55	-0.05	-8.04	5.58	-0.06
Some High School	1.26	2.45	0.02	1.14	2.61	0.02
High School Diploma/GED (Reference Group)						
Some College or Associate's Degree	2.10*	1.05	0.10	2.08ǂ	1.07	0.10
Bachelor's Degree	1.00	1.14	0.04	1.12	1.15	0.05
Some Post-Graduate Education/ Professional Degree	0.18	1.21	0.01	0.21	1.22	0.01
	(R^2 = 0.10; F = 3.52; p < 0.001)			(R^2 = 0.10; F = 3.06; p < 0.001)		

Notes: All models control for Gender, Current Relationship Status, and Current Class Standing.

ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

TABLE 3: OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 11 (*N* = 644)			**MODEL 12 (*N* = 631)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure						
Egocentric Network Size				-0.22	0.29	-0.04
Network Size * Network Size						
Network Density				1.27	1.40	0.05
Network Density * Female						
Social Support						
Support Received				-0.37ǂ	0.20	-0.07
Perceived Reciprocity of Support	0.49	1.03	0.02	0.81	1.04	0.03
Reciprocity of Support * Reciprocity of Support	2.47ǂ	1.26	0.08	2.46ǂ	1.27	0.08
Ego Demographics & Control Variables						
Age	-0.21*	0.09	-0.11	-0.24**	0.09	-0.12
Race/Ethnicity						
White (Reference Group)						
Hispanic or Latino	0.26	1.10	0.01	0.01	1.12	0.00
Black or African American	-2.27ǂ	1.18	-0.08	-2.52*	1.20	-0.09
Asian	3.96*	1.63	0.10	4.08*	1.64	0.10
Other	0.80	1.69	0.02	0.31	1.75	0.01
Trouble Paying for Things						
Never (Reference Group)						
Rarely	1.68ǂ	0.95	0.08	1.45	0.96	0.07
Sometimes	4.61***	1.00	0.22	4.38***	1.01	0.21
Always	11.22***	2.48	0.18	10.54***	2.56	0.17
Highest Level of Parental Education						
Grade School or Less	-8.09	5.55	-0.06	-8.67	5.57	-0.06
Some High School	1.29	2.45	0.02	1.18	2.61	0.02
High School Diploma/GED (Reference Group)						
Some College or Associate's Degree	2.11*	1.05	0.10	2.10ǂ	1.07	0.10
Bachelor's Degree	1.00	1.13	0.04	1.11	1.15	0.05
Some Post-Graduate Education/ Professional Degree	0.32	1.21	0.01	0.36	1.22	0.02
	(R^2 = 0.11; F = 3.55; p < 0.001)			(R^2 = 0.11; F = 3.10; p < 0.001)		

Notes: All models control for Gender, Current Relationship Status, and Current Class Standing.
ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

CHAPTER 6:

DISCUSSION

Using social network analysis as a theoretical framework, the current study examined the associations between self-reported egocentric network characteristics and depression among a sample of United States college students. For the purposes of this investigation, specific focus was placed on egocentric network size and density, and on the perceived reciprocity of social support exchanges that occur within personal friendship networks. To reiterate, it is important to understand factors related to depression among this population due to the severity of its potential outcomes. Specifically, depression has been linked to decreased academic productivity, interpersonal problems at school, and truancy among college students (Heiligenstein and Guenther 1996). Moreover, depression is associated with suicide, difficulty concentrating, reduced energy, changes in weight, and changes in the quality or quantity of sleep among those in the general population (Lackey 2008; Hockenbury and Hockenbury 2003; Spirito et al. 2003; American Psychiatric Association 2000; Sadowski and Kelley 1993).

Findings – Network Structure

As stated prior, a recent study conducted by Christina Falci and Clea McNeely (2009) provided much of the basis for the current investigation. To elaborate, while

numerous scholars (Ueno 2005; Bearman and Moody 2004; Cannuscio et al. 2004; Burt 1987) have reported finding inverse relationships between social integration and depressive symptomology, Falci and McNeely (2009) tested for and found a curvilinear relationship between egocentric network size and depression among a nationally representative sample of American adolescents. Stated more clearly, depressive symptoms were found to decline as network size increased until a specific threshold was reached and this trend reversed (Falci and McNeely 2009). Prior to their investigation, relatively few (if any) network studies had entertained the theoretical notion that over-integration may actually result in greater mental health problems (Pescosolido and Levy 2002) and a sense of obligation that negatively affects the individual (Durkheim 1897/2006).

In accordance with the research of Falci and McNeely (2009), the current study tested for both linear and curvilinear relationships between egocentric network size and depression. It was predicted that a curvilinear relationship would be observed between these two variables, with large and small personal friendship networks being associated with higher levels of depression than average-sized networks. Contrary to expectations, egocentric network size and curvilinear network size both failed to significantly predict depression at the multivariate level. More directly, the results of this study not only failed to support the findings of Falci and McNeely (2009), but they also failed to support a long line of mental health research which suggests that there is an inverse relationship between social integration and depression.

There are several potential explanations for the lack of an observed relationship between egocentric network size and depressive symptomology. First, it should be noted

that in their own study, Falci and McNeely (2009) found that as egocentric network size increased, depressive symptoms declined until a network size of 12 friends was reached; on average, adolescents with 24 friends reported experiencing roughly equivalent levels of depression as those with no friends. Therefore, it is certainly possible that the failure to observe a curvilinear relationship between egocentric network size and depression was related to the fact that individuals participating in the current study were unable to reach a threshold of 12 reported friends.

Clearly, the limited range of observed values for egocentric network size should be considered a methodological issue. Because their data were collected from a series of closed networks (i.e., high schools), Falci and McNeely (2009) were able to count both those friendship nominations that were made and those that were received by focal adolescents when calculating personal network size.[38] This resulted in a range of 0-32 friends (Falci and McNeely 2009), as opposed to the range of 0-5 that was observed in the current investigation.[39] Although research has demonstrated that there is generally a high correlation between the number of ties that are reported by participants and the size of their personal networks as determined by more extensive measurement techniques, the proposition that name generators and their related follow-up questions may provide somewhat limited estimates of egocentric network characteristics (Marin and Hampton 2007) should not be entirely overlooked.

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[38]A *closed network* may be described as a closed set of actors. To clarify, the boundary of a set of actors "allows a researcher to describe and identify the population under study" (Wasserman and Faust 1994:31). Actors located outside of a closed network are generally not considered when attempting to describe the characteristics of a specific population (Wasserman and Faust 1994).

[39]While egocentric network size is most commonly assessed using self-reports, measurements relying upon multiple perspectives (i.e., those of egos and their respective alters) are believed to provide more accurate representations of structural network characteristics (Wellman 1988).

Still, it should be made clear that in their own research, Falci and McNeely (2009) found that having even 1 friend was protective for adolescents and that "each additional friend [was] incrementally better, up to roughly 11 friends" (2048). Moreover, negative relationships between egocentric network size and depression have been found in at least two other network studies that restricted the number of alters reported to 5 (Burt 1987) and to 10 (Ueno 2005), respectively. Taking this into account, the current investigation's failure to reveal a linear relationship between egocentric network size and depression may simply be an anomaly. Regardless, it is important to treat this result with caution, as data were collected from a single institution of higher education using non-random sampling. Therefore, findings are not necessarily representative of the larger student body.

It is also important to consider the possibility that college students represent a unique population, with distinct characteristics that have not been adequately explored by network researchers focusing on either adolescents *or* adults.[40] To further elaborate, Jeffrey Arnett (2004) has argued that a new and unprecedented period of the life course has taken shape over the past four decades. This period, which Arnett (2004) labels *emerging adulthood*, stretches from the late teens through the mid-to-late twenties and is characterized by instability, exploration, and opportunity. Arnett (2004) claims that relative to previous generations, most of today's young people fail to achieve their educational goals, get married, become parents, or make long-term career choices until later on in the lifespan. So, while emerging adulthood is marked by freedoms

[40]Most studies investigating the relationship between egocentric network size and mental health have focused on either high school students (Falci and McNeely 2009; Ueno 2005; Bearman and Moody 2004) or general (i.e., individuals over the age of 18) adult populations (Haines et al 2008; Cannuscio et al. 2004; Burt 1987).

uncharacteristic of adolescence (e.g., increased independence), it is also devoid of the responsibilities and the relative stability historically associated with adulthood. However, according to Arnett (2000), "much more work remains to be done on virtually every aspect of development during this period," including determining the extent to which emerging adults "rely on friends for support and companionship, given that this is a period when most young people have left their families of origin but have not yet entered marriage" (476).

As stated prior, over 92% of the individuals who took part in the current investigation were between the ages of 18 and 26, thereby meeting Jeffrey Arnett's (2004) age guidelines for emerging adulthood. Notably, in both bivariate and multivariate analyses, social support was found to have a significant, inverse relationship with depressive symptomology. However, egocentric network size was only found to have an extremely weak (0.07) and marginally significant ($p < 0.10$) bivariate relationship with social support. Clearly, these findings fail to uphold the theoretical notion that those with small egocentric networks are prone to suffering from inadequate levels of support (Haines, Beggs, and Hurlbert 2002; Thorlindsson and Bjarnason 1998; Walker, Wasserman, and Wellman 1993). If the results of the current investigation are not to be treated as an anomaly, it may be prudent for scholars to further explore the relationships between egocentric network size, social support, and depression among college students in particular, and among emerging adults more generally. Although purely speculation, it is possible that due to their involvement in social activities both at work and at school, college students require relatively little companionship from their

close friends.[41] If this is indeed the case, even small egocentric networks may be able to provide sufficient amounts of social support. Again, however, this is a question for future research.

In addition to examining the relationship between egocentric network size and depression, Falci and McNeely (2009) explored potential interactions between network size, density, and gender. This approach was quite noteworthy, as most researchers have focused on delineating independent associations between network characteristics and depression, rather than searching for interaction effects. As discussed in further detail above, Falci and McNeely (2009) found a negative association between network density and depression among female adolescents, but no significant relationship was found among males of the same age. Of additional significance, the authors found that females in large, cohesive networks reported lower levels of depressive symptoms than those in large, fragmented networks; the opposite pattern was found among males (Falci and McNeely 2009).

Again, in accordance with the research of Falci and McNeely (2009), the current study set out to examine potential interactions between network size, density, and gender. Specifically, it was hypothesized that a negative association would be found between network density and depression among female college students, but no significant relationship was expected among males. Additionally, it was predicted that females in large, cohesive networks would report lower levels of depressive symptoms than those in large, fragmented networks; males were expected to demonstrate the opposite tendency. Contrary to expectations, network density failed to significantly predict depressive

[41] Approximately 60% of all college students in America hold jobs while in school, and one fourth of all students work full time (Fitzpatrick and Turner 2006; Arnett 2004).

symptomology at the multivariate level – both among females and among the sample as a whole. Because gender, egocentric network size, and network density were not found to be significant predictors of depression at the multivariate level, further interactions between these three variables were not assessed.

As was the case for egocentric network size, there are several potential explanations for the lack of an observed relationship between network density and depression. For instance, it should be noted that in their own research, Falci and McNeely (2009) found that the association between network density and depressive symptomology was extremely weak among female adolescents with small egocentric networks; the magnitude of this relationship became incrementally larger as network size increased. Accordingly, it is possible that the current investigation's failure to reveal an inverse relationship between network density and depressive symptomology among female college students was related to the fact that there was an artificial limit placed on the number of friends that could be reported by participants.

Also, as stated prior, researchers investigating the relationship between network density and mental health have commonly produced inconsistent results (Lin and Peek 1999). Serving as an example, Claude Fischer (1982) examined the social ties of approximately 1,050 individuals residing in 50 different urban localities and found that network density was positively associated with psychological well-being – but only among those of low socioeconomic status. Additionally, when Charles Kadushin (1983) studied the interpersonal environments of Vietnam War veterans, an inverse relationship was found between network density and stress, but only among those living in rural areas. Research focusing directly on the mental health of adolescents has been just as erratic.

To elaborate, while Ueno (2005) has reported finding a negative association between network density and depressive symptomology among adolescents, research conducted by Bearman and Moody (2004) suggests that there is only an inverse relationship between network cohesion and suicidal ideation among adolescent females. Complicating matters even further, in a recent study, Haines et al. (2008) failed to find a significant relationship between network density and depressive symptomology among adults of either sex. Clearly, the relationship between network density and mental health requires further investigation, as research in this area has been sporadic, lacked continuity, and provided inconsistent results. Moreover, since Falci and McNeely (2009) were the first (and only) scholars to report finding a three-way interaction between network size, density, and gender – additional research will be necessary in order to confirm (or refute) their results.

Findings – The Importance of Reciprocity

In addition to examining the relationship between network structure and depression, the current investigation explored the extent to which social support and perceptions of reciprocity were associated with well-being. As stated prior, inverse relationships between social support and depressive symptomology have commonly been reported by scholars investigating mental health (Falci and McNeely 2009; Haines et al. 2008; Symister and Friend 2003; Laible, Carlo, and Raffaelli 2000). Moreover, in their own research, Falci and McNeely (2009) found that the amount of support received by adolescents mediated the relationship that was observed between small egocentric network size and depression. However, it should be made clear that this support was not

found to mediate the relationship between large egocentric network size and depressive symptomology, or between network density and depression (Falci and McNeely 2009).

Accordingly, the present study sought to expand upon the existing literature by exploring the extent to which perceptions of reciprocity mediate the relationships between network characteristics and depression. To reiterate, although the mediating effects of support reciprocity have not been investigated directly by network researchers, there is wealth of empirical evidence which suggests that this line of inquiry is important and should not be overlooked. More specifically, in accordance with the principles of equity theory, numerous studies have demonstrated that perceptions of overbenefiting or underbenefiting in comparison to one's peers are both associated with relatively high levels of depressive symptomology (Vaananen et al. 2008; Taniguchi and Ura 2002; Bakker et al. 2000; Buunk and Schaufeli 1999). In essence, equity theorists have proposed that giving more than one receives may lead to feelings of resentment, while receiving more than one gives may lead to feelings of guilt or shame (Vaananen et al. 2008).

Again, since it has been suggested that the effort which must be exerted to maintain a large network may come to outweigh any benefits or support received from it (Haines et al. 2008), there is reason to suspect that perceptions of equity may mediate the relationship between large egocentric network size and depression. Of further significance, highly cohesive networks are thought to minimize the effort required to maintain individual relationships and to result in the sharing of social burdens (Forrester and Tashchian 2004). Therefore, perceptions of reciprocity may also mediate the relationship between network density and depressive symptomology, especially among

females, who are more likely than males to seek out and to give social support (Rosenfield, Lennon, and White 2005; Umberson et al. 1996; Frydenberg and Lewis 1993).

Ultimately, it was predicted that there would be a negative association between social support and depression among those participating in the current investigation; social support was also expected to mediate the relationship between small egocentric network size and depressive symptomology. Moreover, in accordance with the principles of equity theory, it was predicted that there would be a curvilinear relationship between reciprocity of support and depression: Individuals who perceived underbenefiting or overbenefiting in comparison to their friends were expected to report experiencing higher levels of depression than those in more equitable networks. It was further hypothesized that perceptions of equity would mediate the relationship between large egocentric network size and depressive symptomology, and between network density (among females) and depression.

Notably, in the current study, it was not possible to assess the potential mediating effects of either social support or support reciprocity since egocentric network size and density were not found to be significant predictors of depression. However, consistent with expectations, an inverse relationship was found between the amount of support that was received by respondents and depressive symptomology. Also, students who perceived overbenefiting or underbenefiting in comparison to their alters reported experiencing higher levels of depression than those in more equitable networks. Clearly, the most important thing that should be taken from these findings is that support reciprocity has yet to be ruled out as a potential mediator in the relationship between

network structure and depression. Stated more directly, perceptions of equity may still be able to explain the relationships that Falci and McNeely (2009) observed between large egocentric network size and depression – and between network density and depressive symptomology. However, as stated prior, additional research will be necessary in order to confirm the findings of these two scholars and to further assess the mediating effects of support reciprocity.

Results When Including Family Members and Partners as Alters

For the sake of comprehensiveness, network measures (e.g., egocentric network size, network density, and number of female friends) were recalculated to include family members and partners as alters; all analyses were then rerun.[42] As models 13 and 14 illustrate, egocentric network size and curvilinear network size still failed to significantly predict depressive symptomology at the multivariate level. In models 17 and 18, however, a significant inverse relationship was found between network density and depression among female respondents. The magnitude of the association between these two variables was relatively large, and the unstandardized coefficient (Model 17 = -6.95) for network density (among females) remained stable when controlling for egocentric network size (Model 18 = -7.03). Clearly, this result is more in line with findings reported by Falci and McNeely (2009).

Standing in contrast to their findings, however, Model 23 indicates that females with large, cohesive networks were especially likely to report experiencing high levels (unstandardized coefficient = 4.90) of depressive symptomology. As stated prior, in their own research, Falci and McNeely (2009) found that there was a reduced risk for

[42]Supplementary descriptive and inferential statistics are presented in Appendix B and Appendix C.

depression among female adolescents with large, dense networks. Finally, it should be noted that even when including family members and partners as alters, social support (see models 24 and 25) was found to have a significant, inverse relationship with depressive symptomology at the multivariate level. However, reciprocity of support (see models 26-29) was no longer found to be significant predictor of depression.

The precise meaning of these results is open to interpretation. On average, respondents nominated 1.8 family members and 0.6 partners as friends.[43] However, it is widely acknowledged that interpersonal relationships with relatives and significant others encompass qualitatively distinct forms of interaction. To elaborate, while research focusing on adults has indicated that that friendship ties are more likely to transfer emotional aid and companionship than any other relation, family members are most commonly relied upon for financial aid and large services such as child care (Wellman and Wortley 1990). In contrast, partners have been found to provide more comprehensive forms of social support (Wellman and Wortley 1990). For the purposes of this discussion, such distinctions may be especially important, as research has demonstrated that many college students rely upon their family members for assistance with food and shelter, college expenses, bills, and other major expenditures (Osgood et al. 2005). Therefore, it is not necessarily surprising, for instance, that support reciprocity loses its ability to predict depressive symptomology when including family members and partners as alters, as it would seem that college students are unlikely to be (or to expect to be) in equitable financial relationships with their families.

[43]Again, participants reported an average of 2.2 friends who were not further classified as being family members or partners.

Moreover, although these findings (i.e., those including family members and partners as alters) are certainly interesting, it is somewhat beyond the scope of the current investigation to speculate as to their significance and/or implications. More clearly, the present study was focused on delineating the importance of friendship ties, and there appears to be sufficient theoretical justification for excluding family members and partners from consideration. Although such relations were not directly excluded by Falci and McNeely (2009), their sample was comprised of a series of closed networks (i.e., high schools). Therefore, in their own study, family members and partners were unlikely to have constituted a large number of the alters who were reported by participants. In contrast, these two relations accounted for approximately 52% of all friendship nominations in the current investigation. Specifically, 40% of those nominated were family members, and 12% were partners. This finding is interesting in and of itself. While there is some research which suggests that individuals between the ages of 18 and 30 may come to view their parents as equals (Arnett 2004), studies investigating the extent to which both parents and other family members come to be viewed as friends are notably absent from the literature. Ultimately, this may prove to be a fruitful area for future research.

Conclusion

The current investigation adds to the limited number of studies which have examined network structure in relation to mental health. This project was somewhat unique, as direct focus was placed on the well-being of United States college students. Although no significant relationships were found between egocentric network characteristics and depressive symptomology, social support and perceptions of

reciprocity were both found to significantly predict depression at the multivariate level. However, because egocentric network size and density were not found to have significant relationships with depression, it was not possible to assess the potential mediating effects of support reciprocity. Therefore, at least to some extent, perceptions of equity may still explain the relationships that Falci and McNeely (2009) observed between large egocentric network size and depression – and between network density and depressive symptomology. As stated prior, additional research will be necessary in order to confirm the findings of these two scholars and to further assess the mediating effects of perceived equity.

To reiterate, it is possible that the failure to observe a significant relationship between network structure and depression was related to the fact that an artificial limit was placed on the number of alters who could be reported by individuals participating in the current investigation. In order to address this concern, future studies should consider expanding the number of alters who can be reported by participants; this could be accomplished by assessing friendship using multiple name generators. It is also possible that college students represent a unique population, with distinct characteristics that have not been adequately explored by network researchers focusing on either adolescents or adults. Therefore, it may be prudent for scholars to further explore the relationships between egocentric network characteristics and depression among college students in particular, as relatively few network studies have focused directly on this group. Again, however, it is important to interpret the results of this investigation with caution, as data were collected from a single institution of higher education using non-random sampling. As such, findings are not necessarily representative of the larger student body.

In addition to the limitations that have already been discussed, it should be made clear that because the data used in this investigation are cross-sectional, it is not possible to determine the causality of observed relationships. Stated more clearly, the possibility that depressed college students are highly susceptible to involving themselves in non-reciprocal and non-supportive friendships cannot be ruled out entirely. In order to address this concern, it is suggested that (if at all possible) future studies utilize data collected at multiple points in time. As a final note, the large number of family members and partners who were nominated as friends in the present study should not be overlooked. The precise meaning of friendship among college students has yet to be studied empirically and remains unclear. Ultimately, while the contributions of the current investigation proved to be somewhat limited in scope, it is believed that this project has provided considerable insight and direction for future research.

LIST OF REFERENCES

Add Health. 2010. "About Add Health." UNC Carolina Population Center; Retrieved February 17, 2011 (http://www.cpc.unc.edu/projects/addhealth/about).

American College Health Association. 2009. "American College Health Association-National College Health Assessment Spring 2008 Reference Group Data Report (Abridged)." *Journal of American College Health* 57(5):477-488.

American Psychiatric Association. 2000. *Diagnostic and Statistical Manual of Mental Disorders*. Revised – 4th Edition. Washington, DC: American Psychiatric Association.

Arnett, Jeffrey J. 2004. *Emerging Adulthood: The Winding Road from the Late Teens through the Twenties*. New York: Oxford University Press.

------. 2000. "Emerging Adulthood: A Theory of Development from the Late Teens through the Twenties." *American Psychologist* 55(5):469-480.

Bailey, Mary K., Jaclene A. Zauszniewski, Marjorie M. Heinzer, and Marion Hemstrom-Kraines. 2007. "Patterns of Depressive Symptoms in Children." *Journal of Child and Adolescent Psychiatric Nursing* 20(2):86-95.

Bakker, Arnold B., Wilmar B. Schaufeli, Evangelia Demerouti, Peter Janssen, Rennee Van Der Hulst, and Janneke Brouwer. 2000. "Using Equity Theory to Examine

the Difference between Burnout and Depression." *Anxiety, Stress, and Coping* 13:247-268.

Bearman, Peter S. and James Moody. 2004. "Suicide and Friendships among American Adolescents." *American Journal of Public Health* 94(1):89-95.

Bozo, Ozlem, N.E. Toksabay, and Oya Kurum. 2009. "Activities of Daily Living, Depression, and Social Support among Elderly Turkish People." *The Journal of Psychology* 143(2):193-205.

Burt, Ronald S. 1984. "Network Items and the General Social Survey." *Social Networks* 6:293-339.

------. 1987. "A Note on Strangers, Friends, and Happiness." *Social Networks* 9(4):311-332.

Burt, Ronald S. and Miguel G. Guilarte. 1986. "A Note on Scaling the General Social Survey Network Item Response Categories." *Social Networks* 8:387-396.

Buunk, Bram P. and Wilmar B. Schaufeli. 1999. "Reciprocity in Interpersonal Relationships: An Evolutionary Perspective on Its Importance for Health and Well-Being." *European Review of Social Psychology* 10:259-291.

Cannuscio, Carolyn C., Graham A. Colditz, Eric B. Rimm, Lisa F. Berkman, Camara P. Jones, and Ichiro Kawachi. 2004. "Employment Status, Social Ties, and Caregivers' Mental Health." *Social Science & Medicine* 58:1247-1256.

Cecil, Heather, Melinda A. Stanley, Patricia G. Carrion, and Alan Swann. 1995. "Psychometric Properties of the MSPSS and NOS in Psychiatric Outpatients." *Journal of Clinical Psychology* 51(5):593-602.

Coates, Deborah. 1985. “Relationships between Self-Concept Measures and Social Network Characteristics for Black Adolescents.” *Journal of Early Adolescence* 5:319–338.

Cohen, Sheldon and Thomas A. Wills. 1985. “Stress, Social Support, and the Buffering Hypothesis.” *Psychological Bulletin* 98:310–357.

Coleman James. 1990. *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Cyranowski, Jill. 2011. “Depression Review.” Pittsburgh Mind-Body Center; Retrieved March 5, 2011 (http://pmbcii.psy.cmu.edu/core_c/Depression_3_2006.pdf).

Dahlem, Nancy W., Gregory D. Zimet, and Robin R. Walker. 1991. “The Multidimensional Scale of Perceived Social Support: A Confirmation Study.” *Journal of Clinical Psychology* 47(6):756-761.

Durkheim, Emile. 1897/2006. *On Suicide*. New York: Penguin Books.

Edles, Laura D. and Scott Appelrouth. 2005. *Sociological Theory in the Classical Era*. Thousand Oaks, CA: Pine Forge Press.

Fagan, Ronald W. 1994. “Social Well-Being in University Students.” *Journal of Youth and Adolescence* 23:237-249.

Falci, Christina and Clea McNeely. 2009. “Too Many Friends: Social Integration, Network Cohesion and Adolescent Depressive Symptoms.” *Social Forces* 87(4):2031-2062.

Field, Tiffany, Miguel Diego, and Christopher Sanders. 2001. “Adolescent Depression and Risk Factors.” *Adolescence* 36:491–498.

Fiori, Katherine L., Tony C. Antonucci, and Kai S. Cortina. 2006. "Social Network Typologies and Mental Health among Older Adults." *Journal of Gerontology* 61B(1):25-32.

Fischer, Claude. 1982. *To Dwell among Friends*. University of Chicago Press, Chicago.

Fischer, Claude and Susan Phillips. 1982. "Who is Alone? Social Characteristics of People with Small Networks. Pp. 21-39 in *Loneliness: A Source Book of Current Theory, Research and Therapy*, edited by Letitia Peplau and Daniel Perlman. New York: Wiley.

Fitzpatrick, Maria D. and Sarah E. Turner. 2006. "Blurring the Boundary: Changes in the Transition from College Participation to Adulthood." The Network on Transitions to Adulthood, Retrieved February 20, 2011 (http://www.transad.pop.upenn.edu/downloads/fitzpatrick.pdf).

Forrester, William R. and Armen Tashchian. 2004. "Characteristics of Work Groups and Their Relationship with Social and Task Cohesion in Student Teams." *Psychological Reports* 95(1):207-214.

Friedkin, Noah E. 2004. "Social Cohesion." *Annual Review of Sociology* 30:409-25.

Frydenberg, Erica and Ramon Lewis. 1993. "Boys Play Sport and Girls Turn to Others: Age, Gender, and Ethnicity as Determinants of Coping." *Journal of Adolescence* 16:253-266.

Fryers, Tom, David Melzer, and Rachel Jenkins. 2003. "Social Inequalities and the Common Mental Disorders: A Systematic Review of the Evidence." *Social Psychiatry & Psychiatric Epidemiology* 38(5):229-237.

Gest, Scott D., Sandra A. Graham-Bermann, and Willard W. Hartup. 2001. "Peer Experience: Common and Unique Features of Number of Friendships, Social Network Centrality, and Sociometric Status." *Social Development* 10(1):23-40.

Glover, Troy D. and Diana C. Parry. 2008. "Friendships Developed Subsequent to a Stressful Life Event: The Interplay of Leisure, Social Capital, and Health." *Journal of Leisure Research* 40(2):208-230.

Glover, Troy D., Kimberly J. Shinew, and Diana C. Parry. 2005. "Association, Sociability, and Civic Culture: The Democratic Effect of Community Gardening." *Leisure Sciences 27:75-92.*

Goodman, Elizabeth. 1999. "The Role of Socioeconomic Status Gradients in Explaining Differences in US Adolescents' Health." *American Journal of Public Health* 89(10):1522-1528.

Haines, Valerie A., John J. Beggs, and Jeanne S. Hurlbert. 2008. "Contextualizing Health Outcomes: Do Effects of Network Structure Differ for Women and Men?" *Sex Roles* 59:164-175.

------. 2002. "Exploring the Structural Contexts of the Support Processes: Social Networks, Social Statuses, Social Support, and Psychological Distress." Pp. 269-92 in *Social Networks and Health*, edited by Judith A. Levy and Bernice A. Pescosolido. New York: JAI Press.

Hair, Joseph F., Ronald L. Tatham, Rolph Anderson, and William C. Black. 2006. *Multivariate Data Analysis*. Revised – 6th Edition. Upper Saddle River, NJ: Prentice Hall.

Hao, Lingxin and Richard W. Johnson. 2000. "Economic, Cultural, and Social Origins of Emotional Well-Being." *Research on Aging* 22(6):599-629.

Hatfield, Elaine, Jane Traupmann, Susan Sprecher, Mary Utne, and Judy Hay. 1985. "Equity and Intimate Relations: Recent Research." Pp. 91-117 in *Compatible and Incompatible Relationships*, edited by William Ickes. New York: Springer-Verlag.

Haynie, Dana L. 2001. "Delinquent Peers Revisited: Does Network Structure Matter?" *American Journal of Sociology* 106(4):1013-1057.

Heiligenstein, Eric and Greta Guenther. 1996. "Depression and Academic Impairment in College Students." *Journal of American College Health* 45(2):59-64.

Hockenbury, Don H. and Sandra E. Hockenbury. 2003. *Psychology*. New York: Worth Publishers.

House, James S., Karl R. Landis, and Debra Umberson. 1988. "Social Relationships and Health." *Science* 241:540-545.

Hyun, Myung-Sun, Kyoung Nam, Hee Sung Kang, and William M. Reynolds. 2009. "Reynolds Adolescent Depression Scale - Second Edition: Initial Validation of the Korean Version." *Journal of Advanced Nursing* 65(3):642-651.

Illinois State University. 2008. "SPSS: Descriptive Statistics." Department of Psychology; Retrieved March 6, 2011 (http://psychology.illinoisstate.edu/psy138/resources/spss/spss3.html).

Kadushin, Charles, 1983. "Mental Health and the Interpersonal Environment: Reexamination of Some Effects of Social Structure and Mental Health." *American Sociological Review*. 48:188–198.

Kazarian, Shahe S. and Scott B. McCabe. 1991. "Dimensions of Social Support in the MSPSS: Factorial Structure, Reliability, and Theoretical Implications." *Journal of Community Psychology* 19:150-160.

Kelly, William E., Kathryn E. Kelly, Franklin C. Brown, and Hillary B. Kelly. 1999. "Gender Differences in Depression among College Students: A Multi-Cultural Perspective." *College Student Journal* 33(1):72-76.

Kirsch, Irving, Brett J. Deacon, Tania B. Huedo-Medina, Alan Scoboria, Thomas J. Moore, and Blair T. Johnson. 2008. "Initial Severity and Antidepressant Benefits: A Meta-Analysis of Data Submitted to the Food and Drug Administration." *PLoS Medicine* 5(2):260-268.

Kromrey, Jeffrey D. and Lynn Foster-Johnson. 1998. "Mean Centering in Moderated Multiple Regression: Much Ado about Nothing." *Educational and Psychological Measurement* 58(1):42-67.

Lackey, Gerald. 2008. "'Feeling Blue' in Spanish: A Qualitative Inquiry of Depression among Mexican Immigrants." *Social Science & Medicine* 67:228-237.

Laible, Deborah J., Gustavo Carlo, and Marcela Raffaelli. 2000. "The Differential Relations of Parent and Peer Attachment to Adolescent Adjustment." *Journal of Youth and Adolescence* 29(1):45-59.

Lin, Nan and M.K. Peek. 1999. "Social Networks and Mental Health." Pp. 241-258 in *A Handbook for the Study of Mental Health: Social Contexts, Theories, and Systems*, edited by A.V. Horwitz and T.L Scheid. New York: Cambridge University Press.

Lin, Nan, Xiaolan Ye, and Walter M. Ensel. 1999. "Social Support and Depressed Mood: A Structural Analysis." *Journal of Health and Social Behavior* 40:344-359.

Link, Bruce G., Mary C. Lennon, and Bruce P. Dohrenwend. 1993. "Socioeconomic Status and Depression: The Role of Occupations Involving Direction, Control, and Planning." *American Journal of Sociology* 98(6):1351-1387.

Lorant, V., D. Deliege, W. Eaton, A. Robert, P. Philippot, and M. Ansseau. 2003. "Socioeconomic Inequalities in Depression: A Meta-Analysis." *American Journal of Epidemiology* 157(2):98-112.

Low, Kathryn G. and Joshua M. Feissner. 1998. "Seasonal Affective Disorder in College Students: Prevalence and Latitude." *Journal of American College Health* 47(3):135-138.

Marin, Alexandra and Keith N. Hampton. 2007. "Simplifying the Personal Name Generator: Alternatives to Traditional Multiple and Single Name Generators." *Field Methods* 19(2):163-193.

Miech, Richard A. and Michael J. Shanahan. 2000. "Socioeconomic Status and Depression Over the Life Course." *Journal of Health and Social Behavior* 41(2):162-176.

Monsour, Michael. 2002. *Women and Men as Friends: Relationships across the Life Span in the 21st Century*. Mahwah, NJ: Lawrence Erlbaum Associates.

National Center for Injury Prevention and Control. 2006. "10 Leading Causes of Death, United States: 2006, All Races, Both Sexes." Centers for Disease Control and

Prevention, Retrieved February 17, 2010 (http://webappa.cdc.gov/cgi-bin/broker.exe).

Okazaki, S. 1997. "Sources of Ethnic Differences between Asian American and White American College Students on Measures of Depression and Social Anxiety." *Journal of Abnormal Psychology* 106(1):52-60.

Osgood, D.W., E.M. Foster, Constance Flanagan, and Gretchen R. Ruth. 2005. *On Your Own without a Net: The Transition to Adulthood for Vulnerable Populations*. Chicago, IL: The University of Chicago Press.

Pescosolido, Bernice A. and Judith A. Levy. 2002. "The Role of Social Networks in Health, Illness, Disease, and Healing: The Accepting Present, the Forgotten Past, and the Dangerous Potential for a Complacent Future." *Advances in Medical Sociology* 8:3-25.

Prescott, Carol A., John J. McArdle; Earl S. Hishinuma, Ronald C. Johnson, Robin H. Miyamoto, Naleen N. Andrade, Jeanne L. Edman, George K. Makini, Linda B. Nahulu, Noelle Y.C. Yuen, and Barry S. Carlton. 1998. "Prediction of Major Depression and Dysthymia from CES-D Scores among Ethnic Minority Adolescents." *Journal of the American Academy of Child and Adolescent Psychiatry* 37(5):495-503.

Radloff, Lenore S. 1977. "The CES-D Scale: A Self-Report Depression Scale for Research in the General Population." *Applied Psychological Measurement* 1(3):385-401.

Rosenfield, Sarah, Mary C. Lennon, and Helene R. White. 2005. "The Self and Mental Health: Self-Salience and the Emergence of Internalizing and Externalizing Problems." *Journal of Health and Social Behavior* 46:323-340.

Sachoff, Mike. 2011. "Too Many Facebook Friends Causes Stress." WebProNews; Retrieved March 5, 2011 (http://mbcalyn.wordpress.com/2011/02/16/too-many-facebook-friends-causes-stress-webpronews).

Sadowski, Christine, and Mary L. Kelley. 1993. "Social Problem Solving in Suicidal Adolescents." *Journal of Consulting and Clinical Psychology* 61(1):121-127.

Schaefer, David R. and Olga Kornienko. 2009. "Building Cohesion in Positively Connected Exchange Networks." *Social Psychology Quarterly*. 72:384-402.

SCIRE Project. 2010. "Center for Epidemiologic Studies Depression Scale (CES-D)." Monkey Hill Health Communications; Retrieved March 5, 2011 (http://www.scireproject.com/outcome-measures/center-epidemiological-studies-depression-scale-ces-d).

Spirito, Anthony, Sylvia Valeri, Julie Boergers, and Deidre Donaldson. 2003. "Predictors of Continued Suicidal Behavior in Adolescents following a Suicide Attempt." *Journal of Clinical Child and Adolescent Psychology* 32(2):284-289.

Steinberg, Laurence and Kathryn C. Monahan. 2007. "Age Differences in Resistance to Peer Influence." *Developmental Psychology* 43(6):1531-1543.

Symister, Petra and Ronald Friend. 2003. "The Influence of Social Support and Problematic Support on Optimism and Depression in Chronic Illness: A Prospective Study Evaluating Self-Esteem as a Mediator." *Health Psychology* 22(2):123-129.

Taniguchi, Hirokazu and Mitsuhiro Ura. 2002. "Support Reciprocity and Depression among Elementary School and High School Students. *Japanese Psychological Research* 44(4):247-253.

Turner, Jonathan H. and Jan E. Stets. 2005. *The Sociology of Emotions*. New York: Cambridge University Press.

Thorlindsson, Thorolfur and Thoroddur Bjarnason. 1998. "Modeling Durkheim on the Micro Level: A Study of Youth Suicidality." *American Sociological Review* 63:94-110.

Ueno, Koji. 2005. "The Effects of Friendship Networks on Adolescent Depressive Symptoms." *Social Science Research* 34:484-510.

Umberson, Debra, Meichu D. Chen, James S. House, Kristine Hopkins, and Ellen Slaten. 1996. "The Effect of Social Relationships on Psychological Well-Being: Are Men and Women Really So Different?" *American Sociological Review* 61:837-857.

U.S. Census Bureau. 2008. "School Enrollment--Social and Economic Characteristics of Students: October 2008." U.S. Census Bureau, Housing and Household Economic Statistics Division, Education and Social Stratification Branch; Retrieved February 19, 2010 (http://www.census.gov/population/www/socdemo/school/Cps2008.html).

Vaananen, Ari, Bram P. Bunk, Mika Kivimaki, Jaana Pentti, and Jussi Vahtera. 2005. "When It is Better to Give Than to Receive: Long-Term Health Effects of Perceived Reciprocity in Support Exchange." *Journal of Personality and Social Psychology* 89(2):176-193.

Vaananen, Ari, Abraham P. Buunk, Mika Kivimaki, Jussi Vahtera, and Markku Koskenvuo. 2008. "Change in Reciprocity as a Predictor of Depressive Symptoms: A Prospective Cohort Study of Finnish Women and Men." *Social Science and Medicine* 67:1907-1916.

Van Horn, Joan E., Wilmar B. Schaufeli, and Toon W. Taris. 2001. "Lack of Reciprocity among Dutch Teachers: Validation of Reciprocity Indices and Their Relation to Stress and Well-Being." *Work and Stress* 15(3):191-213.

Walker, John M., Paul M. Wasserman, and Barry Wellman. 1993. "Statistical Models for Social Support Networks." *Sociological Methods and Research* 22(1):71-98.

Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. New York: Cambridge University Press.

Wellman, Barry. 1988. "Structural Analysis: From Method and Metaphor to Theory and Substance." Pp. 19-61 in *Social Structures: A Network Approach*, edited by Barry Wellman and S.D. Berkowitz. Cambridge: Cambridge University Press.

------. 2007. "Challenges in Collecting Personal Network Data: The Nature of Personal Network Analysis." *Field Methods* 19(2):111-115.

Wellman, Barry and Scot Wortley. 1990. "Different Strokes from Different Folks: Community Ties and Social Support." *American Journal of Sociology* 96(3):558-588.

Zucker, Kenneth J., Debra N. Wilson-Smith, Janice A. Kurita, and Anita Stern. 1995. "Children's Appraisals of Sex-Typed Behavior in Their Peers." *Sex Roles* 33(11/12):703-725.

APPENDICES

Appendix A: Survey Questions

Instructions: Please answer the following questions about yourself.

1. Age ____

2. Gender
   - □ female
   - □ male

3. Race/Ethnicity (Please indicate which of the following categories you MOST identify with)
   - □ White
   - □ Black or African American
   - □ Hispanic or Latino
   - □ Asian Native
   - □ American Indian or Alaska Native
   - □ Hawaiian or Other Pacific Islander
   - □ Other

4. Current Relationship Status
   - □ Involved in a Steady Relationship/Engaged/Married
   - □ Single/Casually Dating/Divorced/Widowed/Separated

5. What is the highest level of education completed by either of your parents?
   - □ Grade School or Less
   - □ Some High School
   - □ High School Diploma or GED
   - □ Some College or Associate's Degree
   - □ Bachelor's Degree
   - □ Some Post-Graduate Education or Professional Degree (M.A./PhD/MBA/MD/etc.)

6. How far away do you live from the university?
   - □ 0 miles (I live on campus)
   - □ 0.1 – 5 miles
   - □ 5.1 – 10 miles
   - □ 10.1 – 20 miles
   - □ 20.1 – 50 miles
   - □ More than 50 miles

Appendix A: Survey Questions (Continued)

7. Current Class Standing
   - □ freshman
   - □ sophomore
   - □ junior
   - □ senior
   - □ other

8. High School GPA ____

Instructions: The following items will list some of the things that different people value. Some people say these things are very important to them. Other people say they are not so important. Please explain how important each of these things is to you.

9. Financial security is . . .
   - □ one of the most important values you hold
   - □ very important
   - □ somewhat important
   - □ not too important
   - □ not at all important

10. Being married is . . .
   - □ one of the most important values you hold
   - □ very important
   - □ somewhat important
   - □ not too important
   - □ not at all important

11. Having Children is . . .
   - □ one of the most important values you hold
   - □ very important
   - □ somewhat important
   - □ not too important
   - □ not at all important

12. Having faith in God is . . .
   - □ one of the most important values you hold
   - □ very important
   - □ somewhat important
   - □ not too important
   - □ not at all important

Appendix A: Survey Questions (Continued)

13. Having nice things is . . .
    - □ one of the most important values you hold
    - □ very important
    - □ somewhat important
    - □ not too important
    - □ not at all important

14. Having a fulfilling job is . . .
    - □ one of the most important values you hold
    - □ very important
    - □ somewhat important
    - □ not too important
    - □ not at all important

15. Being cultured is . . .
    - □ one of the most important values you hold
    - □ very important
    - □ somewhat important
    - □ not too important
    - □ not at all important

16. Being self-sufficient and not having to depend on others is . . .
    - □ one of the most important values you hold
    - □ very important
    - □ somewhat important
    - □ not too important
    - □ not at all important

Instructions: For each of the following, please indicate how well the description applies to you.

17. I am a kind person.
    - □ a very good description
    - □ a good description
    - □ a fair description
    - □ not a very good description
    - □ not a very good description at all

18. I am a dependable person.
    - □ a very good description
    - □ a good description
    - □ a fair description
    - □ not a very good description
    - □ not a very good description at all

Appendix A: Survey Questions (Continued)

Instructions: Indicate your agreement with the following statements.

19. I'm always optimistic about my future.
    - □ strongly agree
    - □ agree
    - □ disagree
    - □ strongly disagree
    - □ don't know

20. Overall, I expect more good things to happen to me than bad.
    - □ strongly agree
    - □ agree
    - □ disagree
    - □ strongly disagree
    - □ don't know

Instructions: Please answer the following questions to the best of your ability.

21. Would you say that your own health, in general, is excellent, good, fair, or poor?
    - □ excellent
    - □ good
    - □ fair
    - □ poor
    - □ don't know

22. How often do you have problems paying for things that you need (for example: food, clothing, or rent)?
    - □ Never
    - □ Rarely
    - □ Sometimes
    - □ Always

Appendix A: Survey Questions (Continued)

Instructions: Consider who the closest and most important friends in your life are. Put the initials of these people, maximum 5, in the following blanks. Then select the proper alternative suited to these people in the questions that follow.

23. Person 1 (Initials) _____

24. Person 2 (Initials) _____

25. Person 3 (Initials) _____

26. Person 4 (Initials) _____

27. Person 5 (Initials) _____

28. Gender (Is this individual male or female?)

_____ □ male □ female
_____ □ male □ female
_____ □ male □ female
_____ □ male □ female
_____ □ male □ female

29. Is this person currently enrolled as a student at your school?

_____ □ yes □ no
_____ □ yes □ no
_____ □ yes □ no
_____ □ yes □ no
_____ □ yes □ no

30. In addition to being a friend, would you characterize this individual as being a . . .

_____ □ family member □ partner □ neither of these
_____ □ family member □ partner □ neither of these
_____ □ family member □ partner □ neither of these
_____ □ family member □ partner □ neither of these
_____ □ family member □ partner □ neither of these

Appendix A: Survey Questions (Continued)

31. In your relationship with this person, which of you gives or receives more support and help (for example: emotional support, companionship, information, services, or financial help)? How would you describe your relationship in this respect?

_____ □ I give support and help more than I receive
□ I receive support and help as much as I give
□ I receive support and help more than I give

_____ □ I give support and help more than I receive
□ I receive support and help as much as I give
□ I receive support and help more than I give

_____ □ I give support and help more than I receive
□ I receive support and help as much as I give
□ I receive support and help more than I give

_____ □ I give support and help more than I receive
□ I receive support and help as much as I give
□ I receive support and help more than I give

_____ □ I give support and help more than I receive
□ I receive support and help as much as I give
□ I receive support and help more than I give

Appendix A: Survey Questions (Continued)

32. Please describe the relationship between each pair of your friends.

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

______ and ______ □ (1) are strangers
□ (2) are as close to each other as I am to them
□ neither (1) or (2)

Appendix A: Survey Questions (Continued)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

33. I feel that . . .

My friends really try to help me.

□ very strongly disagree
□ strongly disagree
□ mildly disagree
□ neutral
□ mildly agree
□ strongly agree
□ very strongly agree

I can count on my friends when things go wrong.

□ very strongly disagree
□ strongly disagree
□ mildly disagree
□ neutral
□ mildly agree
□ strongly agree
□ very strongly agree

I have friends with whom I can share my joys and my sorrows.

□ very strongly disagree
□ strongly disagree
□ mildly disagree
□ neutral
□ mildly agree
□ strongly agree
□ very strongly agree

I can talk about my problems with my friends.

□ very strongly disagree
□ strongly disagree
□ mildly disagree
□ neutral
□ mildly agree
□ strongly agree
□ very strongly agree

Appendix A: Survey Questions (Continued)

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

34. During the past week . . .

I was bothered by things that usually don't bother me.
- □ rarely or none of the time (less than 1 day)
- □ some or a little of the time (1-2 days)
- □ occasionally or a moderate amount of the time (3-4 days)
- □ most or all of the time (5-7 days)

I did not feel like eating; my appetite was poor.
- □ rarely or none of the time (less than 1 day)
- □ some or a little of the time (1-2 days)
- □ occasionally or a moderate amount of the time (3-4 days)
- □ most or all of the time (5-7 days)

I felt that I could not shake off the blues even with help from my family or friends.
- □ rarely or none of the time (less than 1 day)
- □ some or a little of the time (1-2 days)
- □ occasionally or a moderate amount of the time (3-4 days)
- □ most or all of the time (5-7 days)

I felt that I was just as good as other people.
- □ rarely or none of the time (less than 1 day)
- □ some or a little of the time (1-2 days)
- □ occasionally or a moderate amount of the time (3-4 days)
- □ most or all of the time (5-7 days)

I had trouble keeping my mind on what I was doing.
- □ rarely or none of the time (less than 1 day)
- □ some or a little of the time (1-2 days)
- □ occasionally or a moderate amount of the time (3-4 days)
- □ most or all of the time (5-7 days)

I felt depressed.
- □ rarely or none of the time (less than 1 day)
- □ some or a little of the time (1-2 days)
- □ occasionally or a moderate amount of the time (3-4 days)
- □ most or all of the time (5-7 days)

Appendix A: Survey Questions (Continued)

I felt that everything I did was an effort.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I felt hopeful about the future.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I thought my life had been a failure.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I felt fearful.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

My sleep was restless.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I was happy.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I talked less than usual.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

Appendix A: Survey Questions (Continued)

I felt lonely

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

People were unfriendly.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I enjoyed life.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I had crying spells.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I felt sad.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I felt that people dislike me.

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

I could not get "going."

□ rarely or none of the time (less than 1 day)
□ some or a little of the time (1-2 days)
□ occasionally or a moderate amount of the time (3-4 days)
□ most or all of the time (5-7 days)

Appendix B: Supplementary Descriptive Statistics

TABLE A1: Descriptive Statistics for Individual CES-D Items

	n	%
I Was Bothered by Things That Usually Don't Bother Me . . .		
Rarely or None of the Time (Less than 1 Day)	307	46.7
Some or a Little of the Time (1-2 Days)	225	34.2
Occasionally or a Moderate Amount of the Time (3-4 Days)	103	15.7
Most or All of the Time (5-7 Days)	22	3.4
I Did Not Feel like Eating; My Appetite Was Poor . . .		
Rarely or None of the Time (Less than 1 Day)	391	59.5
Some or a Little of the Time (1-2 Days)	152	23.1
Occasionally or a Moderate Amount of the Time (3-4 Days)	86	13.1
Most or All of the Time (5-7 Days)	28	4.3
I Felt That I Could Not Shake Off the Blues . . .		
Rarely or None of the Time (Less than 1 Day)	393	59.8
Some or a Little of the Time (1-2 Days)	151	23.0
Occasionally or a Moderate Amount of the Time (3-4 Days)	83	12.6
Most or All of the Time (5-7 Days)	30	4.6
I Felt That I Was Just as Good as Other People . . .		
Most or All of the Time (5-7 Days)	251	38.2
Occasionally or a Moderate Amount of the Time (3-4 Days)	234	35.6
Some or a Little of the Time (1-2 Days)	110	16.7
Rarely or None of the Time (Less than 1 Day)	62	9.5
I Had Trouble Keeping My Mind on What I Was Doing . . .		
Rarely or None of the Time (Less than 1 Day)	184	28.0
Some or a Little of the Time (1-2 Days)	248	37.7
Occasionally or a Moderate Amount of the Time (3-4 Days)	161	24.5
Most or All of the Time (5-7 Days)	64	9.8
I Felt Depressed . . .		
Rarely or None of the Time (Less than 1 Day)	378	57.5
Some or a Little of the Time (1-2 Days)	173	26.3
Occasionally or a Moderate Amount of the Time (3-4 Days)	80	12.2
Most or All of the Time (5-7 Days)	26	4.0

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A1: Descriptive Statistics for Individual CES-D Items (Continued)

	n	%
I Felt That Everything I Did Was an Effort . . .		
Rarely or None of the Time (Less than 1 Day)	178	27.1
Some or a Little of the Time (1-2 Days)	206	31.4
Occasionally or a Moderate Amount of the Time (3-4 Days)	181	27.5
Most or All of the Time (5-7 Days)	92	14.0
I felt Hopeful about the Future . . .		
Most or All of the Time (5-7 Days)	255	38.9
Occasionally or a Moderate Amount of the Time (3-4 Days)	249	38.0
Some or a Little of the Time (1-2 Days)	116	17.7
Rarely or None of the Time (Less than 1 Day)	36	5.4
I Though My Life Had Been a Failure . . .		
Rarely or None of the Time (Less than 1 Day)	538	82.0
Some or a Little of the Time (1-2 Days)	67	10.2
Occasionally or a Moderate Amount of the Time (3-4 Days)	41	6.3
Most or All of the Time (5-7 Days)	10	1.5
I Felt Fearful . . .		
Rarely or None of the Time (Less than 1 Day)	368	56.1
Some or a Little of the Time (1-2 Days)	194	29.6
Occasionally or a Moderate Amount of the Time (3-4 Days)	71	10.8
Most or All of the Time (5-7 Days)	23	3.5
My Sleep Was Restless . . .		
Rarely or None of the Time (Less than 1 Day)	284	43.3
Some or a Little of the Time (1-2 Days)	196	29.9
Occasionally or a Moderate Amount of the Time (3-4 Days)	103	15.7
Most or All of the Time (5-7 Days)	73	11.1
I Was Happy . . .		
Most or All of the Time (5-7 Days)	283	43.1
Occasionally or a Moderate Amount of the Time (3-4 Days)	271	41.3
Some or a Little of the Time (1-2 Days)	87	13.3
Rarely or None of the Time (Less than 1 Day)	15	2.3

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A1: Descriptive Statistics for Individual CES-D Items (Continued)

	n	%
I Talked Less than Usual . . .		
Rarely or None of the Time (Less than 1 Day)	333	50.7
Some or a Little of the Time (1-2 Days)	214	32.6
Occasionally or a Moderate Amount of the Time (3-4 Days)	83	12.7
Most or All of the Time (5-7 Days)	26	4.0
I Felt Lonely . . .		
Rarely or None of the Time (Less than 1 Day)	319	48.6
Some or a Little of the Time (1-2 Days)	188	28.7
Occasionally or a Moderate Amount of the Time (3-4 Days)	105	16.0
Most or All of the Time (5-7 Days)	44	6.7
People Were Unfriendly . . .		
Rarely or None of the Time (Less than 1 Day)	420	64.0
Some or a Little of the Time (1-2 Days)	177	27.0
Occasionally or a Moderate Amount of the Time (3-4 Days)	45	6.9
Most or All of the Time (5-7 Days)	14	2.1
I Enjoyed Life . . .		
Most or All of the Time (5-7 Days)	305	46.5
Occasionally or a Moderate Amount of the Time (3-4 Days)	227	34.6
Some or a Little of the Time (1-2 Days)	104	15.9
Rarely or None of the Time (Less than 1 Day)	20	3.0
I Had Crying Spells . . .		
Rarely or None of the Time (Less than 1 Day)	480	73.2
Some or a Little of the Time (1-2 Days)	102	15.5
Occasionally or a Moderate Amount of the Time (3-4 Days)	52	7.9
Most or All of the Time (5-7 Days)	22	3.4
I Felt Sad . . .		
Rarely or None of the Time (Less than 1 Day)	318	48.4
Some or a Little of the Time (1-2 Days)	228	34.8
Occasionally or a Moderate Amount of the Time (3-4 Days)	80	12.2
Most or All of the Time (5-7 Days)	30	4.6

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A1: Descriptive Statistics for Individual CES-D Items (Continued)

	n	*%*
I Felt That People Disliked Me . . .		
Rarely or None of the Time (Less than 1 Day)	423	64.6
Some or a Little of the Time (1-2 Days)	159	24.2
Occasionally or a Moderate Amount of the Time (3-4 Days)	58	8.8
Most or All of the Time (5-7 Days)	16	2.4
I Could Not Get "Going" . . .		
Rarely or None of the Time (Less than 1 Day)	361	55.1
Some or a Little of the Time (1-2 Days)	191	29.1
Occasionally or a Moderate Amount of the Time (3-4 Days)	77	11.7
Most or All of the Time (5-7 Days)	27	4.1

Notes: ($N = 671$)

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A2: Descriptive Statistics for Individual MSPSS Items

	n	%
My Friends Really Try to Help Me . . .		
Very Strongly Disagree	62	9.5
Strongly Disagree	45	6.9
Mildly Disagree	18	2.7
Neutral	38	5.8
Mildly Agree	82	12.5
Strongly Agree	237	36.2
Very Strongly Agree	173	26.4
I Can Count on My Friends When Things Go Wrong . . .		
Very Strongly Disagree	61	9.3
Strongly Disagree	45	6.9
Mildly Disagree	20	3.1
Neutral	31	4.7
Mildly Agree	83	12.7
Strongly Agree	206	31.5
Very Strongly Agree	208	31.8
I Have Friends with Whom I Can Share My Joys and My Sorrows . . .		
Very Strongly Disagree	75	11.5
Strongly Disagree	36	5.5
Mildly Disagree	12	1.8
Neutral	22	3.4
Mildly Agree	54	8.3
Strongly Agree	179	27.4
Very Strongly Agree	276	42.1

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A2: Descriptive Statistics for Individual MSPSS Items (Continued)

	n	*%*
I Can Talk about My Problems with My Friends . . .		
Very Strongly Disagree	72	11.0
Strongly Disagree	37	5.7
Mildly Disagree	19	2.9
Neutral	34	5.2
Mildly Agree	58	8.9
Strongly Agree	184	28.1
Very Strongly Agree	250	38.2

Notes: (N = 671)

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A3: Descriptive Statistics for GSS Survey Items

	n	%
Financial Security is . . .		
Not at All Important	3	0.5
Not Too Important	6	0.9
Somewhat Important	79	11.9
Very Important	414	62.1
One of the Most Important Values You Hold	164	24.6
Being Married is . . .		
Not at All Important	32	4.8
Not Too Important	74	11.1
Somewhat Important	170	25.6
Very Important	227	34.1
One of the Most Important Values You Hold	162	24.4
Having Children is . . .		
Not at All Important	37	5.6
Not Too Important	70	10.6
Somewhat Important	161	24.3
Very Important	212	32.0
One of the Most Important Values You Hold	182	27.5
Having Faith in God is . . .		
Not at All Important	82	12.4
Not Too Important	81	12.2
Somewhat Important	115	17.3
Very Important	118	17.8
One of the Most Important Values You Hold	267	40.3
Having Nice Things is . . .		
Not at All Important	21	3.2
Not Too Important	139	20.9
Somewhat Important	370	55.6
Very Important	116	17.4
One of the Most Important Values You Hold	20	2.9

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A3: Descriptive Statistics for GSS Survey Items (Continued)

	n	%
Having a Fulfilling Job is . . .		
Not at All Important	3	0.5
Not Too Important	4	0.6
Somewhat Important	67	10.1
Very Important	336	50.5
One of the Most Important Values You Hold	255	38.3
Being Cultured is . . .		
Not at All Important	3	0.5
Not Too Important	49	7.4
Somewhat Important	210	31.6
Very Important	274	41.3
One of the Most Important Values You Hold	128	19.2
Being Self-Sufficient and Not Having to Depend on Others is . . .		
Not at All Important	1	0.2
Not Too Important	14	2.1
Somewhat Important	62	9.3
Very Important	279	41.9
One of the Most Important Values You Hold	310	46.5
I am a Kind Person . . .		
Not a Very Good Description at All	0	0.0
Not a Very Good Description	6	0.9
A Fair Description	51	7.7
A Good Description	283	42.7
A Very Good Description	323	48.7
I am a Dependable Person . . .		
Not a Very Good Description at All	3	0.5
Not a Very Good Description	15	2.3
A Fair Description	51	7.7
A Good Description	274	41.3
A Very Good Description	320	48.2

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A3: Descriptive Statistics for GSS Survey Items (Continued)

	n	*%*
I'm Always Optimistic about My Future . . .		
Strongly Disagree	11	1.7
Disagree	95	14.3
Don't Know	31	4.7
Agree	382	57.6
Strongly Agree	144	21.7
I Expect More Good Things to Happen to Me than Bad . . .		
Strongly Disagree	13	1.9
Disagree	76	11.4
Don't Know	47	7.1
Agree	341	51.4
Strongly Agree	187	28.2
Would You Say That Your Own Health, in General, is . . .		
Poor	12	1.8
Fair	94	14.2
Good	378	57.0
Excellent	179	27.0
Don't Know	0	0.0

Notes: ($N = 671$)

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A4: Additional Personal Network Statistics

Variable	Mean	SD	Min	Max
Number of Friends Enrolled at University (Excluding Family Members and Partners)	0.6	1.0	0	5
Total # of Family Members Reported	1.8	1.6	0	5
Total # of Partners Reported	0.6	0.6	0	5

Notes: ($N = 671$)

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A5: Number of Friends (Excluding Family Members and Partners) by Total Number of Alters Reported

	Number of Friends - *n (%)*						
Total Number of Alters Reported	**0**	**1**	**2**	**3**	**4**	**5**	Totals
0	3 (2.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (0.5)
1	2 (1.6)	4 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	6 (0.9)
2	8 (6.3)	14 (10.8)	4 (3.9)	0 (0.0)	0 (0.0)	0 (0.0)	26 (4.0)
3	19 (15.1)	12 (9.2)	12 (11.7)	11 (9.3)	0 (0.0)	0 (0.0)	54 (8.2)
4	9 (7.1)	10 (7.7)	20 (19.4)	16 (13.6)	11 (9.9)	0 (0.0)	66 (10.1)
5	85 (67.5)	90 (69.2)	67 (65.0)	91 (77.1)	100 (90.1)	65 (100.0)	498 (76.3)
Totals	126	130	103	118	111	65	653

Notes: (N = 671)

Appendix B: Supplementary Descriptive Statistics (Continued)

TABLE A6: Network Statistics – Including Family Members and Partners as Alters

Variable	Mean	SD	Min	Max
Egocentric Network Size (Including Family Members and Partners)	4.6	0.9	0	5
Network Density	0.6	0.2	0.0	1.0
Perceived Reciprocity of Support (Hatfield Global Reciprocity Measure)	0.0	0.3	-1.0	1.0

Notes: (N = 671)

Appendix C: Supplementary Inferential Statistics

TABLE A7: Bivariate Correlations - Including Family Members and Partners as Alters (Spearman's rho / Pearson's *r*)

Variables	Egocentric Network Size	Network Density	Social Support	Reciprocity of Support	Depression
Egocentric Network Size	----------	0.13*** / 0.20***	0.09* / 0.07ǂ	0.05 / 0.04	-0.04 / -0.02
Network Density	----------	----------	0.01 / -0.01	0.06 / 0.04	-0.04 / -0.04
Social Support	----------	----------	----------	0.04 / 0.04	-0.12** / -0.05
Reciprocity of Support	----------	----------	----------	----------	0.00 / 0.03
Depression	----------	----------	----------	----------	----------

Notes: ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001 (*N* = 671)

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable

	MODEL 13 (*N* = 651)			**MODEL 14 (*N* = 651)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size	**-0.10**	**0.40**	**-0.01**	0.69	2.37	0.07
Network Size * Network Size				**-0.11**	**0.33**	**-0.08**
Network Size * Female						
Network Density						
Network Density * Female						
Network Density * Network Size						
Network Density * Network Size * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.10; F = 3.79; p < 0.001)			(R^2 = 0.10; F = 3.60; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 15 (*N* = 644)			**MODEL 16 (*N* = 644)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size				-0.07	0.41	-0.01
Network Size * Network Size						
Network Size * Female						
Network Density	**-0.98**	**1.60**	**-0.02**	**-0.92**	**1.63**	**-0.02**
Network Density * Female						
Network Density * Network Size						
Network Density * Network Size * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.10; F = 3.67; p < 0.001)			(R^2 = 0.10; F = 3.48; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 17 (*N* = 644)			**MODEL 18 (*N* = 644)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size				-0.13	0.41	-0.01
Network Size * Network Size						
Network Size * Female						
Network Density	3.49	2.65	0.09	3.64	2.69	0.09
Network Density * Female	**-6.95***	**3.29**	**-0.22**	**-7.03***	**3.30**	**-0.23**
Network Density * Network Size						
Network Density * Network Size * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.11; F = 3.73; p < 0.001)			(R^2 = 0.11; F = 3.55; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 19 (*N* = 651)			**MODEL 20 (*N* = 644)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size	-0.32	0.64	-0.03	-0.63	0.67	-0.06
Network Size * Network Size						
Network Size * Female	**0.36**	**0.82**	**0.08**	**0.80**	**0.85**	**0.18**
Network Density				4.23	2.76	0.10
Network Density * Female				-7.82*	3.41	-0.25
Network Density * Network Size						
Network Density * Network Size * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.10; F = 3.60; p < 0.001)			(R^2 = 0.11; F = 3.43; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 21 (*N* = 644)			**MODEL 22 (*N* = 644)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size	0.47	0.70	0.05	0.26	0.70	0.03
Network Size * Network Size						
Network Size * Female						
Network Density	4.68	6.09	0.12	7.48	6.23	0.18
Network Density * Female				-6.73*	3.33	-0.22
Network Density * Network Size	**-1.28**	**1.34**	**-0.16**	**-0.92**	**1.35**	**-0.12**
Network Density * Network Size * Female						
Social Support						
Support Received						
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.10; F = 3.36; p < 0.001)			(R^2 = 0.11; F = 3.41; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 23 (*N* = 644)		
	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*			
Egocentric Network Size	0.75	1.00	0.07
Network Size * Network Size			
Network Size * Female	-1.19	1.39	-0.27
Network Density	19.04*	8.47	0.47
Network Density * Female	-28.79*	11.99	-0.93
Network Density * Network Size	-3.53ǂ	1.91	-0.44
Network Density * Network Size * Female	**4.90ǂ**	**2.65**	**0.76**
Social Support			
Support Received			
Perceived Reciprocity of Support			
Reciprocity of Support * Reciprocity of Support			
	(R^2 = 0.11; F = 3.32; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 24 (*N* = 645)			**MODEL 25 (*N* = 638)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size				0.74	1.01	0.07
Network Size * Network Size						
Network Size * Female				-1.18	1.40	-0.27
Network Density				19.46*	8.45	0.48
Network Density * Female				-29.98*	11.97	-0.96
Network Density * Network Size				-3.50ǂ	1.91	-0.44
Network Density * Network Size * Female				4.98ǂ	2.65	0.77
Social Support						
Support Received	**-0.35ǂ**	**0.20**	**-0.07**	**-0.39ǂ**	**0.20**	**-0.08**
Perceived Reciprocity of Support						
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.11; F = 3.69; p < 0.001)			(R^2 = 0.12; F = 3.32; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 26 (*N* = 644)			**MODEL 27 (*N* = 631)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size				0.83	1.01	0.08
Network Size * Network Size						
Network Size * Female				-1.31	1.39	-0.30
Network Density				19.92*	8.44	0.49
Network Density * Female				-30.96*	11.96	-1.00
Network Density * Network Size				-3.91*	1.90	-0.49
Network Density * Network Size * Female				5.49*	2.65	0.85
Social Support						
Support Received				-0.38ǂ	0.20	-0.08
Perceived Reciprocity of Support	**0.37**	**1.14**	**0.01**	**0.64**	**1.16**	**0.02**
Reciprocity of Support * Reciprocity of Support						
	(R^2 = 0.10; F = 3.71; p < 0.001)			(R^2 = 0.12; F = 3.13; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

Appendix C: Supplementary Inferential Statistics (Continued)

TABLE A8: Additional OLS Regression Models with Depression as the Dependent Variable (Continued)

	MODEL 28 (*N* = 644)			**MODEL 29 (*N* = 631)**		
	B	Standard Error	Beta	B	Standard Error	Beta
Network Structure *(Including Family Members and Partners as Alters)*						
Egocentric Network Size				0.85	1.01	0.08
Network Size * Network Size						
Network Size * Female				-1.33	1.40	-0.30
Network Density				19.93*	8.45	0.49
Network Density * Female				-31.04*	11.97	-1.00
Network Density * Network Size				-3.93*	1.91	-0.50
Network Density * Network Size * Female				5.52*	2.65	0.86
Social Support						
Support Received				-0.38ǂ	0.20	-0.08
Perceived Reciprocity of Support	0.45	1.16	0.02	0.70	1.18	0.02
Reciprocity of Support * Reciprocity of Support	**0.72**	**1.94**	**0.02**	**0.54**	**1.99**	**0.01**
	(R^2 = 0.10; F = 3.53; p < 0.001)			(R^2 = 0.12; F = 3.01; p < 0.001)		

Notes: All Appendix models control for Age, Gender, Race/Ethnicity, Current Relationship Status, Trouble Paying for Things, Highest Level of Parental Education, and Current Class Standing. ǂp < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001