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Social Connectedness and the Quality of Life in Chronically Ill Patients

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SOCIAL CONNECTEDNESS AND THE QUALITY OF LIFE IN CHRONICALLY ILL

PATIENTS

by

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Abstract

Social connectedness, feelings of belonging and closeness with the social world, has been identified as an important aspect for the physical, emotional, and collective well-being. People faced with chronic illness may feel like they no longer belong, and this lack of connectedness may have a negative impact on health, well-being, and psychological functioning. The present study investigated social connectedness and quality of life in 151 patients with ongoing symptoms of chronic illness. It was hypothesized that lower levels of social connectedness would be associated with poorer health-related quality of life and more depression. Participants (N =151, 85.4% women, M_{age} = 46.5) completed four online surveys that measured the level of their connectedness (Social Connectedness Scale) and their health related quality of life (Depression PHQ Scale and the SF-36 Scale). Overall, the hypotheses were supported with social connectedness being a significant predictor of depression and seven of the eight subscales on the health outcomes SF-36 measure. There was an increase in physical and social functioning, emotional well-being, and energy as the patients' level of social connectedness increased. Meanwhile, decreased feelings of social connectedness were associated with greater pain and role limitations due to physical health and emotional problems. These findings suggest that feelings of interpersonal closeness and belonging can be an important factor in health outcomes and quality of life within a chronically ill population.

Social Connectedness and the Quality of Life in Chronically Ill Patients

In the modern age of technology, people have a wide variety of choices in how to stay connected. With social networking sites like Facebook, Classmates.com, and Twitter we can find friends and family that we have not seen for decades, or we can use programs like Instagram to share our every move with whoever will pay attention and offer companionship. Technology has given us inventions like Skype and web cameras to stay in touch with those that serve overseas or are in long-distance relationships. We prefer to watch sport events and competitions in the company of others, whether it's at a stadium, a sports bar, or the comfort of our own home just to have someone there to share the joys and hardships like illness with. People crave attention and communication, and every so often we catch ourselves sending a text message just to say "I'm thinking about you". Why is it that we are so addicted to contact and interaction that we can stay up for hours chatting on the phone with family, e-mailing co-workers, or texting our friends? The answer is simple: we need to feel like we belong, that we are a part of a community, that we are connected to the social world.

In their research on social ties, Baumeister and Leary (1995) state that all humans have an innate need to belong, to form at least a few meaningful and close relationships. This need to belong is a vital component in the study of social ties, relationship formation, positive interactions and the development of social skills. Among other advantages, feeling connected, has been shown to increase both physical and psychological well-being (Lee & Robbins, 1998). Even as early as infancy, we need to create safe and positive attachments (usually with the primary caregiver) in order to reap the benefits of normal and secure development (Bowlby, 1982). If this need to belong is not met, severe deprivations in social, emotional, and health outcomes can occur (Baumeister and Leary, 1995). For example, people lacking social ties have

been shown to have higher rates of both physical and mental illness (Kawachi&Berkman, 2001). There has also been a link to adjustment, well-being, stress, and health problems following a thwarted need to belong (Baumeister and Leary, 1995). Being deprived of this basic human need may have consequence on the immune system as well. Researchers were able to identify a link between loneliness and a decrease in the natural killer cell activity (Kiecolt-Glaser, Garner, et al., 1984), along with loneliness and elevated cortisol levels (Kiecolt-Glaser, Ricker, et al., 1984). In their research on social isolation, Cacioppo and Hawkley (2003) emphasized that individuals who have low perceived social isolation were characterized by better health behaviors in part due to the influence of their family and friends. It is therefore essential to feel some type of connection to those around us.

Social Connectedness

Social connectedness refers to feeling united with the larger world, the sense of being a part of a global community (Lee & Robbins, 1998). People can feel connected when they are in a smaller group, but also the general society and community such as feelings of unity with a crowd at a football game or belonging to a religious congregation. Kohut (1984) argued that social connectedness provides individuals with a sense of identity and appropriate means to maintain relationships. Conversely, those who exhibit low levels of connectedness have been shown to adapt unhealthy and dysfunctional behaviors like withdrawal, aloofness, and isolation in their interpersonal encounters (Lee & Robbins, 1995). These behaviors consequently lead individuals to experience greater psychological distress in their inability to connect (Lee, Draper, & Lee, 2001).

Social connectedness is related to lower levels of loneliness and more adjustment to stress and anxiety (Duru, 2008). It appears that connectedness plays a major part in less rejection

sensitivity, isolation, and social avoidance (Lee, Dean, & Jung, 2008). It has also been linked with emotional health and a greater willingness to take interpersonal risks, thereby providing greater opportunity to create social ties (Townsend &McWhirter, 2005). These social ties play a beneficial role in maintaining the psychological well-being, coping with stress disorders, depression symptoms and anxiety (Kawachi&Berkman, 2001). People that create and maintain more social relationships have been shown to have a lower susceptibility to the common cold and other viruses (Cohen et al., 1997). Social ties that lead to connectedness are therefore fundamental in people's lives.

In her study on connectedness, belonging, and school attitudes, Svavarsdottir (2008) found that chronically ill schoolchildren show significantly less positive feelings and display lower connectedness levels towards their school than a sample of healthy controls. Meanwhile, Hall-Lande et al. (2007) showed that social connectedness may have protective factors in a link between social isolation and psychological health outcomes. Researchers revealed that close peer relationships may have a major buffering effect against depression, negative thoughts, and low self-esteem among adolescents. Family connectedness was also identified as one of the key aspects in preventing negative thoughts and suicide attempts in particular. It appears that social connectedness benefits exceed health and social outcomes. Connectedness is also a vital component in emotional consequences that affect us as early as school and continue to shape us throughout our lives.

Social connectedness and belongingness may also be important from an evolutionary standpoint. For ages, people have been striving to form social bonds in order to create alliances, find mates, and ultimately reproduce (Baumeister and Leary, 1995). Having a higher level of social connectedness, may be particularly beneficial for the survival of the species as it allows

for stronger social ties and feelings of being a part of the larger social world. It has been shown that feelings of connectedness increase empathetic responding (Cialdini et al., 1997) and social acts such as cooperation (Glaeser et al., 2000). Being a part of a group may also have important implications for defending one's resources and self-protection against threats in the environment (Baumeister and Leary, 1995). Knowing that one has a place in the group, somewhere they belong can be imperative in increasing confidence and building better social skills that later help us form healthy relationships.

Chronic Illness

In the past decades, there has been a shift of focus in medicine and the health field from acute to chronic illness. While acute infectious diseases such as malaria, polio, and tuberculosis used to be at the center of medical research, innovations in vaccines and medical equipment were able to reduce and even eradicate most of these diseases (Narain, 2011). Meanwhile, chronic illness has become a focal topic in the healthcare field, with chronic symptoms (e.g., pain) recognized as perceptual experiences that are affected by various psychological, emotional, social, and environmental factors (Turk and Okifuji, 2002). Strauss et al. (1984) represented chronic illness as an expression of a multitude of symptoms that can change over time, but do not truly go away. In addition, the impact that chronic symptoms of illness have on a person's life may be underestimated and unacknowledged. These multiple symptoms can have an immense impact on peoples' daily life, limiting their physical and emotional well-being (Bernard, Prince,&Edsall, 2000). Furthermore, the exact cause of the symptoms of illness may not be biomedically explained or understood. The Center for Disease Control predicts that in the year 2020, seven out of ten deaths in the world will be caused by a chronic illness. This includes conditions like chronic heart disease (the leading cause of death in the US), cancer, diabetes,

chronic respiratory disease, etc. The epidemic that is chronic illness is bound to cause pain, suffering, financial deprivation, disability, depression, and so much more anguish to those unfortunate enough to develop a chronic illness.

Chronic illness includes patients with a conventional medical diagnosis, as well as those suffering from functional somatic syndromes. A conventional diagnosis is characterized by a medically known treatment and pathology of known origin (Stone, Carson & Sharpe, 2005). A few of the conventional diagnoses were mentioned earlier, and sadly though a wide variety of these established labels exist, sometimes an illness has no common explanation. While a conventional disease requires objectively observable abnormalities, symptoms are the patient's subjective experience of changes in their body. Therefore, when a medical professional cannot find a tangible explanation for the patient's subjective experience, the symptoms are referred to as functional (Wessely, Nimnuan, Sharpe, 1999). The term functional somatic syndrome is used in many syndromes that are characterized more by symptoms, distress, and disability than by discernible tissue abnormality (Barsky and Borus, 1999). These disorders include, but are not limited to, fibromyalgia, chronic fatigue syndrome, and irritable bowel syndrome. Those with a functional syndrome receive a diagnosis of exclusion, and often accept treatments of unsuccessful or undetermined impact. Nevertheless, identifying variables of impact in both conventional and functional chronic illnesses can inform and lead to the development of important measures and scientific contributions with practical implications for the well-being of patients.

Quality of Life

How a person adapts to chronic illness has been established as an important factor for future outcomes and quality of life. Health-related quality of life refers to "the extent to which

one's usual or expected physical, emotional, and social well-being are affected by a medical condition or its treatment" (Cella&Nowinski, 2002, S10-S17). Many studies explore the impact that chronic illness has on patients with conventional diagnosis, but very little is done to study patients with functional disorders. More research is needed to examine this much understudied population. This group may be of particular importance, because unlike rate of survival or cost of living (measured in units), quality of life involves tapping into subjective experiences like pain level, life satisfaction, and personal well-being (Cella&Nowinski, 2002). Quality of life is therefore essential in gauging the patients' perspective on the progression of their illness and treatment plan. This study attempts to examine quality of life and the effects that social connectedness has on the subjective experiences of patients with conventional and functional chronic illness.

Social Connectedness and Health

Social connectedness has been empirically tied with various physical, psychological and well-being outcomes. It may be one of the key aspects in satisfying the need to belong and is therefore essential for future health, emotional and social consequences of chronic illness. In the recent years, connectedness has emerged as one of the main factors related to depression (Williams &Galliher, 2006). Depression in particular, has been highly significant in the study of health outcomes, being related to a variety of medical conditions like heart disease, diabetes, and cancer (Eaton et al., 1996; Mendes et al., 1998; Pennix et al., 1998). In their study on the effects of chronic illness on caregivers, Janevic et al. (2012) showed that depression has a high comorbidity rate with chronic illness. Researchers also demonstrated that depression is associated with increased healthcare costs, disability, and mortality. Nonetheless, having enhanced interactions with caregivers and being provided with more care, led to an alleviation of

depressive symptoms in the chronically ill patients. In their research on social connectedness, Lee & Robbins (1995, 1998) mention a link between depression and social connectedness, although they fail to address how they determined this relationship and why it occurs. However, knowing the high comorbidity rate of depression and chronic illness, and the benefits that connectedness has on health outcomes, it is plausible to speculate that social connectedness will be strongly related to depression levels among chronically ill patients. Relating social connectedness to depression may be potentially instrumental in implementing connectedness as part of treatment programs for the chronically ill population.

Meanwhile, behavioral measures have shown that social connectedness has an emerging effect on the lives and health outcomes of chronically ill adolescents (Sawyer, Drew, Yeo, &Britto, 2007). Loneliness, depression, anxiety and other disorders that often have been linked to chronic illness are now associated with lower levels of social connectedness (Hawkley, Masi, Berry, &Cacioppo, 2006). Social connectedness has also been related to patient recovery after major surgery. In their study on the effects of connectedness on patient recovery, Mitchinson et al. (2007) were able to show that connectedness was largely influential in patient's pre and post operation outcomes. Patients exhibited a link between the size of their social network and the levels of pain and anxiety they felt prior to the operation. After the surgery took place, patients with larger and more effective social networks showed faster recovery time and better outcomes. Lower levels of connectedness were linked to greater depression, opiate use, and pain intensity. The study also showed that participation in worship practices and other social functions was positively associated with more inner peace and relaxation post-surgery. This research suggests that lower connectedness and a smaller social network are related to a greater dependence on pain medication, caregiver attention, and emotional support.

Social Connectedness, Health, and Quality of Life

Though there is limited research on social connectedness, it nevertheless suggests that connectedness is related to various health outcomes. More research is needed in this area as social connectedness appears to be a highly understudied and undervalued topic. This study strives to further the link between connectedness and health outcomes by investigating whether connectedness will also be positively associated and predictive of the health related quality of life in patients suffering from chronic illness. Though group differences are not the main focus of this study, patients with both a conventional and functional somatic diagnosis will be examined.

Hypotheses. Following the empirical evidence of social connectedness and its positive health and relationship outcomes, it is hypothesized that increased levels of social connectedness would be associated with a greater quality of life. It is predicted that higher levels of social connectedness would be particularly linked to better physical and social functioning, less limitations due to physical health and emotional problems, less pain, better emotional well-being, and better general health. More social connectedness is also hypothesized to be related to less depression and anxiety among the participants.

Method

As part of the VOICE (Verification Of Illness, Coping, & Experience) study, 151 patients with chronic symptoms of illness persisting for over three months were recruited through online medical forums and chat rooms. The participants had to be at least 18 years of age, and had sought some type of medical advice for their symptoms. The VOICE study includes four different surveys and open-ended questions investigating personal beliefs about illness, coping and adjustment, and illness outcomes. They were: *How You are Coping with Your Symptoms*, *Personal Views of Your Physical Symptoms*, *Relationships with Others and Support*, and *The*

Impact of Illness on Your Life. The participants were free to complete as many questions and surveys as they liked, and were given the option to opt out of any survey whenever they wanted. The surveys were a part of a website created for this project (http://www.unf.edu/~llange/voice/), and served as the method of data collection. They began with an informed consent form that stated information about the project and the research team, explained the criteria for study participation and options the participants had in terms of ending the survey, privacy policies, or contacting the researchers. The first part of the surveys focused on medical information to determine the diagnosis participants were given, as well as the extent and the length of their symptoms. After completing the measures, the participants were directed to a debriefing form that thanked them for their input and addressed those participants who did not consent or did not qualify for the study.

Participants

The participants were recruited using medical chat rooms and forums. A notice was first sent out to the webmasters asking permission to post information about the study on the forum/chat room after which an announcement was posted on the site asking qualifying patients to participate (Appendix A). If they chose to partake in the study, participants were given a link to the VOICE website where they had access to the surveys. The announcement was posted on numerous websites and forums targeting a wide diversity of illnesses. Due to the fact that this study only targeted patients with chronic illness, any and all results pertain to a similar population and may not be a fair indicator of other groups, thereby limiting generalizability.

Over 300 participants completed one of the surveys, proving the efforts of the research team to be productive. Nevertheless, the study had approximately a forty percent attrition rate due to the exclusion of participants that did not consent to the study, those who had multiple

diagnoses, had a psychiatric or affective illness diagnosis, had no diagnosis or had medically unexplained symptoms, whose symptom length was less than three months, and those who did not complete all four surveys.

The final sample consisted of 151 participants ranging from 18 to 76 years, with a mean age of 46.5 (SD = 12.87) years. The sample consisted of 129 females (85.5%) and 22 males (14.5%). The majority of the participants (93%) were White/Caucasian, 73% were in a committed relationship, and 33% had an income level between $20,000 and $50,000. A major proportion of the sample (94%) had symptoms that persisted for over one year. Based on medical criteria established in the literature (Henningen, Zipfel, & Herzog, 2007; Stone, Carson & Sharpe, 2005), 57 participants (37.7%) were classified as having a conventional diagnosis when the origin of their pathology and treatment was known and 94 (62.3%) were classified as having a functional somatic illness if they suffered from symptoms rather than an illness of known etiology. Despite having an unequal sample size representation in the two conditions, the demographic information was similar for both illness groups. A chi-square test for independence revealed no significant differences between the two illness groups at α = .05 level. For more information on the demographics by group, please refer to Table 1. There were 47 various illnesses presented in the sample. The most reported diagnosis within the FSS illness group (as well as both groups) was Fibromyalgia (30%), while Sarcoidosis and Rheumatoid Arthritis were the highest reported diagnosis within the CD group. Refer to Tables 2 and 3 for additional information on illness distributions.

Table 1Demographics by Illness Group

	FSS	**CD**
Participants	94	57
Mean Age	47.27 (SD = 12.90)	45.20 (SD = 12.80)
Gender	82 Female, 12 Male	47 Female, 10 Male
Race[a]	89 (58.9%)	52 (34.4%)

Relationship Status[b]	70 (46%)	35 (23%)
Income	57 (37.7) in 50,000 or less	34 (22.5%) in 50,000 or less
	24 (15.8%) in 50,000-100,000	15 (9.93%) in 50,000-100,000
Illness	95 (63%)	52 (34.4%)
Duration[c]	$M = 14.1$ years, $SD = 13.1$	$M = 12.1$ years, $SD = 10.4$

[a] White/Caucasian. [b] Reported being in a relationship or married. [c] Symptoms lasting one year or longer.

Table 2 Illness Distributions within the Functional Somatic Group

Illness Name	n
Atypical Facial Pain	1
CFIDS[a]	5
Chronic Fatigue Syndrome (CFS)	9
Chronic Low Back Pain	4
Delusional Parasitosis	2
Fibromyalgia	45
Gulf War Syndrome	1
Insomnia	1
Irritable Bowel Syndrome	3
Morgellon's Disease	4
Multiple Chemical Sensitivity	2
Myofacial Pain Syndrome	2
Restless Leg Syndrome	14
Sick Building Syndrome	1

[a]Chronic Fatigue Immune Dysfunction Syndrome

Table 3 Illness Distributions within the Conventional Diagnosis Group

Illness Name	n	Illness Name	n
Adrenal Cancer	1	Interstitial Cystitis	1
Ankylosing Spondylitis	3	Lyme Disease	3
Arthritis	1	Macular Degenerative	1
Behcet's Disease	1	Meniere's Disease	5
Chiari Malformation Type1	1	Osteoarthritis	2
COPD[a]	1	Pernicious Anemia	1
CRPS[b]	5	Postpolio Syndrome	1
Crohn's Disease	1	Pudendal Neuralgia	2
Diabetes Insipidus	1	Rheumatoid Arthritis	5
Diabetes Mellitus	1	Sarcoidosis	5
Dysautonomia	1	Sclederma	1
Eczema/Dermatitis	1	Sjorgren's Disease	1
Ehlers Danlos Syndrome	3	SOD[d]	1
Endometriosis	1	Spondylitis	1
Epstein Barr Virus (EBV)	1	Stiff Person Syndrome	1
Grave's Disease	1	TMJ[c]	1
Hypothyroidism	1		

[a]Chronic Obstructive Pulmonary Disease
[b]ComplexRegional Pain Syndrome
[c]Temporomandibular Joint Dysfunction
[d]Sphincter of Oddi Dysfunction

Measures

Approximately twenty extensive scales were used as part of the VOICE project to gauge a wide variety of the experiences and struggles faced by the chronically ill population. Three of these scales were used for the current study.

Social Connectedness Scale: The primary scale of interest in this study is the social connectedness scale that was developed by Lee and Robbins (1995). The scale consists of eight items that evaluate the participant's level of belongingness and their feelings of bonding and connecting to the social world. The measure demonstrates high internal consistency, with Cronbach's alpha of .993 as evidenced by the collected data. This is in agreement with the assertion the scale as highly reliable ($\alpha = .91$, Lee & Robbins, 1995). Participants rated statements included in the measure on a five-point Likert type scale from 1 (agree) to 5 (disagree), with the total sum value ranging from 8 to 48 points. Items on the Social Connectedness Scale include statements like "I feel disconnected from the world around me" and "I feel so distant from people". Greater scores on this measure indicate a higher level of connectedness to the social world as perceived by the participants. For the purposes of this study, the average of the Social Connectedness Scale scores for each participant was used in the statistical analyses. There was no missing data for this scale, consequently it was not a concern during the analysis.

SF-36: The Short Form-36 was designed primarily as a measure of adjustment and health outcomes. It consists of 36 items and eight subscales that access physical, emotional and social components of health. The eight subscales are as follows: physical functioning, role

limitations due to physical health, role limitation due to emotional problems, energy/fatigue,

emotional well-being, social functioning, pain, and general health. The participants are asked to

rate the statements provided in the SF-36 from 0 to 100, where higher scores indicate more

advantageous outcomes (and in essence a better quality of life). The internal consistency of the

measure was relatively good, with each of the eight subscales reliability being at Cronbach's

alpha> .70. This is in accordance with the literature, with the SF-36 internal reliability of α> .75

for all subscales except social functioning (α = .73, Brazier, Harper, Jones, O'cathain, Thomas,

Usherwood, & Westlake, 1992). For more information on the SF-36 reliability distribution,

please refer to Table 4.

Table 4 Reliability Distributions for the SF-36 Scale

Area	Dimensions	Number of questions	Reliability
Functional status	Physical functioning	10	Cronbach α = .92
	Social functioning	2	Cronbach α = .86
	Role limitations due to health	4	Cronbach α = .91
	Role limitations due to emotional problems	3	Cronbach α = .88
Well-being	Emotional well-being	5	Cronbach α = .78
	Energy/Fatigue (Vitality)	4	Cronbach α = .83
	Pain	2	Cronbach α = .87
Overall evaluation of health	General health	5	Cronbach α = .70

PHQ-8: The Patient Health Questionnaire-8 is a measure of depression severity for a

population-based study. The measure asks the participants "Over the last four weeks, how often

have you been bothered by any of the following problems?". The PHQ-8 consists of eight items

scored on four-point Likert type scale from 0 ("not at all") to 3 ("nearly every day"). Some of the

items include "Little interest or pleasure in doing things", "Feeling down, depressed, or

hopeless", and "Trouble falling or staying sleep, or sleeping too much". The items are items

scores range from 0 to 24 points, with higher scores demonstrating higher depression. The scale

displays high internal consistency as part of the data collection with Cronbach's alpha = .85. This

is in concordance with the literature that also shows a high reliability of the measure (Cronbach's

alpha = .87, Kroenke, Strine, Spitzer, Williams, Berry and Mokdad, 2009). One of the ways that

depression was defined in the present study was having a score of $\geq$ 10 on the PHQ-8, with 88%

sensitivity and 88% specificity for major depression regardless of diagnosis status (Kroenke,

Strine, Spitzer, Williams, Berry and Mokdad, 2009). There was no missing data for this

particular scale, therefore it was not an issue during the analysis.

Symptom count, severity, and length: In order to gauge the full spectrum of illness

conditions and symptoms experienced by the participants, they were given a checklist of 63

symptoms and asked to choose any that apply to them or their condition. The participants were

asked if they had been bothered by these symptoms in the past four weeks and if these symptoms

relate directly to their illness. The symptom categories included nausea, dry mouth, amnesia,

back pain, paralysis, etc. The participants were asked to check all symptoms that applied to them.

The severity of the symptoms was assessed by asking participants "To what degree are

you now experiencing your persistent or intermittent physical symptoms?". The participants

recorded their response on a 5-point Likert type scale ranging from 1 (not at all) to 5 (extremely).

The length of the symptoms experienced by the participants was measured via their

responses to the question "For how long have you had these persistent or intermittent physical

symptoms?". Participants recorded their responses using a 4-point Likert type scale with the

possible choices of less than 3 months (1), 3 months to 6 months (2), over 6 months to 1 year (3),

and more than 1 year (4). Participants that chose less than 3 months were excluded from

participating in the study, while those that indicated symptom length of over a year were given the opportunity to specify the duration of their condition.

Results

Statistical analyses included correlational coefficients, multivariate tests, and hierarchical linear regressions and were completed using the IBM SPSS software program. An alpha level of Cronbach's alpha (α) = .05 was used for all of the analyses and Tukey's HSD post-hoc test was used when appropriate. For the analyses of variance (ANOVAS), Levene's test was used to assess the homogeneity of variance. In turn, scatterplots of residual values and Q-Q plots were used for the hierarchical linear regressions to assess the linearity and homoscedasticity of the values. In addition, a collinearity analysis was performed on all variables of interest. The tests did not reveal any assumption violations in the data. Due to missing data, the participant count is less than that of the final sample (N = 151) on some of the response measures.

Demographics and Variables of Interest

Descriptive statistics showed that participants exhibited a relatively low level of social connectedness, averaging approximately a 23, with 48 being the highest possible score on the Social Connectedness Scale (refer to Table 5 for more details).

Table 5 Summary Descriptive Statistics of Social Connectedness

		Statistics	
Variable	n	*M*	*SD*
Average Social Connectedness	151	2.87	1.27
Sum Social Connectedness	151	22.9	10.2

Analyses of Variance (ANOVAs) were calculated to determine potential demographic differences in social connectedness, depression, and the eight subscales of the SF-36 measure.

The results of the SF-36 scale were summed up and higher scores on the SF-36 indicated better outcomes for the particular subscales (Brazier, Harper, Jones, O'cathain, Thomas, Usherwood, & Westlake, 1992). The demographic variables used in these analyses were: gender, ethnicity, relationship status, income, education, employment status and illness group. The analyses revealed no significant differences in social connectedness and role limitations due to emotional problems for any of the demographic measures (p >.05).

The analysis showed that males had significantly higher level of depression than females $F(1, 149) = 3.05$, $p = .050$. There was also a significant difference between employment groups $F(4, 146) = 3.38$, $p = .011$. Tukey's HSD indicated that participants who were retired showed significantly less depression than those who were unemployed for health reasons and other/unemployed. No other employment groups or demographic variables were significant with depression scores.

The analysis also revealed significant differences in general health for ethnicity $F(1, 150) = 4.72$, $p = .031$ and gender $F(1, 149) = 5.05$, $p = .008$. It appears that Caucasian participants reported higher levels of general health that those of other races, while females had significantly higher levels of general health than males. No other analyses of general health and demographics were significant.

There were significant differences in pain based on the employment status. Students showed significantly lower pain than those unemployed for health reasons and other/unemployed $F(4, 146) = 4.53$, $p = .002$. In addition, participants who were employed and those who were retired had lower pain than those who were other/unemployed. No other groups were different from the others in pain levels.

Physical functioning showed a significant difference for the degree of education, with post-college graduates having significantly better physical functioning than those with some college and an associate's degree $F(5, 145) = 3.31$, $p = .007$. No other education groups were significant. There were significant differences in physical functioning based on household income, with the group earning more than $100,000 having significantly better physical functioning than any other group $F(3,144) = 4.42$, $p = .005$. Employment status also showed differences, with those unemployed for health reason having significantly worse physical functioning than those who were employed and students $F(4, 146) = 6.34$, $p < .001$. Participants than were employed and students were not significantly different from those who were retired and those other/unemployed, neither were those unemployed for health reasons.

Social functioning revealed a significant difference in the income level $F(3,144) = 3.46$, $p = .018$ and employment status $F(4, 146) = 4.02$, $p = .004$. Tukey's HSD indicated that participants earning more than $100,000 had significantly higher social functioning than any other income group, while those employed showed significantly higher social functioning than those unemployed for health reasons. There was a significant difference in energy/fatigue for relationship status, with those not in a committed relationship having more energy than those in a committed relationship $F(1, 150) = 5.42$, $p = .021$. No other demographics showed any differences for the fatigue variable.

The limitations due to health reasons showed significant differences in employment status $F(4, 146) = 4.54$, $p = .002$ and income $F(3, 144) = 2.71$, $p = .048$. Tukey's HSD revealed that students had significantly less role limitations due to physical functioning than any other group. Those who earned more than $100,000 had significantly less role limitations due to physical functioning than those whose income was$20,000 to $50,000 and $50,000 to $100,000.

The group receiving less than $20,000 was not significantly different from any other income groups.

The emotional well-being was the only test that revealed any group differences for the two illness types, with the conventional diagnosis group having a significantly higher emotional well-being than the functional somatic group $F(1, 150) = 3.92p = .050$. The analysis also revealed a significant difference in relationship status, with those not in a committed relationship having a significantly better emotional well-being than those in a committed relationship $F(1, 150) = 4.16, p = .043$. For full results of the demographics and variables of interest, please refer to Tables 6 -9.

Table 6 Analyses of Variance for Demographics and Variables of Interest

Variable	n	Social Connectedness		Depression		General Health	
		M	SD	M	SD	M	SD
Ethnicity		NS		NS		$p{\leq}.05*$	
White	141	2.88	1.28	12.3	5.71	52.3	9.28
Other/Multiple	8	2.68	1.15	12.8	6.24	46.0	7.18
Education		NS		NS		NS	
High school or less	6	2.70	1.77	14.0	7.32	47.5	5.24
High school graduate	8	2.29	1.08	14.1	6.47	53.1	10.7
Some college	55	2.95	1.32	13.1	5.60	50.1	9.51
Associates degree	17	2.90	1.31	13.3	5.69	51.3	11.2
Bachelor's degree	30	2.64	1.05	11.5	5.41	53.0	7.63
Post college graduate	35	3.10	1.32	10.7	5.65	54.2	9.26
Household Income		NS		NS		NS	
<$20,000	41	2.81	1.28	12.9	5.85	51.3	8.82
$20,000 - $50,000	50	2.63	1.24	13.5	5.68	50.6	9.09
$50,000 - $100,000	29	2.88	1.24	11.5	4.97	53.6	10.3
>$100,000	18	3.38	1.26	10.11	6.24	52.5	9.28
Gender		NS		$p{\leq}.05*$		$p{\leq}.05*$	
Male	24	2.93	1.26	14.9	5.99	50.7	2.11
Female	129	2.57	1.32	12.0	5.60	51.8	.781
Committed Relationship		NS		NS		NS	
Yes	111	2.78	1.25	12.6	5.53	52.7	8.30
No	41	3.11	1.30	11.8	6.27	51.5	9.62
Employment Status		NS		$p<.05*$		NS	
Employed	47	3.21	1.19	11.9	5.94	51.8	10.1
Disabled	44	2.66	1.30	14.3	5.43	53.2	9.90
Unemployed due to health reasons	8	2.77	1.33	13.7[a]	5.59	52.7	9.32
Student	8	2.82	1.29	10.3	5.44	50.6	9.03
Retired	14	3.11	1.20	8.14[b]	4.19	52.5	8.26
Unemployed/Other	9	2.44	1.64	13.3[a]	4.88	50.6	8.62
Illness Group		NS		NS		NS	

Functional somatic syndrome	94	2.80	1.29	13.0	5.78	51.7	9.24
Conventional diagnosis	57	2.98	1.24	11.3	5.53	51.9	9.39

NS: Non significant

Means with different letters were significantly different from each other.

*Table 7 Analyses of Variance for Demographics and Variables of Interest*_____

Variable	n	Pain M	Pain SD	Physical Functioning M	Physical Functioning SD	Social Functioning M	Social Functioning SD
Ethnicity		NS		NS		NS	
White	140	33.5	24.2	40.8	27.6	34.2	24.5
Other/Multiple	11	28.6	17.9	49.8	29.5	27.3	25.5
Education		NS		$p<.05$*		NS	
High school or less	6	20.4	25.2	27.5	30.9	33.3	25.8
High school graduate	9	22.2	13.8	44.7	26.4	34.4	18.6
Some college	55	31.4	21.7	35.4[a]	23.0	34.3	22.5
Associates degree	19	30.0	24.9	29.0[a]	28.0	31.6	28.0
Bachelor's degree	30	37.8	25.7	49.6	28.4	34.6	27.0
Post college graduate	34	33.3	25.5	52.1[b]	29.6	32.9	26.8
Household Income		NS		$p<.05$*		$p<.05$*	
<$20,000	40	33.8	26.5	36.4[a]	30.6	30.5[a]	26.4
$20,000 - $50,000	51	29.2	21.8	38.6[a]	22.7	33.0[a]	22.6
$50,000 - $100,000	40	32.2	20.1	40.3[a]	27.1	30.8[a]	19.6
>$100,000	19	42.4	28.2	62.6[b]	27.9	50.7[b]	30.2
Gender		NS		NS		NS	
Male	24	25.7	23.6	37.8	31.6	25.0	21.1
Female	129	34.6	23.6	41.9	27.2	35.5	24.8
Committed Relationship		NS		NS		NS	
Yes	114	31.2	23.6	40.9	28.9	33.1	22.9
No	40	38.6	23.6	43.0	24.8	35.4	28.9
Employment Status		$p<.05$*		$p<.001$**		$p<.005$*	
Employed	48	36.8	25.3	52.2[a]	25.6	41.5[a]	24.3
Disabled	44	24.9	17.8	26.2	19.3	24.7	20.3
Unemployed due to health reasons	53	27.8[bc]	21.3	28.0[b]	20.9	26.0[b]	20.2
Student	8	51.6[a]	24.7	55.6[a]	32.5	42.2	28.3
Retired	14	47.5[ab]	22.1	47.6	29.4	44.6	24.4
Unemployed/Other	30	25.7[c]	20.8	42.6	30.4	28.6	26.1
Illness Group		NS		NS		NS	
Functional somatic syndrome	94	30.8	23.26	42.3	28.3	31.7	23.6
Conventional diagnosis	57	37.1	24.27	40.1	27.0	37.1	26.0

NS: Non-significant.

Means with different letters were significantly different from each other.

*Table 8 Analyses of Variance for Demographics and Variables of Interest*_____

Variable	n	Energy/Fatigue M	Energy/Fatigue SD	Role limits Health M	Role limits Health SD	Role limits Emotional M	Role limits Emotional SD

Variable	n	M	SD	M	SD	M	SD
Ethnicity		NS		NS		NS	
White	140	54.4	12.3	8.51	24.6	37.2	42.7
Other/Multiple	11	58.2	17.5	<.001	<.001	50.0	45.3
Education		NS		NS		NS	
High school or less	6	60.0	16.7	<.001	<.001	30.6	40.0
High school graduate	9	60.6	17.2	<.001	<.001	20.8	30.5
Some college	55	54.5	11.6	3.18	11.8	38.8	42.9
Associates degree	19	52.6	17.1	17.6	36.2	29.2	46.0
Bachelor's degree	30	52.3	7.51	11.7	28.4	36.7	43.2
Post college graduate	34	55.1	14.0	10.7	29.3	44.3	45.5
Household Income		NS		$p<.05$*		NS	
<$20,000	40	53.2	14.8	8.54	22.8	37.4	42.9
$20,000 - $50,000	51	56.8	13.4	4.00[a]	16.3	33.7	43.7
$50,000 - $100,000	40	52.8	10.1	6.41[a]	22.7	46.6	41.6
>$100,000	19	54.2	10.5	22.2[b]	40.1	29.6	42.6
Gender		NS		NS		NS	
Male	24	54.1	8.82	12.5	29.6	27.3	39.4
Female	129	54.7	13.3	7.17	22.8	39.5	43.2
Committed Relationship		$p<.05$*		NS		NS	
Yes	114	53.2	12.0	9.00	25.8	42.2	4.52
No	40	58.5	13.8	4.88	17.0	45.2	10.1
Employment Status		NS		$p<.05$*		NS	
Employed	48	55.1	14.6	10.6[a]	27.0	35.5	42.5
Disabled		55.3	12.7	2.27[a]	15.1	34.5	43.5
Unemployed due to health reasons	53	56.2	12.4	2.40[a]	14.2	36.9	43.5
Student	8	47.5	15.1	37.5[b]	42.3	50.0	47.1
Retired	14	59.6	9.08	10.7[a]	27.2	50.0	44.8
Unemployed/Other	30	51.7	8.93	4.17[a]	18.7	37.2	42.4
Illness Group		NS		NS		NS	
Functional somatic syndrome	94	54.1	13.2	8.16	24.3	36.1	42.2
Conventional diagnosis	57	55.5	11.9	7.46	23.1	41.5	44.2

NS: Non-significant.
Means with different letters were significantly different from each other.

Table 9 Analyses of Variance for Demographics and Variables of Interest_____

		Emotional Well-being	
Variable	n	*M*	*SD*
Ethnicity		NS	
White	140	60.8	11.4
Other/Multiple	11	65.5	12.9
Education		NS	
High school or less	6	53.7	15.9
High school graduate	9	58.0	11.1
Some college	55	62.0	11.0
Associates degree	19	60.7	11.7
Bachelor's degree	30	61.9	10.6

Post college graduate	34	60.7	12.1
Household Income		NS	
<$20,000	40	59.2	12.1
$20,000 - $50,000	51	61.3	12.2
$50,000 - $100,000	40	61.2	10.8
>$100,000	19	62.4	9.52
Gender		NS	
Male	24	60.2	14.2
Female	129	61.1	10.9
Committed Relationship		$p<.05*$	
Yes	114	60.0	11.6
No	40	64.2	10.6
Employment Status		NS	
Employed	48	63.5	11.5
Disabled		60.0	10.6
Unemployed due to health reasons	53	60.7	11.5
Student	8	55.5	16.2
Retired	14	63.7	11.3
Unemployed/Other	30	58.7	9.47
Illness Group		$P=.05*$	
Functional somatic syndrome	94	59.7	11.0
Conventional diagnosis	57	63.5	12.1

NS: Non-significant.
Means with different letters were significantly different from each other.

Bivariate Analyses of Demographics, Connectedness & Outcome Variables.

Bivariate analyses using the Pearson Product-Moment correlation coefficient were performed to establish the relationship between the variables of interest (social connectedness and outcome variables) and illness related measures (age, overall symptom count, symptom severity, and symptom length). The analysis revealed significant correlations of illness measures with several of the outcome variables and social connectedness. Age was significantly correlated with general health, physical functioning, and role limitations due to health. Symptom length was significantly correlated with general health, energy/fatigue, and emotional well-being. Symptom severity correlated strongly with social connectedness, depression, physical and social functioning, pain, and role limitations due to health. Finally, the overall symptom count correlated significantly with social connectedness, depression, and all health outcome measures

except role limitations due to emotional problems and emotional well-being. For more details, refer to Table 10.

Table 10 Correlations of Illness measures with Social Connectedness and Outcome variables

Variable	Age	Length of Symptom	Current Symptom Severity	Overall Symptom Count
Social Connectedness	.551	-.067	-.207*	.177*
Depression	-.098	.436	.307***	-.286***
General Health	.165*	.184*	.053	.248**
Physical Functioning	-.184*	-.055	-.296***	.247***
Social Functioning	.039	.046	-.335***	.247**
Pain	-.001	-.084	-.462***	.245**
Energy/Fatigue	.009	.241**	. 056	.267***
Role Limits Health	.028	-.046	-.200*	.263***
Role Limits Emotional	.178*	.103	-.042	-.082
Emotional Well-Being	.119	-.174*	-.012	.036

*p < .05, **p< .01, *** p< .001

Bivariate Analyses of Outcome Variables and Social Connectedness

Bivariate analyses using Pearson Product Moment correlation coefficient were employed to determine the degree and nature of association between social connectedness and the outcome variables. The analysis revealed a significant correlation between social connectedness and all nine of the outcome variables (including depression and the eight subscales of the SF-36 scale). Lower levels of connectedness were associated with more depression (r(150) = -.55, p < .001), while higher levels of connectedness were associated with less pain (r(150) = .42, p < .001), more social functioning (r(150) = .48, p < .001) and better general health (r(150) = .21, p = .011). Depression was also significantly negatively correlated with all measures of the SF-36 scale, with more depression being associated with a better quality of life. Finally, some of the variables of the SF-36 measure were significantly associated with other subscales, although all of the correlations were either weak or slightly moderate. This was determined to not be an issue in

terms of multicollinearity. The results of the correlation analyses are summarized in Tables 11

and 12.

Table 11 Correlation Between Outcome Variables and Social Connectedness

Variable	Social Connectedness	Depression
1. Social Connectedness		
2. Depression	-.554***	
3. General Health	.206*	-.294***
4. Emotional Well-Being	.306*	-.358***
5.Pain	.419***	-.584***
6. Social Functioning	.476***	-.479***
7. Energy	.253**	-.164*
8. RL Health	.295***	-.400***
9. RL Emotional	.463***	-.508***
10. Physical Functioning	.292***	-.358***

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

Table 12 Correlation Between Outcome Variables SF-36

Variable	1	2	3	4	5	6	7
1. General Health							
2. Physical Functioning	.060						
3. RL Health	-.050	.303***					
4. RL Emotional	.148	.044	.284***				
5. Energy	.226**	-.018	-.064	.186*			
6. Emotional well-being	.282***	.112	-.027	.384***	.258*		
7. Social Functioning	.008	.474***	.426***	.156	.156	.244***	
8. Pain	.052	.483***	.572***	.250***	-.023	.150	.008

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

Multivariate Analyses of Connectedness & Outcome Variables.

Hierarchical linear regression analyses were carried out to establish the relationship

between social connectedness and the quality of life variables (depression and the eight subscales

of the SF-36 measure). The analyses accounted for the following demographic and socio-cultural

variables: gender, ethnicity, age, education, income, employment status, relationship status, and

illness classification. These demographics were used in every regression analysis and were

entered into Step 1 of the regression model. The analyses also accounted for the following physical illness variables: overall symptom count, severity of ongoing symptoms, and symptom length. These variables were also used for every regression analysis, and were entered into Step 2 of the regression model. Finally, social connectedness was entered into Step 3 of every regression analysis, serving as the primary predictor variable. The quality of life outcome variables were used as criterion variables in these linear regression analyses. As mentioned earlier, tests for multicollinearity and homoscedasticity revealed no violations of the linear regression assumptions. The VIF results of the collinearity analyses were all below the standard value of 3, revealing no multicollinearity issues in the analyses. The Q-Q plots performed for all variables of interest showed a linear distribution of the data with no ouliers.

The first analysis used the depression measure as an outcome variable. The overall model was significant $F(12, 128) = 9.13$, $p < .001$, accounting for 46.1% of the variance in depression. Social connectedness was the strongest independent predictor of depression accounting for 17.6% of the total variance in depression. Lower levels of social connectedness were associated with greater depression [$\beta = -2.013$, $t = -6.47$, $p < .001$]. The demographics accounted for 13.4% of the variance, and the physical symptoms accounted for 15.1% of the variance.

The majority of the variance in general health (10.3%) was accounted for by the physical symptoms with the overall symptom count [$\beta = .198$, $t = 3.17$, $p = .002$] and symptom length [$\beta = 5.091$, $t = 2.10$, $p = .038$] as significant predictors. The demographics accounted for 8.5% of the variance. The overall model explained 20.4% of the variance in general health $F(12,128) = 2.73$, $p < .01$, with social connectedness not adding much to the predictive power of the model [$\Delta R^2 = .15$, $p = .120$]

The socio-cultural variables appeared to be most influential in physical functioning, accounting for 17.9% of the model. Age was a particularly important predictor in this analysis [β= -.602, t = -3.36, p = .001], with greater age being linked to decreased physical functioning. The physical symptoms accounted for 8.9% of the variance, and social connectedness contributed 3.3% for a total model R^2 = 30.1% [F(12, 128) = 4.60, p< .001]. After controlling for the demographics and physical symptoms, greater levels of social connectedness were associated with increased physical functioning [β = 4.250, t = 2.47, p = .015].

The physical symptoms explained the majority of the variance in reported pain, accounting for 21.0%. Unsurprisingly, the severity of the symptoms appeared to be the strongest predictor of pain [β = -9.605, t = -4.80, p< .001], with more severe symptoms being associated with more pain. The demographics accounted for 10.4% of the total variance, and social connectedness accounted for 6.3%. After controlling for physical symptoms and demographics, social connectedness still proved to be a significant predictor of pain [β = 5.072, t = 3.59, p< .001] for a total model R^2 = 37.7% [F(12, 128) = 6.46, p< .001].

Social connectedness was shown to be the strongest independent predictor of social functioning, accounting for 14% of the variance. Greater levels of social connectedness were associated with more social functioning [β = 7.745, t = 5.24, p< .001]. The demographics accounted for only 8.1% of the variance while the physical symptoms accounted for 12.7% with symptom severity being a significant predictor. It appears that more severe symptoms are related to less social functioning [β = -6.351, t = -3.04, p = .003]. The overall model accounted for an impressive 34.8% of the total variance [F(12, 128) = 5.69, p< .001].

Social connectedness was also shown to be the strongest and most significant predictor of emotional well-being, accounting for 5.9% of the total variance. Specifically, greater levels of

social connectedness were associated with more emotional well-being [β = 2.394, t = 3.04, p = .003]. The socio-cultural factors accounted for 9.7% of the variance although no single variable was significant, while physical symptoms accounted for only 2.7% of the variance. The overall model accounted for 18.3% of the total variance [$F(12, 128) = 2.39$, $p < .01$].

The majority of the variance (13.4%) in vitality (energy/fatigue) was explained by the demographic factors, with age being the most significant predictor [β = .264, t = 3.00, p = .003]. Social connectedness was also a significant predictor of vitality, accounting for 4.3% of the total variance. Greater levels of social connectedness were associated with more vitality [β = 2.23, t = 2.647, p = .009]. The overall model was significant and accounted for 21.8% of the total variance [$F(12, 128) = 2.98$, p = .001], with the physical symptoms explaining 4.1% of the model.

Social connectedness was shown to be the single strongest predictor of role limitations due to emotional problems accounting for 21.4% of the total variance [β = 16.644, t = 6.23, $p <$ .001]. The demographic factors accounted for 7.7% of the variance and physical symptoms accounted for only 0.7% of the variance adding little to the predictive power of the overall model R^2 = 29.7% [$F(12, 128) = 4.50$, $p < .001$].

Finally, social connectedness was revealed as the strongest predictor of role limitations due to health, accounting for 5.9% of the total variance [β = 5.062, t = 3.05, p = .003]. The socio-economic factors accounted for 5.2% of the variance and the physical symptoms accounted for 7.1% of the variance, though no single variable was significant. The overall model accounted for 18.3% of the variance [$F(12, 128) = 2.39$, p = .008]. The statistical information pertaining to these analyses is summarized in Table 13.

Table 13 Summary of Hierarchical Linear Regressions for Quality of Life Variables

	Step 1 — Demographics	Step 2 — Physical Symptoms	Step 3 — Social Connectedness

	R^2	F $df(12,128)$	ΔR^2	F $df(12, 128)$	ΔR^2	F $df(12, 128)$	β	t
Variables								
Physical functioning	.179**	3.59**	.089**	4.30***	.033**	4.60	4.250*	2.47
Social functioning	.081	1.45	.127***	3.08***	.140***	5.69***	7.745***	5.24
Role limitations emotional	.077	1.37	.007	1.07	.214***	4.50***	16.644***	6.24
Role limitations health	.052	.906	.071b	1.65**	.059**	2.39**	5.062**	3.05
Emotional well-being	.097	1.77	.027	1.66	.059**	2.39**	2.394**	3.04
Vitality (Energy/Fatigue)	.134**	2.55**	.041	2.49**	.043**	2.98**	2.229**	2.65
Pain	.104	1.92	.210***	5.37***	.063***	6.46***	5.072***	3.59
General health perception	.030	1.53	.103**	2.72**	.015	2.73**	.985	1.57
Depression	.134**	2.56**	.151***	4.68***	.176***	9.13***	-2.013***	-6.47

Step 1 – Demographics included: gender, ethnicity, income, age, relationship status, employment status and illness classification. Step 2 – Physical symptoms included, overall symptom count, symptom severity, and symptom length. Step 3 – Social Connectedness was used as the predictor variable.

Depression and the 8 subscales of the SF-36 were used as the outcome variables in nine separate regression analyses.

Note: *F* statistic reported for overall model for each Step; Standardized β coefficients reported;

df: Degrees of freedom.

*p< .05, **p< .01, ***p < .001

Discussion

The results showed that social connectedness was a significant predictor of quality of life in terms of depression and seven of the eight subscales on the SF-36 measure. The hypotheses were supported with higher levels of connectedness being associated with better quality of life. Though it was not an analysis of primary interest in this study, the study did test for differences in the two illness conditions, the conventional diagnosis and the functional somatic groups. Though the literature suggests a distinction between the two groups in terms of their diagnosis and treatment options (Barsky&Borus, 1999; Stone, Carson & Sharpe, 2005), no such

differences were found in this study. The two illness groups showed no significant differences in social connectedness, health outcomes, or any of the demographics. The only significant difference was demonstrated for the emotional well-being subscale of the SF-36 measure, but even then the difference was minimal with *p = .05* and the conventional diagnosis group having slightly better emotional well-being therefore agreeing with the literature (Stone, Carson & Sharpe, 2005).

The average levels of social connectedness in this sample appear to be lower than those of other populations. The average sum of social connectedness in this study was approximately twenty three, indicating the lower end of the connectedness scale with forty eight being the highest possible outcome. The literature suggests that thirty four to forty is the typical connectedness level in a healthy sample of college students (Lee & Robbins, 1998; Lee & Robbins, 2000; Keough, Lee, & Sexton, 2002). Therefore, the sample used in this study had considerably lower levels of connectedness than average college students. This is unsurprising considering the social and emotional limitations like loneliness faced by patients of chronic illness (Hawkley, Masi, Berry, &Cacioppo, 2006). Though it was expected that the social connectedness levels would be lower in this sample, it is still staggering how much less connectedness patients with chronic illness in this sample actually reported.

Social Connectedness and Depression

Social connectedness was shown to be the strongest predictor of depression even after controlling for socio-cultural variables and physical symptoms. Social connectedness alone, accounted for an impressive 17.6% of the variance, while together with the demographic and physical symptom variables, it accounted for almost half (46.1%) of all the variance in the depression measure. The hypotheses were confirmed with lower levels of social connectedness

being associated with more depression. This is supported by the research of Lee and Robbins (1998) where having a weak sense of social connectedness is related to higher levels of depression, anxiety and low self-esteem. Lee and Robbins suggest this is due to the thwarted need to belong, because people with lower levels of connectedness are unable to properly achieve the need to identify and interact with others. The belongingness hypothesis put forth by Baumeister and Leary (1995) states that a lack of belonging can lead to more criminality, various chronic health problems, and even suicide. It is no surprise then that social connectedness, feeling in tune with the larger social world would provide a buffer against negative health outcomes and depression in particular. In their research on social connectedness, depression, and self-esteem, Williams and Galliher (2006) showed that connectedness was a strong predictor of depression and self-esteem, as well as a mediator between social support and health. In fact, the relationship between social support and psychological health was not significant when not taking into consideration the participants' sense of connectedness. These findings warrant more research and emphasis on social connectedness and its relationship to depression, suggesting that connectedness is an extremely underrated concept when examining health outcomes.

Social Connectedness and Health Outcomes

In this study, social connectedness was indeed a significant predictor of most health outcomes in the SF-36 measure and accounted for a noteworthy portion of the variance in seven of the eight subscales. Social connectedness appeared to be most influential to outcomes that deal with the social or emotional aspect of chronic illness. Accordingly, connectedness was most strongly implicated in social functioning, emotional well-being, and role limitations due to emotional problems. This is consistent with empirical evidence that shows connectedness as an important variable in buffering against loneliness, isolation, and emotional deprivation. In their

extensive research on connectedness and its roots in the belongingness hypothesis, Lee and Robbins (1995) indicate that connectedness and companionship are strong predictors of well-being and social satisfaction. This is reasonable given that connectedness makes one feel like they are part of the group and therefore belong in the social world. Having secure feelings about fitting in, one imagines that individuals are more likely to venture out and participate in activities, form relationships, and be satisfied with their social life. It has been shown that a lack of belonging (and therefore low levels of connectedness) is associated with a difficulty in the formation and maintenance of relationships, avoidance of any social activities, and a lack of tools to deal with isolation and feelings of exclusion (Lee, Draper, & Lee, 2001). It is hence unsurprising that social connectedness is most closely related to and has such an immense impact on social and emotional components of the health outcome measure, with stronger social connectedness being linked to more social functioning, better emotional well-being, and fewer role limitations due to emotional problems.

Despite having a lesser effect on the physical aspects of the SF-36 scale, social connectedness was still a significant and notable predictor of pain, physical functioning, vitality, and role limitations due to health. It must be noted that socio-cultural factors were responsible for a large portion of the variance in the vitality and physical functioning subscales, although the single most significant demographic accountable for the changes was age. This is plausible as it would be logical that younger individuals tend to have more energy and better physical functioning than those of older age. On the other hand, physical symptoms appeared to account for much of the variance in pain and role limitations due to health. This also seems reasonable, since symptom severity, the length of symptoms, and the overall symptom count would very likely have an effect on physical measures like pain. It is reasonable to assume that patients who

have more severe symptoms that have lasted for a longer period of time would have greater pain and more role limitations due to their health. It is therefore all the more impressive that even when accounting for the demographics and physical symptoms, social connectedness was still a significant predictor of physical health outcomes. The literature suggests that social connectedness serves as a good buffering agent against slower patient recovery, severe pain, and the use of drugs post-surgery (Mitchinson et al., 2007). It has also been implicated in better health outcomes for chronically ill adolescents (Sawyer, Drew, Yeo, &Britto, 2007). Overall, it appears that social connectedness has a major albeit overlooked impact on physical health outcomes, with higher levels of connectedness being related to less pain, more energy, better physical functioning, and less role limitations due to health.

Lastly, social connectedness was not a significant predictor of the general health measure. This may be due to the very subjective meaning underlying the general health status variable. General health may be too broad a concept, and participants could have had trouble identifying the precise nature of their responses. For example, the measure asked the participants to rate their general health as well as to predict whether they expect their health to get worse. These are highly subjective items that could have procured slanted results from the participants. Though it had good internal consistency, this subscale may not have been the best tool to ascertain the relationship between social connectedness and general health. In fact, the literature suggests that such a relationship exists, with higher levels of connectedness being linked to lower trait anxiety, less perceived stress, higher social self-esteem, less proneness to chronic loneliness and better subjective well-being (Lee & Robbins, 1995; Lee & Robbins, 1998; Lee, Keough, & Sexton, 2002).

Limitations and Future directions

This study was correlational in design, limiting causation and directionality inferences. Though it is evident that social connectedness is strongly associated with quality of life in chronically ill patients, we can only speculate as why and how this occurs. Looking at the research on belonging, depression, and isolation in chronic illness we understand that feelings of connectedness can be a crucial component of health outcomes and quality of life, but third variable problems that are so influential in correlational research limit our capacity to account for all factors related to and influencing this link. However, despite our inability to control for all possible third variables, several confounds such as socio-cultural variables, physical symptoms, and illness classifications were nevertheless controlled for in this study.

In terms of directionality, it is also unclear whether higher levels of social connectedness lead to having an improved quality of life or whether having a better quality of life consequently leads to having more social connectedness. Though connectedness was used as a predictor variable in this study, it is possible that patients who live in better conditions and perceive their quality of life as manageable participate in more activities, are less isolated due to their illness, and feel more connected to the social world.

Another limitation of this study was convenience sampling and the overrepresentation of white females. This suggests that women are perhaps more likely to seek out information and help in online studies and self-select to participate in health related research, consequently leading to a stronger support network. This study showed no significant differences of social connectedness in any demographic variables. Future studies should try to target more male and ethnically diverse participants in order to gauge whether connectedness truly does not depend on socio-cultural factors or whether the sample used in this study was under-representative of

certain populations skewing the results. Despite the fact that close to half of the sample was outside of the U.S, a more diversified sample would have been preferable. However, considering the population targeted in this study, it is quite impressive that 151 individuals struggling with ongoing symptoms of illness completed four surveys. This suggests the potential in using online research for better understanding illness experience in understudied patients.

Future studies should also include a control group consisting of individuals who are not experiencing ongoing symptoms of illness. This would allow researchers to establish a baseline to measure the variables of interest against and provide a beneficial insight into comparison analyses. The two illness groups targeted in this research project may be too similar to each other and although researchers propose that there are differences between them, this study suggests that all patients dealing with chronic illness face similar struggles and challenges. Having a control group may be essential in showing how much pain and misery these patients really handle and deal with daily.

This study showed that social connectedness has a strong link to quality of life variables and depression in particular. Though it was not a primary analysis of interest in this study, social support (measured by the Multidimensional Scale of Perceived Social Support (MSPSS), Zimet, Dahlem, Zimet, & Farley, 1988) was added to social connectedness as a predictor variable in the third step of the regression model. The same variables were used for the first two steps of the model, with all demographics being included in Step 1, and physical symptoms of illness being included in Step 2, depression was used as an outcome variable. Social connectedness was found to be the single strongest predictor of depression accounting for 17.6% of the total variance, while social support was not significant. This not only implies that social connectedness and social support are independent constructs, but also suggests that connectedness may be a much

better predictor of health outcomes than social support. There has been much research into the various benefits of social support, but this study proposes that being a part of the group and feelings of belonging may be more essential and more valuable than having support. Social connectedness is unfortunately a highly understudied concept, and this study recommends that more research is needed to fully uncover all the advantages of this variable.

In conclusion, this study suggests that social connectedness is a highly beneficial component of physical and psychological health, and that connectedness may be especially advantageous for patients struggling with ongoing symptoms of chronic illness. As the proportion of chronically ill adults goes up all around the world, their needs and the demands of their illness become a vital aspect of investigation, and social connectedness may be a key component of this research. This study showed that connectedness may be even more influential in predicting depression than social support. It also suggests that connectedness is associated with better health outcomes and quality of life. There are therefore strong implications for using connectedness in treatment and intervention programs. Knowing that patients are struggling with belonging and loneliness may lead doctors to adapt a more wholesome approach to treatment where the physical symptoms are targeted along with, and not aside from, the social and emotional aspects of the illness. Overall, social connectedness appears to be a vital concept to the study of depression and positive health outcomes with possible applications in both the medical and scientific fields.

Appendix A

Internet Announcement

DO YOU EXPERIENCE PHYSICAL SYMPTOMS THAT INTERFERE WITH YOUR LIFE?

IF SO, WE WANT TO HEAR YOUR VOICE!

Dr. Lori Lange and a team of graduate researchers at the University of North Florida are currently conducting web survey study on the impact of ongoing physical symptoms in the lives of patients. Specifically, we are recruiting patients who:

- are at least 18 years of age.
- have experienced ongoing or intermittent somatic symptoms for more than 3 months.
- have an illness with ongoing symptoms (e.g., arthritis, lyme disease, eczema, COPD) **or** suffer from a chronic syndrome (e.g., fibromyalgia, IBS, CFS, MCS), **or** experience medically unexplained persistent symptoms (e.g., pain, fatigue, fever).

If you would like to participate or desire further information, please go to: www.unf.edu/~llange/voice

Sincerely,

The VOICE Research Team

Appendix B

Measures

Social Connectedness Scale

Rated: 1 = agree, 2 = slightly agree, 3 = neutral, 4 = slightly disagree, 5 = disagree

1. I feel disconnected from the world around me.

2. Even around people I know, I don't feel that I really belong.

3. I feel so distant from people.

4. I have no sense of togetherness with my peers.

5. I don't feel related to anyone.

6. I catch myself losing all sense of connectedness with society.

7. Even among my friends, there is no sense of brother/sisterhood.

8. I don't feel I participate with anyone or any group.

Lee, R. M. & Robbins, S. B. (1995).Measuring belongingness: The Social Connectedness and

the Social Assurance Scales.*Journal of Counseling Psychology*, *42*(2), 232-241.

Patient Health Questionnaire PHQ-8

Over the last 4 weeks, how often have you been bothered by any of the following problems?

0=Not at all, 1 =Several days, 2=More than half the days, 3=Nearly every day

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Trouble falling or staying sleep, or sleeping too much
4. Feeling tired or having little energy
5. Poor appetite or overeating
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being
so fidgety or restless that you have been moving around a lot more than usual

Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B. W., Berry, J. T. &Mokdad, A. H.

(2009). The PHQ-8 as a measure of current depression in the general population.*Journal*

of Affective Disorders, *114*, 163-173.

SF-36

1. In general, would you say that your health is:
a. Excellent= 100
b. Very good= 75
c. Good= 50
d. Fair= 25
e. Poor= 0

2. Compared to one year ago, how would you rate your health in general now?
a. Much better now than one year ago= 100
b. Somewhat better than one year ago= 75
c. About the same as one year ago= 50
d. Somewhat worse now than one year ago= 25
e. Much worse now than one year ago= 0

The following items are about activities that you might do during a typical day. Does your health now limit you in these activities? If so, how much?

3. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

4. Moderate activities, such as moving a table, pushing a vacuum cleaner,
bowling, or playing golf
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

5. Lifting or carrying groceries
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

6. Climbing several flights of stairs
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

7. Climbing one flight of stairs

Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

8. Bending, kneeling, or stooping
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

9. Walking more than one mile
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

10. Walking several blocks
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

11. Walking one block
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

12. Bathing or dressing yourself
Yes, A Lot Limited= 0
Yes, A Little Limited= 50
No, Not At All Limited= 100

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

13. Cut down on the amount of time you spent on work or other activities
Yes= 0
No= 100

14. Accomplished less than you would like
Yes= 0
No= 100

15. Were limited in the kind of work or other activities
Yes= 0
No= 100

16. Had difficulty performing the work or other activities (for example, it took extra effort)
Yes= 0

No= 100

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

17. Cut down on the amount of time you spent on work or other activities
Yes= 0
No= 100

18. Accomplished less than you would like
Yes= 0
No= 100

19. Didn't do the work or other activities as carefully as usual
Yes= 0
No= 100

20. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?
a. Not at all= 100
b. Slightly= 75
c. Moderately= 50
d. Quite a bit= 25
e. Extremely= 0

21. How much bodily pain have you had during the past 4 weeks?
a. None= 100
b. Very mild= 80
c. Mild= 60
d. Moderate= 40
e. Severe= 20
f. Very severe= 0

22. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)
a. Not at all= 100
b. A little bit= 75
c. Moderately= 50
d. Quite a bit= 25
e. Extremely= 0

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks –

23. Did you feel full of pep?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

24. Have you been a very nervous person?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

25. Have you felt so down in the dumps that nothing could cheer you up?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

26. Have you felt calm & peaceful?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

27. Did you have a lot of energy?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

28. Have you felt downhearted & blue?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20

None of the time= 0

29. Did you feel worn out?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

30. Have you been a happy person?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

31. Did you feel tired?
All of the time= 100
Most of the time= 80
A good bit of the time= 60
Some of the time= 40
A little of the time= 20
None of the time= 0

32. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

a. All of the time= 0
b. Most of the time= 25
c. Some of the time= 50
d. A little of the time= 75
e. None of the time= 100

How TRUE or FALSE is each of the following statements for you?

33. I seem to get sick a lot easier than other people
Definitely true= 0
Mostly true= 25
Don't know= 50
Mostly false= 75
Definitely false= 100

34. I am as healthy as anybody I know
Definitely true= 0

Mostly true= 25
Don't know= 50
Mostly false= 75
Definitely false= 100

35. I expect my health to get worse
Definitely true= 0
Mostly true= 25
Don't know= 50
Mostly false= 75
Definitely false= 100

36. My health is excellent
Definitely true= 0
Mostly true= 25
Don't know= 50
Mostly false= 75
Definitely false= 100

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Curriculum Vitae
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Education
Masters of Arts in General Psychology · University of North Florida 2013
Bachelors of Science in Psychology · University of North Florida 2011
Minor in Chemistry · University of North Florida 2011

Research Experience
Verification of Illness, Coping, and Experience "VOICE" Project · Jacksonville, Florida (2011-2013)
Graduate Research Assistant · Health Physiology Lab at the University of North Florida · Advisor: Dr. Lori Lange

Self, Well-Being, and Social Behavior Lab · Self-Compassion and Relational Value Project · Jacksonville, Florida (2011-2013) · Graduate Research Assistant · University of North Florida · Advisor: Dr. Ashley Allen

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Teaching Experience
Undergraduate Research Methods Lab ·Instructor on Record ·2012-2013

Conference Presentations
Kleynshteyn, I., & Lange, L. (April 26th, 2013). Social Connectedness and Chronic Illness. Oral presentation at the Showcase of Osprey Advancements in Research & Scholarship, Jacksonville, FL.

Lemons, C., Kleynshteyn, I., & Lange, L. (March 13th, 2013). Adjusting to chronic illness: The role of illness representations and coping strategies. Poster presented at the Southeastern Psychological Association Annual Convention, Atlanta, Georgia.

Kleynshteyn, I., Lange, L., & Lemons, C. (January 18th, 2013). Social connectedness and quality of life in chronically ill patients. Poster presented at Society for Personality and Social Psychology Annual Convention, New Orleans, Louisiana.

Landgraf, A., Kleynshteyn, I., Allen, A. (January 19th, 2013). Self-Compassion and relational value. Poster will be presented at the Society of Personality and Social Psychology conference, New Orleans, LA.

Lemons, C., Lange, L., Eldred, K., DeVore, H., &Kleynshteyn, I. (August 3rd, 2012). Limited social support and emotional representations for patients with chronic illness. Poster presented at the American Psychological Association Annual Convention, Orlando, Florida.

Kleynshteyn, I., Lange, L., Eldred, K., Lemons, C., &DeVore, H. (August 3rd, 2012). How do patients adjust to the impact of conventional and functional chronic illnesses? Poster presented at the American Psychological Association Annual Convention, Orlando, Florida.

Landgraf, A., **Kleynshteyn, I.**, Allen, A. (March, 2012). Self-Compassion and relational value. Poster presented at the Showcase of Osprey Advancements in Research & Scholarship, Jacksonville, FL.

Volunteerism and Community Outreach
DKMS · Bone marrow registry drive (2011/2013)   Terry Parker High School Library (2005-2006)
The Blood Alliance (2009-2011)
American Cancer Society (2010)
Nemours Hospital Volunteer (2009)