

**INVESTIGATING THE ROLE OF SOCIAL NETWORKS IN  
ANTIDEPRESSANT MEDICATION INITIATION BEHAVIORS**

**by**

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To the memory of my brother, Larry John Lane Jr. and aunt, Lendia Steverson

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## **ABSTRACT**

### **Investigating the Role of Social Networks in Antidepressant Medication Initiation Behaviors**

**by**

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**Co-Chairs: Caroline A. Gaither and Suzan N. Kucukarslan**

**Background:** Medication adherence in depression continues to challenge patients and providers. Patients' social networks are theorized to impact medication use decisions, particularly in patients with depression. Pescosolido (1992) proposed the Network Episode Model (NEM) as a dynamic model that integrates social networks in predicting patient behavior. This model had not yet been studied in medication adherence research. This study examined the influence of social networks on medication initiation desires and intentions in patients with depression. In addition to the effect of social networks, the role of illness perceptions and medication beliefs on decisions to initiate medication was evaluated.

**Methods:** A randomized experimental post-test only study design was utilized. A 2 X 2-factor model was used to create patient scenarios where recommendation agreement between community and professional networks (conflicting versus

supporting) and physician's attitude toward community "lay" networks (positive and negative) were manipulated. The scenarios were written based on a hypothetical university student, recently diagnosed with depression. Participants were recruited at a large Midwestern University to participate in a 20-25 minute online survey (Qualtrics). Hypotheses were tested using ANOVA at the 0.05 level of significance. The medication initiation decision model was tested using Structural Equation Modeling (SEM).

**Results:** The overall response rate for the study was 23.5% (n=226). The respondents were primarily Caucasian (76%), Female (58%), Undergraduate (63%) and around 11% self-reported a previous diagnosis or a history of depression. Lay network confirmation or conflict of prescribers' recommendation had significant impact on both initiation desire and intention. However, professional network attitude toward community "lay" network involvement only affected initiation desire, with the expression of concern toward social network involvement in medication use decisions producing a higher desire to initiate medication therapy. The SEM showed that treatment concerns, beliefs about treatment necessity, and the perceived ability to control the illness were influential on the decision to initiate medication therapy.

**Conclusion:** Results demonstrate the importance of both "lay" network recommendations and professional "treatment" network attitudes toward "lay" networks in medication initiation desires and intentions. Health care providers must be cognizant of the potential role social networks play in patient medication use decisions.

## **CHAPTER I**

### **Introduction**

#### **Chapter Overview**

This chapter provides an introduction to this dissertation. It is divided into four sections. The first section is an introduction to the role that social networks in patient decision-making. The second section discusses the relevance of social networks in medication adherence research for patients with depression. The third section describes the research project. The chapter closes by presenting the study objectives and study hypotheses.

#### **Introduction to Problem**

Patients often make a conscious or intentional decision not to initiate medication. They may decide not to take the prescription to the pharmacy, have the prescription filled but not pick it up, or not start using the medication even after picking it up from the pharmacy. Recent studies have shown that even when the prescriber directly transmits prescriptions to the pharmacy 1 in 4 patients are non-adherent to drug therapy (Fischer et al., 2010).

The decision to initiate medication to treat an acute or chronic illness is multifaceted and multi-dimensional. There are generally two perspectives on how individuals make health care decisions. The first is individuals make decisions in isolation. The second perspective is that patients consult with others

and it is this interaction that ultimately influences decisions (Pescosolido, 1992). Social and administrative sciences in pharmacy researchers have typically taken the first approach when studying medication adherence. Medication adherence research has yet to account for the influence or roles of other groups or individuals in the patient medication adherence decision.

Research in other health-related decision making processes (e.g. information seeking, treatment seeking, and healthcare utilization) (Kjos, 2009; Phatak & Thomas, 2006; Piette, Heisler, Horne, & Alexander, 2006) provides support for investigating the relationship of social networks on patient medication adherence decisions. Social networks are conceptual structures that characterize a set of relationships. These relationships are most often described in terms of the structure of the relationships (structure), the function of the relationships or interaction (function), and the psychological and physical processes involved in the relationships or interactions (dynamics or content). There has been significant research to support social networks and their effect on healthcare outcomes, health related behaviors, and as a cause of illness. However, the majority of this research has focused on the function and structural aspects of social networks, while neglecting the dynamics or interactions.

Research in medication information seeking behavior has found that patients engage with lay and professional networks for different purposes and seek different information. Patients use both networks to aid in their medication and healthcare decision-making. Individuals consult their professional networks for factual information to aid in diagnosis, monitoring, and for prescriptive

recommendations. Patients consult their lay networks for health beliefs, assistance in developing their individual attitudes toward health, personal experiences, social support, and validation. Research is needed to understand how individuals act when they seek validation from their social network and when information from the social network is inconsistent from the professional network.

Research has shown that interaction with social networks impact health service utilization. Frequent contact with friends or family, and higher perceived social support resulted in greater general healthcare utilization. However, this increased social support and interaction with lay social networks produced lower mental health service utilization. Additionally, Vogel et al (2007) found that mental health service seeking behavior was strongly correlated with prompting by a network member, and knowing a network member who had experience with the mental health system. They also found that prompting and lay network knowledge of the healthcare system produced more positive beliefs about the benefits of treatment and more positive expectations of treatment. Interestingly, while prompting did not result in higher intention to seek treatment, a knowledgeable lay network did strongly correlate with higher intentions. These findings raise questions about an individual's decision-making process after seeking treatment and services and deciding to utilize services.

Conceptually the relationships between social networks and health care utilizations and decision-making have been clearly identified through the Network Episode model (NEM). The NEM is a dynamic, social network model of utilization and compliance that was intended to be applicable to all types of

illness, but particularly focused on mental disorders (Pescosolido, 1992).

Generally, the NEM states that the structure and function of social networks interact with cultural content (i.e. attitudes toward illness) to affect critical decisions through the onset and course of a health problem or illness.

Furthermore, understanding how these social networks are constrained by the dynamic (changing over time) social context and onset of medical problems is important to understand health and illness behaviors. Therefore, social ties (both informal/lay and formal/professional) are coupled with an illness episode to form the building blocks of the NEM.

The NEM model can be modified to predict patient decision-making by adding illness representation as defined by Leventhal's Common Sense Model (CSM). Illness representation has six components which are identity (i.e. the label of the illness, symptoms), the time-line (i.e. duration, cyclical), the causes, the consequences (i.e. physical, emotional, occupational, social, and functional costs), control (i.e. the degree to which the illness can be prevented, cured, and kept from progressing), and the individual's understanding of the illness.

According to the NEM, illness representation could be influenced from interactions with lay and treatment networks.

### **Significance**

Depression is one of the most common mental illnesses worldwide. According to the most recent National Health and Nutrition Examination Survey (NHANES) panel household survey results it is estimated that that 5.4% of persons aged 12 years or older in the US are suffering from depression. When

we examine treatment seekers by illness severity 15.6% would be defined as having mild depression, while 24.3% have moderate depression, and 39 % have the most severe type of depression (Pratt et al., 2008). Lifetime prevalence has been estimated to be around 13% in the US alone (Kessler, 2005). Major depression (Major Depressive Disorder) is the leading cause of disability of adults aged 15-44 in the US (WHO 2008).

Self-management of one's depression via pharmacological treatment with or without psychotherapy is the mainstay of treatment within traditional medicine. Medication adherence in depression is a major issue. A recent European study utilizing a Spanish prescription database, analyzing data from 2003-2007 found that 56% of new patients discontinued taking their medication within the first four months, while only 1 in 5 patients complied (took according to prescribed regimen) during an average four-month period (Serna et al, 2010). Studies in US populations have demonstrated a similar pattern in patients irrespective of payer or health setting, with approximately one-third of patients discontinuing medication with one-month and approximately 50% discontinuing within 3 months of initiation (Melfi et al. 1998, Katzelnick et al. 1996, Lewis et al. 2004, and Simon et al. 2001). Studies have identified several reasons for medication non-adherence, including prescription insurance coverage, costs, marital status, gender, source of care, perceived and actual health status, cognitive and functional impairments, adverse drug reactions, race, ethnicity, co-morbid disease states and mental disorders, inappropriate and appropriate poly-pharmacy, regimen complexity, social stigma, cultural attitudes and beliefs, and



religious practices (Serna et al. 2010, Lee et al. 2010, Schigemura et al. 2010, Hansen et al. 2010, and Interian et al. 2010). Despite the widespread knowledge regarding low adherence and compliance rates within this therapeutic class, little is known about the determinants or mechanisms of early discontinuation (within the first month) and failure to initiate therapy after receiving a prescription for an anti-depressant (Olfson, 2006).

### **Nature of research project**

The objectives of this dissertation were to (1) evaluate the impact of professional “treatment” network attitudes toward patient engagement with community (2) evaluate the impact of conflicting recommendations from community “lay” network and professional “treatment” network and (3) Examine the roles and relationships of community social networks in an individual’s decision to initiate prescribed antidepressant therapy.

A randomized experimental post-test only study design was utilized to study the influence of community “lay” networks and professional “treatment” networks in patient decision to start medication therapy for depression. A 2 X 2 factor model was used in which patient scenarios were created where recommendation agreement between community “lay” and professional “treatment” networks (conflicting versus supporting) and physician’s attitude toward community “lay” networks (positive and negative) were manipulated. The scenarios were written based on a hypothetical university student, recently diagnosed with depression. Subjects were instructed to consider the student in the scenario when answering study questions. The study population included

undergraduate, graduate, and professional students at a large Midwestern university. Participants were recruited via email and invited to participate in 20-25 minutes online survey (Qualtrics).

### **Objectives and Hypotheses**

Using the Network Episode Model (NEM) as a guide three objectives and eight hypotheses were identified.

**Objective 1:** Evaluate the impact of professional “treatment” network attitudes toward patient engagement with community “lay” network

**Hypothesis 1** Professional network encouragement for community “lay” social network involvement in healthcare management will increase the individual’s desire to initiate antidepressant therapy to manage depressive symptoms.

**Hypothesis 2:** Professional network encouragement for community “lay” social network involvement in healthcare management will increase an individual’s intention to initiate antidepressant therapy to managed depressive symptoms.

**Objective 2:** Evaluate the impact of conflicting recommendations from community “lay” network and professional “treatment” network.

**Hypothesis 3:** Confirming advice between an individual’s “professional” treatment network and their “lay” social network will result in greater desire to initiate antidepressant medication to manage depressive symptoms when compared to conflicting advice.

**Hypothesis 4:** Conflicting advice between an individual's "professional" treatment network and "lay" social network will result in lower intention to initiate antidepressant medication to manage depressive symptoms when compared to a confirming advice.

The following hypotheses were developed to test the interaction effect of conflicting recommendations (community "lay" network versus professional "treatment" network) and professional "treatment" network attitude toward community "lay" network.

**Hypothesis 5:** Professional network encouragement for social network involvement will increase the individual's desire to initiate anti-depressant therapy to manage depressive symptoms, in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 6:** Professional network encouragement for social network involvement will decrease the individual's desire to initiate anti-depressant therapy to manage depressive symptoms in the presence of conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 7:** Professional network expressed concern for social network involvement will increase the individual's intention to initiate anti-depressant therapy to manage depressive symptoms in the presence of conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 8:** Professional network expressed concern for social network involvement will decrease the individual's intention to initiate antidepressant therapy to manage depressive symptoms in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

Objective 3: Examine the roles and relationships of community social networks in an individual's decision to initiate prescribed antidepressant therapy.

## **CHAPTER II**

### **Review of Literature**

#### **Chapter Overview**

This chapter discusses the theoretical and empirical framework for investigating the roles and effects of social networks on an individual's prescribed antidepressant medication-related decision making. The Common Sense Model (CSM) is reviewed as the framework for studying patient behavior, which encompasses the role of social networks. This review is followed by a discussion of the Network Episode Model (NEM), a framework to study social networks and healthcare service utilization. Next, a critical review of research focusing on medication utilization, decision-making, and social networks is provided. The Theoretical Model of Effortful Decision Making and Enactment is included in the discussion of the psychological and behavioral processes involved in behavioral decision-making. Finally, research focusing on depression and medication use behaviors (primarily adherence) is reviewed.

After reviewing the theoretical background and the published research, three research objectives are presented. The objectives of this dissertation were to (1) evaluate the impact of professional "treatment" network attitudes toward patient engagement with community "lay" network (2) evaluate the impact of conflicting recommendations from community "lay" network and professional

“treatment” network and (3) examine the roles and relationships of community social networks in an individual’s decision to initiate prescribed antidepressant therapy.

## **Introduction**

The decision to initiate medication to treat an acute or chronic illness is multifaceted, multi-dimensional, involves many steps, and involves numerous factors. There are generally two perspectives on how individuals make health care decisions. The first is individuals make decisions in isolation. The second perspective is that patients consult with others and it is this interaction that ultimately influence decisions (Pescosolido, 1992). In the second perspective, sociological research examining the impact of personal interaction and health has a rich history spanning more than fifty years.

Social pharmacy research in this area has typically taken the first approach and considered the patient’s decision to be an individual one. The research has often neglected to account for the influence or roles of other groups or individuals in this decision making process. However, social networks have been linked empirically and theoretically to other health-related decision making processes. (Kjos, 2009; Phatak & Thomas, 2006; J. D. Piette, Heisler, Horne, & Alexander, 2006).

Empirical evidence using Leventhal’s Common Sense Model, Theory of Reason Action, Theory of Planned Behavior, and the Health Belief Model all point to the role of social networks in an individual’s determination of social norms and health behavioral intention. Research in the 1960’s found that peer

judgment has a significant impact on how an individual would evaluate physical symptoms and seek medication treatment (Friedson, 1961). Cameron, Leventhal, and Leventhal (1993) found that 92% of those who sought medical care reported talking to at least one person about their problem before seeking treatment.

### **Defining Social Networks**

When discussing social networks, there needs to be a clear and consistent understanding of the social network constructs. Based on previous empirical and theoretical research there must be a clear differentiation between social networks and social support. The majority of the literature within the health service field investigating social networks, used the terms interchangeably or did not adequately define the constructs (Ertel, Glymour, & Berkman, 2009).

Social networks are defined as conceptual structures that characterize a set of relationships (Faber & Wasserman, 2002). Typically, network theory aims to understand human behavior through social relationships or ties. The basic premise of the definition is that individuals and organizations shape everyday lives and experiences through consultation, resource sharing, suggestions, support, and nagging (Pescosolido & Levy, 2002). These networks set a context within groups, formal organizations and institutions for those who work in, or served by them, which in turn, affect what people do, how they feel, and what happens to them (Wright & Pescosolido, 2002).

Social networks are particularly important in health and healthcare. Social networks exist in the “lay” community, as it is most commonly conceived, but also

in formal health care system since all care is provided through human communication, with or without touch or human compassion, often in concert or opposition to community cultures, beliefs, and values. (Hohmann, 1999; Pescosolido, Wright, & Sullivan, 1995)

There has been research to suggest that social networks can be the cause of illness or disease as well as involved with the consequences including the recognition of problems as physical or mental health issues, help seeking (e.g. knowledge, advice, access, system barriers), involuntary treatment, caregiving, adherence and outcomes (Pescosolido, 2000). Currently, empirical findings indicate social networks matter. However, research still needs to explain how they are formed, how they are activated, and how they function in conjunction with patients' psychological, biological, or physical factors in performing health behaviors (Valente, 2010, Pescosolido & Levey, 2002).

There are three important features to consider when conceptualizing social networks: structure, content (dynamics), and function (Pescosolido & Levy, 2002). Berkman (1984) proposed that there are six elements of network structure: density and complexity, size, symmetry or reciprocity, geographic proximity or dispersion, homogeneity of network members, and accessibility. Content or dynamics of the interactions between individuals and their social network have often been conceptualized as involving information (both subjective and objective), advice, beliefs, and attitudes. Finally, on a behavioral level it has been posited that social networks function through four primary pathways: (1) social support; (2) social-influence; (3) social engagement and attachment; and



(4) resources and material goods. Social support is often used interchangeably with social networks, but utilizing these definitions, it is just one function of social networks.

Social support has been the most researched aspect of the social network literature within the health sciences. Social support consists of an objective appraisal of an individual's set of network contacts (both individual and group) and the functions these contacts perform. Social support involves an exchange or transaction between people. There have been numerous definitions proposed to conceptualize social support. Thoits suggests that support is "the degree to which a person's basic social needs are gratified through the interactions with others" (Gottlieb, 1981) House went on further to specify these basic social needs and defines social support as a transaction of (a) emotional concern, (b) instrumental aid (goods and services), (c) information, and (d) appraisal (information relevant to self-evaluation) (House, 1981). These support functions in conjunction with the four other functions (social engagement and attachment, social-influence, and resources) of social networks explain why social networks have both positive and negative effects on individual decision-making and behaviors. Non-supportive/non-helpful behaviors have been observed in a variety of health states, but most recently in transplantation research (Ladin & Hanto, 2010). Future research should look for other interactions or functions of social networks beyond social support. By choosing to examine social networks as it relates to health behaviors, the positive, the negative and abhorrent affects social networks will manifest.

## **Social Network Theory: A Health Service Utilization Focus**

Social network research has been generally a description of relationships or interactions using either a macro or micro paradigm with formal or informal categorizations. The macro paradigm focuses on larger societal and community level relationship, while micro paradigms are used to describe individual intimate social network systems. Formal categorizations focus on personal contacts that act as organized circuits of information and where interactions usually occur in planned or structured settings (e.g.. health-systems, employers, etc). Informal categorizations focus on personal contacts that include unplanned, unstructured, casual, spontaneous interactions (e.g. friends, family, acquaintances, etc). A third type of conceptualization often used in social network science describes the strength of the relationships or social ties.

Social network dynamics research or sociometry has extensively studied social ties. One of the earliest examples is the Strength of Weak Ties (SWT) Theory. This theory proposes that weak ties are more important for flow of new information within a social network (Granovetter, 1973). SWT theory defines strong ties as relations with family and friends, while weak ties are those with acquaintances or distant contacts. Though this theory has been shown to demonstrate one type of dynamic that may occur within a social network, it does not address the content, or function of the information.

Bernice Pescosolido, a medical sociologist, was interested in understanding how the social network experience and social network analysis relates to illness and illness treatment decision-making. She felt that social

network theory provided a concise, fluid, and comprehensive set of ideas that could provide the basis for a dynamic model for illness decisions and management. Additionally, social network theory clarified the role of socio-demographic factors known to be associated with medical care decisions. Pescosolido developed the Network Episode Model (NEM) a dynamic, social network model of utilization and compliance that was intended to be applicable to all types of illness, but particularly focused on mental disorders (Pescosolido, 1992).

Generally the NEM states that the structure and function of social networks interact with cultural content (i.e. attitudes toward illness) to affect critical decisions through the onset and course of a health problem or illness. Furthermore understanding how these social networks are constrained by the dynamic (changing over time) social context and onset of medical problems is important to understand health and illness behaviors. Therefore, social ties (both informal/lay and formal/professional) are coupled with an illness episode to form the building blocks of the NEM.

The NEM model was developed based on frequently utilized, health utilization models, such as those proposed by Anderson (1968) and illness decision models, specifically the Illness Career Model. The NEM is unique in that its origins lie in two fairly independent research lines, other than social network theory. First, theories of healthcare utilization and compliance were reviewed and augmented based on suggestions from social psychiatry, medical sociology, anthropology, and decision-making theory. Anderson's (1968) utilization model

was the primary theory selected. Taken from Anderson's model were his three factors that were identified as basis of an individual's rational decision making process regarding utilization: (1) accessibility of resources (financial and geographic) (2) nature of illness (i.e. severity, duration, etc.) (3) "pre-disposing" characteristics (i.e. sociodemographics). (Anderson, 1968) The model was modified to embed social processes where individual's network ties not only provide support and advice during illness episodes, but are sources of beliefs, attitudes and knowledge about medical options; provide information about the availability resources to help manage their condition, and the severity of the medical condition.

The second research line was based in health-behavioral models, primarily illness career approaches. Illness career approaches are characterized as "a series of related stages or phases of a given sphere of activity that a group of people goes through in a progressive fashion or on the way to a more or less definite and recognizable end point or goal" (Roth, 1963). Roth, a medical sociologist, in his pioneering 1963 book described how individuals proceed to illness discovery, treatment and recovery for several medical conditions. Roth's approach laid the framework work for other stage- based health behavioral theories, such as Prochaska and DiClemente's Trans-theoretical model (Prochaska, 1979). From Pescosolido's perspective this illness career consist of five phases following the onset of a problem: (1) Decision to Enter "Sick" Role (Recognition) (2) Decision to enter the "Patient" Role (Utilization) (3) Decision to follow medical advice (Initial Compliance) (4) Decision to terminate care, seek

alternative treatment, or self-help (5) Decision to continue Treatment (Secondary Compliance) (Pescosolido, 1991). Pescosolido also used the Health Belief Model to incorporate findings that attitudes and beliefs are major determinants of utilization. More specifically that the subjective state of readiness (beliefs about severity) and the subjective evaluation of circumstances (e.g. perceived benefits) affect an individual's decision to seek care (Rosentock, 1966).

The NEM was intended to be a dynamic exploratory model of the social process of illness and an individual's attempts to cope with it. The main concept focuses on the social nature of people, including the important relationships with others. These relationships form the foundation for all individual actions. This perspective is in contrast to the usual thinking, in that all human behavior is a calculated individual mental event that occurs in isolation (Pescosolido, 1992). This model is comprehensive and recognizes the importance of the "life course experiences" ethnographic nuances of the illness career, and the use of care and advice both inside and outside of the usual health care system (Pescosolido, 2006).

The current iteration of the NEM model is graphically presented in Figure 1. There are four basic assumptions that provide the basis for understanding the model. First is the belief that all societies hold a vast reserve of people who can be and are consulted during and illness episode (Gurin et. al 1960). Secondly, "bounded rationality" (rational decision process) rather than economic rationality underlie the process of decision making (Simon, 1976). Individuals make decisions that may not produce the optimal economic or financial gain, but make

choices based on their current needs, resources, and time allotted to make decisions. Third, the decision making process for individuals is dynamic. New information, resources, and conditions necessitate individuals change their decision making process to survive. The fourth, and most integral is that the mechanisms underlying the decision-making process are based on interaction with social networks. The strengths of this particular model in the context of medication use and illness are numerous.

The NEM accounts for the role of “social content” of the individual in illness and selection, usage, and formation of social networks. This social content includes social and geographical characteristics such as gender, age, education, work status, marital status, income and occupation. It also includes one’s personal health background such as an individual’s prior history of illness, coping styles, and history of medical insurance. Illness characteristics such as severity, visibility, duration, and acuity /chronicity are considered. Additionally, the NEM’s social content construct includes organizational constraints such as the organization, accessibility, and financing of medical care. Further, the NEM emphasizes both the effect of the social or “lay” network as well as the treatment or “professional” network in an individual’s illness and treatment utilization. Finally, the NEM acknowledges that individuals may have different roles in their illness (i.e. sick role, patient role, chronic role, disabled role, etc.) at different times during their disease and illness, which will also influence their use of social networks.

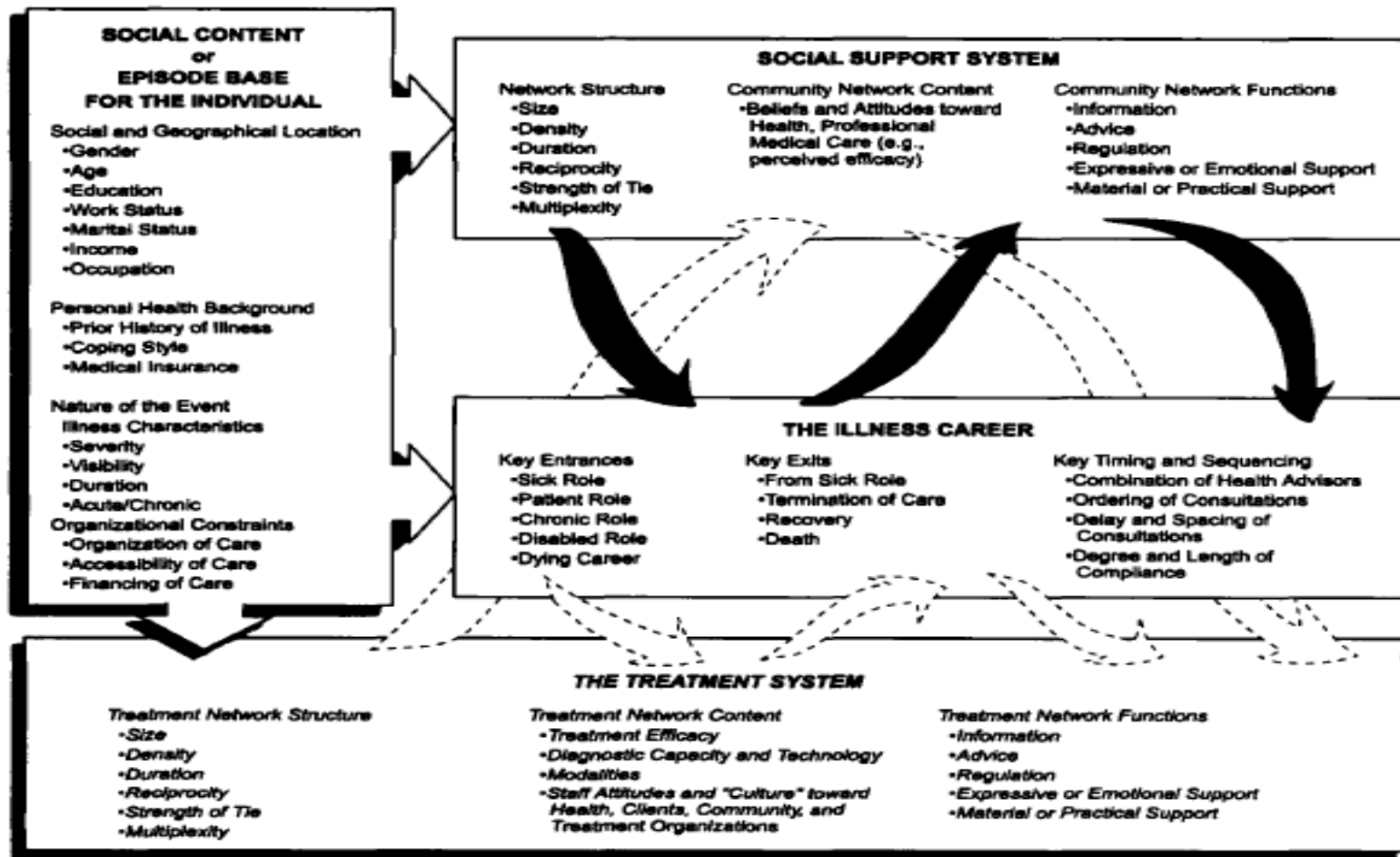


Figure 2.1 Network-Episode Model (NEM)

## **Social Networks and Medication Use Research**

Research integrating NEM concepts to study patient medication use is extremely limited. Kjos' dissertation work studied the roles social networks have in medication information seeking behaviors amongst adults in a Midwestern state (Kjos, 2009). An exploratory qualitative study was conducted with adults over 18 years of age with medication experiences. Subjects were recruited using purposeful sampling techniques at four sites representing Metropolitan Area Core, Metropolitan High Commuting and Small Town Core as defined by the Economic Research Service of the United States Department of Agriculture's "Rural urban Commuting Area" coding system. A total of 40 standardized structured interviews were conducted over a five month period with mostly female (70%), college educated (67.5%), retired (40%), urban dwelling (45%) respondents aged 19-89 (mean 55.3 +/- 18.9). Respondents took on average 6 (+/- 5.3) medications with a range of 1 to 23 medications. The majority (67%) took less than six. Approximately half of the respondents reported successful medication use experiences in past (50%) and had a positive attitude toward medication use (47.5%). The respondents had a variety of medication conditions including cancers, diabetes, organ transplantations, mental disorders, and HIV. However, overall the majority of respondents (75%) indicated that their health status was good (7-9) on a 10-point scale of self-reported health status. Respondents were provided with a \$35 gift card as compensation for completing the 45-minute interview.



Subjects completed audio-recorded structured undisguised interviews that included a protocol script with main questions, probes, and follow-up questions to describe the structure, content and function of the subject's social network with respect to medication information seeking behavior. This type of methodology was consistent with similar research in the area of health information seeking behavior and social networks (Agadjanian, 2002; Baker & Pettigrew, 1999; Carlsson, 2000; Friis et al., 2003; Tardy & Hale, 1998; Wellman, 1995). The interview script had three parts designed using Rubin's topical interviewing approach (1995). Part I consisted of individual characteristics related questions. Part II consisted of an optional eco-map exercise and main questions related to social networks. An eco-map is a written self-administered tool utilized to aid a respondent in recall and formal description of salient aspects of their social network. It is a graphical representation of one's social network. Respondents were provided with a sample social network and were instructed to diagram all the people or groups they interact with whom they discuss trivial or perhaps serious matters. They were asked to be as comprehensive as possible. This dissertation did not truly analyze the eco-maps, but rather used them as aids to prime the respondents to answer relevant study related questions. Part III asked participants to describe narrative accounts of information seeking behavior occurrences. The questions were based on previous literature, and the researcher's ideas for applicability to the context of pharmacy medication information. The interview guide was reviewed by an expert panel (consisting of faculty) and was pilot tested. The data was analyzed using ethnographic content

analysis and meaning categorization of interview transcript content, drawing on the principles of constant and theoretical comparisons.

The results showed that if a person was involved in the medication information seeking behavior incident, it was expected that the type of social contact could be placed into one of two categories: lay (anyone a person talked to about his or her medication outside of the health care realm) or professional (anyone a person talks to about his or her medication inside the health care realm). Within this dichotomy of lay and professional, eight subtypes emerged. The 'lay' subtypes included family, close friend, or acquaintance. The type 'professional' subtypes included nurse, physician, pharmacists, related or friend professional, and other health professionals. These two distinctions are consistent with the NEM model's community network (lay network) and treatment network (professional network), which collaboratively form the individual's larger social network.

The researchers also identified a third category that was not previously identified in the NEM framework. This third type was titled "self" (when a person referred to instance or instances when others have come to them for information). As stated earlier social networks are conceptual structures that characterize a set of relationships. Theoretically, the "self" would be the center of an individual's network and could be a contributing member of another's social network. The self would function within the other's social network similar to other members within their network. It could however be argued that through this interaction of providing information or advice to a network member could modify

an individual's perceived social norms regarding health, disease and illness. The NEM model would however state that this influence would be captured in interactions provided through content from social network members in the form of information utilized in belief and attitude formation. Therefore "self" should not be considered a separate category, but rather included in the content of social networks construct as proposed by the NEM.

The resulting themes and subthemes describing how individuals in the social networks function for medication information seeking scenarios were: network beliefs and attitudes, personal experience, and factual information. Additionally, factual information could further be divided into four subthemes, which included: adverse effects or interactions, cost or insurance, effectiveness, and use or dosing.

The content themes in the Kjos's study were similar with the broader constructs in the NEM model. The NEM model identified beliefs and attitudes towards health and professional medical care as content from "lay networks". The NEM classifies content from the "professional network" as treatment efficacy, diagnostics capacity and technologies, and treatment modality choices. In addition, the framework includes staff attitudes and "culture" towards patients, their lay network utilization, patient community, and treatment organizations. The professional network's attitudes and beliefs are often communicated to the individual through non-verbal communication, verbal modes of communication, and types and quantity of medical information or services provided.

The functions that were provided through social networks related to medication information were described by seven themes. The seven themes were decision-making, diagnosis, monitoring, prescriptive or recommendation, social support, staying informed, and validation. Four of the seven themes are consistent with the network functions as identified by the NEM model: information, advice, regulation, and social support (expressive or emotional, material, and practical). Three of the seven themes are consistent with the network functions as identified by the NEM: diagnosis, prescriptive or recommendation, and staying informed. Conceptually these last three could actually be considered part of main four themes identified. Staying informed is providing the patient with information. Prescriptive or recommendations could be considered advice or recommendation. Diagnosis could also be seen as advice or regulation.

The Kjos study had numerous limitations. First the study sample was not representative of the general population. Additionally, the respondents described their health status as higher than that reported in previous studies. Purposive sampling was initially utilized, but due to recruitment issues a more convenient sample was developed with the majority of respondents (47.5%) being from the same senior center. The study did not include important factors such as disease severity, type of disease, and resource availability within the context of social network selection of usage. The NEM model includes these factors in the social content construct.

Molloy et. al in 2008 studied the use of social networks by patients with recently hospitalized with acute coronary syndrome (ACS) (Molloy, Perkins-Porras, Bhattacharyya, Strike, & Steptoe, 2008; Molloy, Perkins-Porras, Strike, & Steptoe, 2008). These researchers tested whether social network size or partner stress predicts rehabilitation attendance, medication adherence, or quality of life. A social network was defined as relatively stable web of social relationships surrounding an individual. Partner stress was defined as negative interactions of close network member. The study was undertaken as part of larger multi-site study in the United Kingdom to study the behavioral and emotional triggers of ACS. The researchers did not base their study on specific theoretical framework, but did support their study based on previous works in the area. These works were primarily observational studies that demonstrated that close social relationships (social support, social ties, or social networks) predicted poor health outcomes (Cohen, 2004; House, Landis, & Umberson, 1998; and Seeman, 1996). Additionally, they used the work of Berkman et al. (2000) as defining behavioral pathways, by which social networks act (i.e. provision of social support, social influence, social engagement and attachment, and access to resources and material goods) in the design of their study. Study researchers surveyed 193 ACS patients during their hospitalization. They utilized Cohen's social network measure (1997) defined as the frequency of social interactions within a 2 week period with 12 specific sets of contacts (e.g. children, friends, neighbors, co-workers, etc.). The measure provides a scaled score ranging from 0 to 12, representing non-existent to extensive social networks, respectively

They categorized respondents into small social networks (less than 4 contacts), medium networks (4-5 contacts) and larger networks (>5 contacts). Negative affectivity was measured utilizing the Distress Scale (DS)-16 (Denollet, 1998). Partner stress was measured by asking participants within 5 days of their admission if their relationship had been stressful to them over the 6 months prior to their ACS episode. Other variables included adherence to medication prior and post admission and health related quality of life (SF-36). The adherence measure asked patients if they had any problems with medication, if they take medication every day and how often they miss a dose. Adherence and quality of life were evaluated 12 months after their discharge from the hospital. Clinical data was collected from patient measured 12 months.

The study found that patient non-adherence was predicted by partner stress ( $p=0.017$ ) with an adjusted odds ratio of 2.89. However, social network size alone was not found to be a significant predictor of medication non-adherence. When social network size and partner stress were included in the same regression model, they found significance ( $p=0.019$ ) and an odds ratio of 2.92. The researchers concluded that while social network size alone was not a predictor of non-adherence it becomes an important predictor of non-adherence in the presence of partner stress. These findings support the use of the NEM within a medication use framework. The NEM suggests that social network use, and formation is a result of numerous factors including relationship dynamics and network characteristics, which would explain why characteristics alone did not predict non-adherence. Additionally the framework emphasizes the importance

of the illness roles and nature of the illness and their potential relationship with patient behaviors, which could potentially explain the significance of partner stress. In the NEM, individuals may play different roles, which in turn will require entering and exiting their different networks, as well as utilizing them differently. These specific roles can also occur as result of responsibilities within the relationship. For example, partner stress could cause an individual to take on more or less of a sick role based on the needs and desires of the partner. If the partner needs them to be more of a caregiver, then they may occupy this role. Conversely, if the partner desires to care for the individual then they may assume more of sick patient role. Other findings of interest were that social network size predicted both physical and mental health status ( $p=0.008$  and  $0.032$ , respectively) with the effect remaining significant with the introduction of partner stress. These results are consistent with the extensive body of research that has shown having a larger social network produces better health outcomes, increases physical activity, and improves overall health status (Berkman, 1984; Berkman, Glass, Brissette, & Seeman, 2000; Levy & Pescosolido, 2002; Melchior, Berkman, Niedhammer, Chea, & Goldberg, 2003; Michael, Berkman, Colditz, Holmes, & Kawachi, 2002). This result is also consistent with the structure (size, density, etc.) construct within the NEM model.

The study however had significant limitations. Although their measure of negative affect (DS-16) is a validated measure, their measures of medication non-adherence and partner stress were non-standardized and lacked validation. These measures were developed based on discussion amongst the researchers

and were not pre-tested. They could have utilized objective measures of medication adherence, which the study authors stated were available. The partner stress measure could have been significantly affected by recall bias and social desirability. Because of longer time periods, individuals may have recalled more recent or more salient events more clearly. For example, when asked about partner stress over the last six months, the time period closer to their hospitalization may have been particularly more salient, allowing respondents to overly emphasize those stressful events. Additionally, admitting relationship stress may be culturally unacceptable within certain cultures and individuals may have been reluctant to discuss or admit partner stress. Either of these situations could have created an over-report or an under-report for partner stress.

Ncama et al (2008) examined the relationship between social support and medication adherence in patients with HIV. The researchers utilized an HIV specific social support definition developed by Burgoyne and Sanders (2000) and defined social support as assistance offered by one's social network, rather than professional network. Further work in HIV patients led them to define membership of their social support network as being family, friends, neighbors, and co-workers. The researchers focused on two specific research questions: (1) what are the characteristics of social support in relationship to medication adherence (disease specific) in this population and (2) Are there differences in medication adherence (disease specific) between those who have greater or lesser social support? They conducted a descriptive, exploratory study of 149



adults receiving treatment at one of four outpatient clinics in South Africa for HIV/AIDS. Participants were recruited while waiting to receive care and were provided with a food voucher for participation.

The study instruments consisted of socio-demographic questionnaire; questions about appointments, advice and instruction; Medical Outcomes Study (MOS) Social Support Scale; MOS SF-36; Morisky Adherence Scale; Perceived Non-Adherence Scale (ACTG). The MOS Social Support Survey is a validated 20-item summed Likert type measure of social networks and support with questions on the number of close friends and close relatives. Additional questions address different types of needs such as someone to help when one is confined to bed, someone to seek advice from during a crisis, someone to take you to the doctor, and someone in which to confide. Higher scores indicate greater social support. The MOS SF-36 is a validated generic measure that can be used with different populations to measure various components of quality of life. It consists of nine subscales, including aspects related to physical functioning, role physical, role emotional, body pain, social functioning, mental health, general health perception, vitality/energy/fatigue, and changes in health. The health transition scale is a one-item response to change in health over 1 year. The perceived non-adherence instrument is a validated nine-question survey that assesses adherence from the previous four days, within the past week, and periodically to more than 3 months prior to the interview. The instrument also assesses reasons for non-adherence. Finally, the Morisky Adherence Scale is a validated four item self-report dichotomous scale.

Responses are either positive or negative with scale scores varying from 0 to 4. Low adherence is indicated by a score of 0–1, a medium adherence score by 2–3, and high adherence by a score of 4. The data was analyzed utilizing Pearson correlation and multivariate regression.

The researchers found that there were no significant differences in social support or quality of life between those who reported high and low medication adherence. This result was disappointing for the researchers, but is consistent with the NEM models belief that social support is just one function of social networks and therefore the effect of social support on adherence, may be mediated or moderated by the other functions of the networks. They did however find, consistent with previous research that the number of close friends and family (network size) significantly correlated with a greater sense of social support.

This study utilized validated instruments, but had several issues with translation and back-translation of the instruments. Additionally, the respondents were asked to use multiple recall periods for different sections, which made the overall instrument cognitively complex for the respondents. Finally, the researchers did not consider other factors that may impact the decision to adhere to medication in their analyses, which they could have identified by using a theoretical framework such as the NEM. Those factors specifically salient to HIV include beliefs and attitudes toward illness from the lay and professional networks, illness characteristics, and the illness career.

## **Social Network and Social Support in Health Services Utilization Research**

Network research in health resource utilization and health-care decision-making was reviewed to supplement the limited research available in patient medication-use behavior. The scope of the health services research was limited to treatment behavior, excluding the prevention and promotion literature. The research in this area involving social networks ranges from large-scale epidemiological studies to smaller qualitative focus group and individual interview based studies.

Maulik, Eaton, and Bradshaw (2009) studied the role of social networks and social support in mental health service usage in Baltimore cohort of the Epidemiologic Cohort Area (ECA) study. The researchers combined concepts from the Anderson healthcare utilization model and the NEM model to develop their study model. Specifically, predisposing factors (i.e. social structure, demographic factors, and health beliefs), enabling factors (i.e. socioeconomic factors), social support, and social networks were included. The data for this study were gathered from the 1993-1996 (n=1920) and 2004-2005 (n=1071) ECA samples. Structured interviews were conducted by trained lay interviewers of a random sample of residents from the greater Baltimore area. Social networks were measured utilizing two sets of pre-tested questions. The first involved questions asking study subjects of the number relatives and friends they had kept in contact with in the past 6 months (network size). The second set of questions asked about the frequency of contact with friends or family, including

physical meetings, emails, postal mail, or phone over the last 6 months (frequency of interaction). Social support was measured through sets of questions that asked respondents about the perceived quality of support from friends, relatives, and spouse/partner provided over the past 6 months. From these questions they formed a summated score with values ranging from 6-24 with higher scores indicating better quality of perceived support. They also asked respondents about their mental health service usage and assessed their mental health status using the Diagnostic Interview Schedule, based on DSM-III-R criteria to identify the presence of mental illness or defect over the past 12 months.

The researchers found that over 50% of their study subjects had regular contact (at least a few times a month) with 6 or more relatives and over 30% had regular contact (at least a few times a month) with more the 6 friends. They found in an unadjusted regression model that reduced frequency of meeting with friend or relatives was associated with reduced odds of accessing general medical services. Increased social support of friends, relatives or partners was associated with and increased use of general health services. These findings support the NEM model. Respondents with more frequent contact with social network members could be using these interactions and members as actual treatment for their condition. As it relates to social support the individuals may be receiving emotional, instrumental, or social support necessary to motivate them and aid them in their decision to seek out the appropriate general health services. However when it came specifically to mental health services they found

that higher levels of social support reduced service utilization by 24% to 56%. These results also further support the dynamic nature of social networks and the belief that network usage depends on characteristics of the illness. When looking at frequency of contact, the researchers found a positive relationship between frequency of contact with friends and odds of accessing services across all mental health conditions. However, they also found that increased frequency of interaction with a relative or friend resulted in 40% and 60% reduction in general medical services, respectively. Again these results are consistent with the belief that usages of social networks are multi-factorial as proposed in the NEM.

This study was unique in that it utilized a population based sample and not a clinical sample in examining social networks and mental health service utilization. The authors concluded that the association between service use and social networks varied across friend, relatives, and spouse, but the association in increased social network and social support was not uniformly associated with decreased use of services. This is consistent the dynamic multi-factorial approach to social network approach to social network utilization.

The study was methodologically strong, but it also has numerous limitations. One major limitation is that of generalizability. The population surveyed was urban, predominantly minority, and had lower socio-economic status than the average US city. One would question whether the findings were more of an artifact of the structural or social factors. Additionally, social desirability and recall bias could be an issue due to the time frame utilized for

recall and the use of interviews as a mode of delivery. Finally the social support measures were developed specifically of this study and therefore were not standardized and limit their comparisons to other studies.

Another set of studies examined the role of one's social network in individual's decision to seek help from a mental health professional (Vogel, Wade, Wester, Larson, & Hackler, 2007). The researchers were led by three specific aims: (1) to examine the effects of one's social network on people's perceived social norms and anticipated outcomes of seeking mental health services (2) to examine the effects of one's social network on people's attitudes towards and intentions to seek mental health services (3) the potential differences in the effect of one's social network on the help-seeking behavior of women and men. Their research conceptual framework was formed by integrating the Theory of Reason Action (TRA) and the NEM model. They carried out this investigation in a series of two studies of two large samples of college students who expressed having mental health concerns (n=780, n=746).

In Study 1 the researchers examined the relationship of an individual's social network to his or her (a) seeking mental health services, (b) anticipating the risks and benefits (i.e. the expected outcomes) of seeking mental health services, and (c) the perception of the social norms towards seeking mental health services. Social network was measured by asking if the individual had been prompted to seek help by someone she or he knew, or knew someone else who had sought help. Perceived risk and benefits of seeking help from a mental health professional was measured using the Disclosure Expectations Scale

(DES; Vogel & Wester, 2003). The DES is a validated 8-item questionnaire designed to assess participants' expectations about the risks and benefits associated with talking about an emotional problem with a therapist. Social norms were measured using a previously developed and tested item which asked respondents their level of agreement on a 5 point scale with the following statement, "People who are important to me would think that I should seek help from a mental health professional if I were experiencing a personal problem." They hypothesized (1) that those who had been prompted to seek help and those who knew someone else who sought help would be more likely to seek help and to have greater expectations of the benefits and fewer expectations of the risks of talking to a therapist (2) that being prompted to seek help and knowing someone who had sought help would be associated with the belief that one would find approval from his or her social network for seeking psychological help for a personal problem (i.e., positive social norms).

The researchers found that of those that indicated they would seek mental health services, 75% had been prompted to seek help by someone they knew and 95% knew someone who has sought help. These results are consistent with the NEM framework regarding lay network using in the decisions regarding health service utilization. They also found that those who are prompted to seek help or knew someone who had sought help had more positive beliefs about the benefits of talking to therapists and had more positive expectations than those who were not prompted or did not know someone who had sought help. They however did not find any relationship between prompting and network member

knowledge and anticipated risk. These results underscore the importance of understanding the actual content/dynamics of the interaction with the social network members in addition to knowing the interaction occurred, which is a fundamental part of the NEM model.

In study 2 the researchers wanted to replicate their findings from study 1 and examine the relationships of being prompted to seek help and knowing someone who had sought help on attitudes and intentions to seek mental health services. Perceived risk and benefits were measured, using the previously described DES. Attitudes toward seeking mental health services were measured with the Attitudes Toward Seeking Professional Psychological Help Scale (ATSPPHS; Fischer & Farina, 1995). This validated 10-item measure asked respondents about their agreement or disagreement about statements such as “If I believed I was having a mental breakdown, my first inclination would be to get professional attention. Intention to seek mental health service treatment was measured using the Intentions to Seek Counseling Inventory (ISCI; Cash, Begley, McCown, & Weise, 1975). The ISCI is a validated 17-item measure which asked respondents how likely they were to seek therapy if they were experiencing one of the problems listed (i.e. relationship difficulties, depression, personal worries, etc.). They hypothesized that those who were prompted to seek help and knew someone who had sought help would have more positive attitudes and intentions to seek mental health services.

In their attempt to replicate the findings from study 1, they produced the same significant findings. They also found that those who were prompted to seek



help knew someone who sought help or had previously sought help had more positive attitudes about seeking mental health services than those who had not been prompted or know someone who had sought help. These results are consistent with the NEM model again underscoring the importance of interaction with their social network members, and the individual's own previous experiences with health service utilization. As it related to intent to seek treatment, prompting did not result in greater intention to seek treatment, but knowing someone who had sought treatment and having sought treatment in the past did significantly increase intention to seek treatment. Again, this underscores the importance of dynamics/content of the interaction with an individual's social network and previous experience with the treatment system will strongly impact future intention to utilize services.

This particular series of studies provided a good example of how the NEM can be integrated effectively into a traditional health behavior framework to examine health attitudes and behavioral intention. However, the study was limited in that it did not get details regarding the dynamics of the interactions between networks members or the content of the interactions between network members.

### **Psychosocial Behavioral Decision Making**

Up to this point the discussion has focused on the more behavioral aspects of the decision science. However, social, psychological, and behavioral research has shown us that there are numerous psychological processes involved in decision science. Bagozzi and his colleagues (2003) proposed a

model that is based on the decision science literature. The Theoretical Model of Effortful Decision Making and Enactment describes the process involved in a behavioral decision and how this decision results in an action (Bagozzi et al., 2003). The general premise of the theory is that individuals choose to initiate behaviors to achieve some goal. The model conceptualizes the decision process from the initial motivational impetus to achieve a goal through the decision enactment. It also includes emotional and cognitive factors that affect this decision-making and enactment process.

As it relates to the discussion of medication use behaviors, the model introduces two different and important steps that occur prior to an individual deciding to do a behavior. First the individual must have some desire and intention to achieve the goal of the intended behavior. For example, a patient may be considering initiating medication to control or improve a health condition, to improve physical appearance, or to prevent future health problems. The goal desire is the intensity by which an individual will pursue a goal. After the individual has an established goal-desire then he or she will have some intention to achieve that goal. Individuals may seek a goal as highly desirable, but feel that they lack the resources or ability to achieve it and therefore may have a low intention or commitment to attain a particular goal or end state. This theory makes this important differentiation between the psychological processes of intention and desire. Desire is the motivational impetus, while the intention is the commitment to enact.

The second differentiation is that these desire and intentions occur when evaluating their goals, but also when deciding whether to enact the chosen behavior. This second component of the process, implementation desire and intention, represents the individuals overall planned intention to carry out a specific goal directed behavior. The desire represents the intensity at which an individual would want to pursue the behavior, while the implementation intention is the individual's commitment or perceived likeliness to pursue the behavior. Just as with the goal, individuals may see the behavior as highly desirable, but fail to believe that they have the ability or resources to actually carry-out the behavior.

### **Medication Adherence in Depression Research**

Depression is one of the most common mental illnesses worldwide. According to the most recent National Health and Nutrition Examination Survey (NHANES) panel household survey results it is estimated that that 5.4% of persons aged 12 years or older in the US are suffering from depression. Persons seeking treatment may be defined as mildly depressed (15.6 %), moderately depressed (24.3 %) or severely depressed (39%). (Pratt et.al 2008). Lifetime prevalence has been estimated to be around 13% in the US alone (Kessler 2005). Major depression (Major Depressive Disorder) is the leading cause of disability of adults aged 15-44 in the US (WHO 2008).

Self-management of one's depression via pharmacological treatment with or without psychotherapy is the mainstay of treatment within traditional medicine.

Despite the benefits of medication therapy, medication adherence in depression is a major issue. A recent European study utilizing a Spanish prescription database, analyzing data from 2003-2007 found that 56% of new patients discontinued taking their medication within the first four months, while only 1 in 5 patients complied (took according to prescribed regimen) during an average four-month period (Serna et al 2010). Studies in US populations have demonstrated a similar pattern in patients irrespective of payer or health setting, with approximately one-third discontinuing medication within one-month and approximately 50% discontinuing within 1 month (Melfi et al ,1998, Katzelnick et al, 1996, Lewis et al, 2004, and Simon et al, 2001).

Studies have identified several reasons for medication non-adherence in patients, including prescription insurance coverage, costs, marital status, gender, source of care, perceived and actual health status, cognitive and functional impairments, adverse drug reactions, race, ethnicity, co-morbid disease states and mental disorders, inappropriate and appropriate poly-pharmacy, regimen complexity, social stigma, cultural attitudes and beliefs, and religious practices (Serna et al, 2010, Lee et al, 2010, Schigemura et al, 2010, Hansen et al, 2010, Interian et al, 2010). Despite the widespread knowledge regarding low adherence and compliance rates within this therapeutic class, little is known about the determinants or mechanisms of early discontinuation (within the first month) and failure to initiate therapy after receiving prescription for anti-depressant (Olfson 2006).

The only published study that examined the incidence and characteristics of patients who declined antidepressant treatment (defined as non-fillers and single rx-fillers) was conducted in Netherlands in 2008 (van Geffen, 2009). The researchers defined the decision to initiate medication as a complex cognitive process. They believed it involved patient recognition of the problem requiring physician consultation; a physician-patient interaction that results in medication being prescribed; patient decision to present the prescription for pharmacy dispensing; patient decision to pick up dispensed prescription; patient's decision to initiate and take the first dose of medication; and finally the patient decision to persist in drug-taking behavior. Previous research has shown that the decision to initiate therapy by the patient can be influenced by the way in which a patient evaluates his/her need to medication relative to cost (J. D. Piette et al., 2006). In this retrospective database study, which linked medical and prescription databases, researchers found that one in four patients who receive a first-time antidepressant declined treatment. They found that age, educational level, non-western background, having a specific indication (vs. general symptoms), perceived health status, contact with a general practitioner within 28 days of prescription date, type of medication (SSRI vs. non-SSRI) differed among decliners (patients who do not fill or only filled a single prescription in the pharmacy) and initiators (patients who filled at least two consecutive antidepressant prescriptions). Additionally, they found that gender, perceived health status, and contact with a general practitioner within 28 days of prescription fill date differed among non-fillers (patients who received a

prescription from their general practitioner, but did not fill the prescription at the pharmacy within 30 days) and fillers (patients who received a prescription from their general practitioner, and filled the prescription at the pharmacy). Finally, they found that patients with a non-specific indication for prescribing, non-western immigrants, greater than 60 years of age, female, attained less than or equal to a pre-college education, self-reported poor/moderate health status, and who were prescribed and SSRI prescribed were less likely to get their antidepressant medication filled. Though the research had the strength of being based a population-based dataset that combined both clinical and prescription data, the study had on several major weaknesses. First, because of its retrospective design the researchers were not able to gain insight into the process of prescription non-fulfillment. Additionally, it did not identify a reason for patient's non-filling behaviors or whether notification of the GP of the patient's behavior affected their subsequent medication use behaviors.

The results from this study are consistent with the key components of the social content/episodic base construct within the NEM model, which impacts health service and social network utilization. Gender, age, educational attainments are components of the social and geographical location aspect of the construct. Additionally, self-rated health status is part of both the personal health background and nature of the event construct. Furthermore, non-western cultural classification is a characteristic of the lay social support systems, while prescribing habits are characteristics of the individual's treatment system/network. Interestingly, during the discussion section of their paper van

Geffen and colleagues identified several reasons for antidepressant prescription denial based on previous literature. These reasons included a lack of a shared understanding between prescriber and patient in regard to the problem and treatment; disparity in patient's and prescriber's attitudes toward antidepressant treatment; differences in patient and provider perspective; patient may not expect to receive a prescription, the prescriber and patient could both be more interested in non-pharmacological options such as psychotherapy (both formal and informal); and patients may initially agree but change their mind based on additional information and interactions with their social network. These reasons further demonstrate the strength of utilizing the NEM framework in exploring medication utilization behaviors.

As stated previously several health behavioral models have been utilized to model consumer medication behavior. One such model, the Common Sense Model has been extensively studied to explain consumer medication behavior and proposes a role for social networks in medication use behaviors. The CSM incorporates the individual's emotional and cognitive perception of their illness in their medication use behaviors, which are consistent with the NEM framework.

### **Leventhal's Common-Sense Model (CSM)**

Behavioral scientist and psychologist Howard Leventhal originally conceptualized the Common-Sense Model of self-regulation during the 1960 and 1970s. He began investigating how fear messages in acute situations may lead individuals to begin health-promoting behaviors, specifically seat-belt wearing and smoking cessation (Leventhal,2003). He found that different types of

information were needed to influence both attitudes and actions to perceived threats to health and well-being, and these only lasted for short periods of time. He therefore became interested in understanding what adaptations and coping efforts need to be made and maintained for those experiencing chronic illnesses.

Leventhal and his colleagues developed a dual-process, hierarchical adaptive system with three main constructs. The model proposes that representations of illness experience will guide one's action planning, coping responses, and performance of health-promoting behaviors. Individuals will monitor the success and failure of the coping and behavioral promoting behaviors using an appraisal process. The dual process, which makes the model unique, differentiates the active parallel cognitive processing of how individuals regulate their responses to illness and the individual's regulation of emotional control. The entire model occurs within a socio-cultural context that can be affected by characteristics of the individual. A visual representation of the CSM model is depicted Figure 2.2. A key construct of interest in the CSM is illness representations or 'lay' beliefs about illness. These representations integrate with existing beliefs (the normative guidelines that people hold), enabling them to make sense of their symptoms and guide any coping actions. Leventhal identified five components of these illness representations:

1. *Identity*: the label or name given to the condition and the symptoms
2. *Cause*: the individualistic ideas about the perceived cause of the condition, which may not be completely biomedically accurate



3. *Timeline*: the predictive belief about how long the condition might last (i.e. acute or chronic)
4. *Consequences*: the individual beliefs about the consequences of the condition and how this will impact the individual physically and socially
5. *Curability/controllability*: the beliefs about whether the condition can be cured or kept under control and the degree to which the individual plays a part in achieving this

These representations will be based on information gathered from personal experience as well as the opinions and discourses of significant others, health professionals and media sources, reflecting issues such as stress, environmental pollution and other pathogens.

As people with a chronic illness obtain new information about their condition and evaluate their attempts to moderate, cure or cope with its effects, new representations are formed and developed based upon these experiences. Illness representations are in effect cumulative, with information being adopted, discarded or adapted as necessary. These representations are linked to the selection of coping procedures, action plans and outcomes.

As it relates to social networks, Leventhal's model proposes that social networks play a role as sources of information for the identification of an illness stimulus, and provide support in the development and appraisal of cognitive and emotional coping strategies. Leventhal et al propose relationships within the networks may improve as a result of improvement in illness outcomes, and that

social networks (operationalized as institutions, groups, and social roles) may provide the actual and perceived social-context that may be used in the evaluation of specific illness episodes (Leventhal, Leventhal, & Contrada, 1998). Additionally, the CSM defines an individual's illness representations at the person-level, which is consistent with the NEM model. The roles of social networks in the CSM have been not been extensively or clearly, empirically tested. (Hagger & Orbell, 2003)

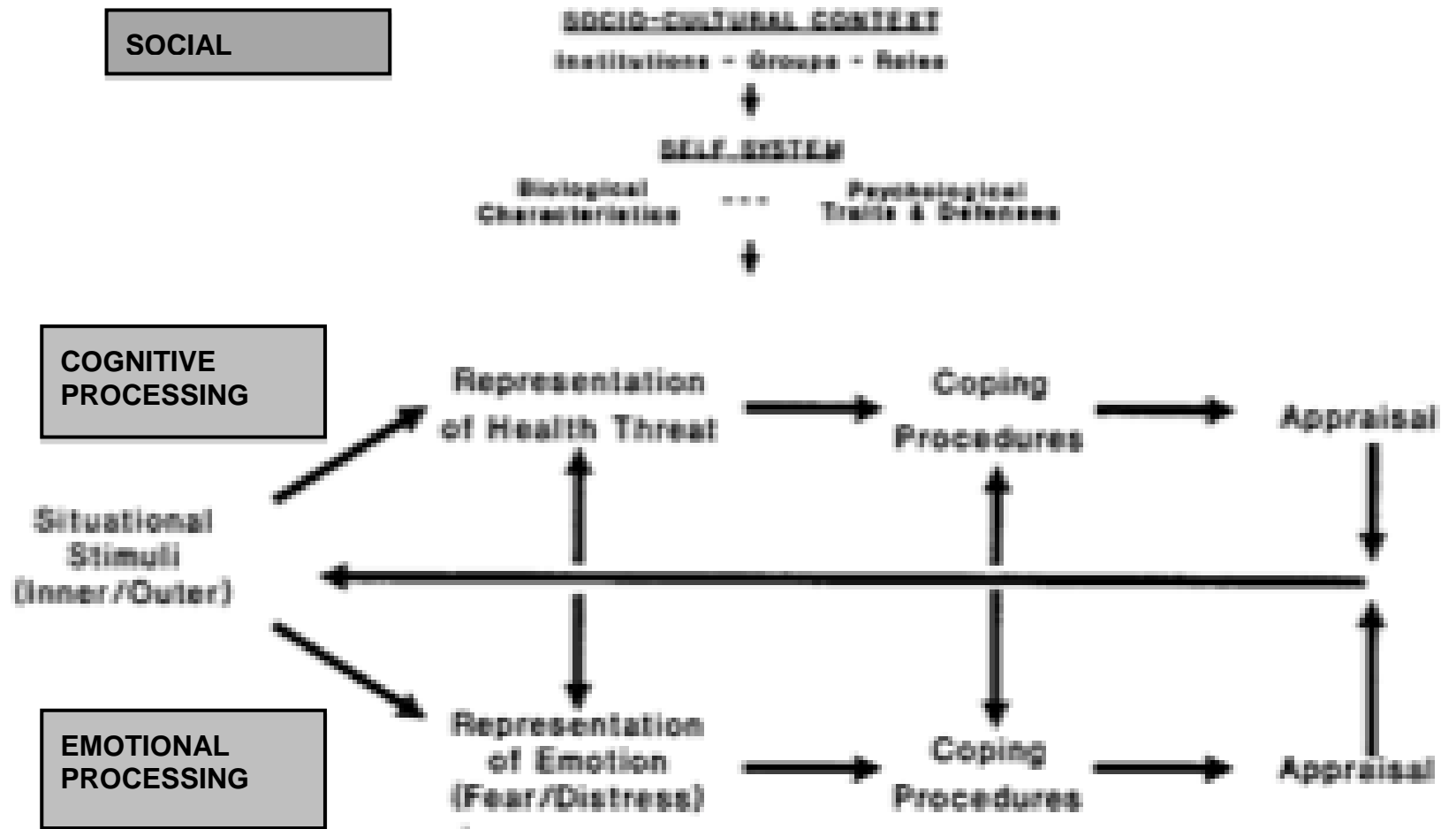


Figure 2.4. Leventhal's Common Sense Model (CSM) (Adapted from Leventhal et al. 1992)

## **Common Sense Model in Depression**

A meta-analysis CSM found that it has been empirically tested across a variety of different illnesses, including diabetes (type I and II), irritable bowel syndrome, psoriasis, arthritis, chronic fatigue syndrome, asthma, epilepsy, hypertension, and HIV. The model was originally conceptualized and applied to physical illnesses, but researchers have begun to study CSM in mental illness.

Lobban in 2001 first began testing Leventhal's assertion that the CSM could be applied to patients with severe mental illnesses. The researchers first identified articles that examined the beliefs that people with mental illness hold about their experiences. They then divided this literature into those that focused on the experience of individuals who experience mental illness, beliefs held of relatives/carers about individuals' mental illness experiences, and beliefs held by treatment professions about individuals' mental illness. They found that consistency among the literature to support all constructs in the CSM except timeline. They did note that there was surprisingly no published research in regards to the timeline in an individual's illness representation within mental illness. Lobban suggested that this could be due to the difficulty for individuals with mental illness to predict the timeline of their illness and therefore challenging their beliefs associated with distress would be difficult. They concluded that there was significant research supporting the importance of models of mental illness with variation in behavioral outcomes. The behavioral outcomes that were found to be studied included medication adherence, treatment seeking, behavioral and cognitive therapy attendance and participation, and personal safety promoting

behaviors. The published work demonstrates there is an inconsistent understanding of the individual's appraisal of mental health experiences. The researchers believed that their findings in regards to individual experience were best summarized by a quote from Rogers et al. (1998):

*.. future practice and research might fruitfully examine the way in which placing value on patients' own definitions of their problems, experience, and management strategies presents an opportunity to rethink the nature of professional/patient encounters about medication and mental health policy more generally.*

Fortune et al (2004) tested the CSM model's illness representation dimensions in a sample of 101 British women who were either currently diagnosed with depression or had history of depression. The researchers were interested in understanding how individuals' would model their own depression, how individuals would interpret the depression experience, and if these perceptions would impact how they interpret and cope with symptoms, seek help, and their level of cooperation and persistence with treatment recommendations. The investigation was led by three aims (1) to examine models of depression and to assess whether the dimensions of CSM found in physical illness were relevant to depression (2) to compare the content and structure of people's models of depression with those of physical illnesses; (3) to examine the potential utility of the illness perception questionnaire (IPQ) when used for depression in terms of reliability, internal coherence and some aspects of its validity. Participants were chosen from a database of a large randomized clinical trial of cognitive

behavioral therapy in depressed women with pre-school children. The researchers used a convenience sample approach, only contacting 101 women at the end of the trial with a telephone number, who agreed to be interviewed and gave informed consent. The majority of the participants had mild depression, with a mean Beck Depression Inventory Score (BDI) of 17.48 (SD=10.58). The range for mild depression on this scale is 10-18. Additionally the participants had had on average 2.62 depressive episodes (SD=1.35) and had their first episode of depression 9.49 years (SD=6.89) prior to the study period. At the time of the study 70% of participants had been prescribed antidepressants in the past, with 16% currently taking antidepressants.

The researchers utilized a simple method of identifying participants' illness (physical and mental) cognitions. (Lau et al 1989) Participants were provided with two separate sheets of paper with 12 blank lines. They were instructed to think back to the last time they were 'sick' (physical illness) or the last time they were 'depressed' (depression) and to write down everything they could remember about the experience. Using qualitative methods, the responses were coded and rated by an expert panel of evaluators to classify the subject's responses into one the five illness representation categories. They had rater agreement with all informed raters (knowledgeable about the CSM model) and naïve raters (new to the CSM) model having K values above 0.7. There was no significant difference identified between the number cognitions identified by participants between mental and physical illnesses. Only 1% of the sample self-identified all five dimensions for both depression and physical illnesses. The majority of

respondents defined their depression (46%) and physical illness (40%) using two dimensions. The results of a chi-squared test utilized to analyze the consistency of dimensions across the two different illness models found that there was a significant difference. Based on the visual inspection of the data this is an attributable difference in only two dimensions. The first was cause, with more participants identifying cause in depression (72 vs. 18) and the second was timeline, with more patients identifying this dimension with physical illness (27 vs. 7). The results support the use of the illness representation dimensions in depression, with the exception of timeline. Problems with the timeline dimension were mentioned previously by the Fortune et al (2004). Patients in general have difficulty identifying how long a depressive episode will occur.

The second part of the study involved the administration of the illness perception questionnaire (IPQ) for both physical illness and depression. The IPQ is theoretically derived, validated instrument that comprises five scales that provide information about the five dimensions of illness representations. On the identity scale the respondents assess the range of symptoms believed to be part of the illness measured from checklists. For this study this checklist was modified for depression by asking respondents to rate the frequency of occurrence during their last episode of depression of the 14 items suggested by the DSM-IV, the recognized diagnostic manual for mental disorders and disabilities. All other scales were consistent with the original IPQ and consisted of the 5 point strongly agree to strongly disagree scales with statements describing the other four dimensions. All respondents were administered both the IPQ (physical illness)

and the modified IPQ (depression). The first 52 respondents were administered the instruments a second time in two weeks to assess test-retest reliability. Both the IPQ and modified IPQ had good psychometric properties (internal consistency, test-retest reliability, and inter-scale correlations). They found that participant's scores on the IPQ scores significantly correlated with their BDI scores. Participants with more severe depression perceived more severe consequences, while lower BDI scores were related to greater perceived control over their depression. The results provide support for the use of the CSM's illness representations in patients with depression.

### **Common Sense Model and Medication Adherence Behaviors**

The Haggar meta-analysis also identified illness outcome and coping behaviors in which the CSM has been applied and studied. The six different categories, one with subcategories of coping behaviors studied included: avoidance/denial, cognitive reappraisal, doctor's visits, expressing emotion, problem focused coping (generic and specific), and seeking social support. Medication adherence was seen as a specific problem focused coping behavior. The application of the CSM model as it relates to medication adherence behaviors has been primarily conducted by Horne (1999, 2002) and his colleagues in the United Kingdom.

Horne and Weinman (2002) conducted a study to evaluate the degree to which variations in reported adherence to preventer medication for asthma could be explained by perceptions of asthma and perceptions of asthma medication. The study was based on the CSM model. Horne however believed that the



CSM's ability to explain treatment adherence would be enhanced by extending the scope to focus on specific treatment beliefs (Horne 1997). Specifically, as it relates to medication adherence, decisions are influenced by both personnel beliefs about necessity of treatment to improve or maintain health as well as concerns about the potential adverse effects of treatment. Their investigation was led by three hypotheses: (1) Medication adherence is positively correlated with patients' perceptions of necessity for preventer medication and negatively correlated with concerns about potential adverse events (2) Patients' perceptions of the seriousness of their asthma (timeline and consequences) is positively correlated with their beliefs about the necessity of prescribed medication and negative correlated with their concerns about potential adverse effects and (3) Treatment beliefs will add to the proportion of variance in adherence that is explained by demographic variables, clinical factors and illness perceptions.

They conducted a cross-sectional study of 100 community-based patients attending an asthma clinic. Subjects were eligible if they had a confirmed diagnosis of asthma and had been receiving preventer medication for at least one month prior to attendance at the clinic. Respondents were provided with the IPQ, the Beliefs about Medicines Questionnaire (BMQ), and the Medication Adherence Report Scale (MARS). The BMQ is validated two-item instrument that assesses patient's beliefs about the necessity of preventer medication for controlling asthma and concerns about potential adverse consequences of using it. The MARS is a validated self-reported 9-item measure of medication non-

adherence. The researchers found all study instruments to be psychometrically valid in the study population.

The researchers found that IPQ scores were positively correlated with the number of asthma related visits over the previous six months, which is consistent with the NEM model. As it related to their first two study hypotheses: adherence to preventer medication correlated with necessity beliefs; positive correlations between medication necessity and asthma timeline; concerns about the potential adverse events were not correlated with timeline or consequences. These results support enhancing the illness characteristics construct of the NEM to include the dimensions of the illness representation from the CSM model. HLM analyses were run and demonstrated that illness perceptions and treatment beliefs account for a significant amount of variance in reported adherence scores (13% and 17% respectively). Structural Equation Model Analysis (SEM) run for the third hypothesis found a good fitting model (RMSEA=0.14,  $p=0.05$ ) to explain the relationship between illness perceptions, medication beliefs and reported adherence. Beliefs about medication adherence and IPQ consequences scale directly predicted 30% of the variance in reported adherence. Illness perceptions were largely mediated by necessity beliefs. The results further support the use of CSM constructs in looking at medication adherence as a coping behavior. The results have replicated in patients with chronic pain (Nicklas et al. 2010).

### **Summarizing the Literature and Identifying Gaps**

Social networks are defined as conceptual structures that characterize a set of personal relationships. Conceptually these relationships are most often

discussed in terms of the structural aspects of the relationships (structure), the function of the relationships or interaction (function), and the actual psychological and physical processes involved in the relationships or interactions (dynamics or content). There has been significant research to support social networks and their effect on healthcare outcomes, health related behaviors, and as a cause of illness. However the majority of this research has focused on the function and structural aspects of social networks, while neglecting the dynamics or interactions. Future research should focus on the content and dynamics of the social network-individual interactions.

Research in medication information seeking behavior has found that patients engage with lay and professional networks for different purposes and seek different information. Patients use both networks to aid in their medication and healthcare decision-making. They have found however that individuals consulted their professional networks for factual information and to aid in diagnosis, monitoring, and for prescriptive recommendations. While individuals consulted their lay networks more for health beliefs and attitudes, personal experiences, social support, and validation. The research has not explored what occurs when disconfirmation does occur. Research is needed to understand how individuals act when they go to their social network for validation and they do not receive information or advice consistent with their professional network.

Other research on medication use has shown that partner stress alone or partner stress in conjunction with network size is a predictor of medication non-adherence. Researchers also found that network size correlated with a greater

sense of social support. However, they also found that having a high or low level of medication adherence does not correlate with changes in quality of life or perceived social support. There needs to be further research to understand the content or dynamics of the interactions that are occurring between individuals and social networks that may impact their perceptions of social support and improved or decreased quality of life.

Research has shown that interaction with social network impacts health service utilization. Frequent contact with friends or family, and higher perceived social support resulted in greater general healthcare utilization. However this increased social support and interaction with lay social networks produced lower mental health service utilization. However, Vogel et al. found that mental health service seeking was strongly correlated with prompting by a network member, and knowing a network member who had experience with the mental health system. They also found that prompting and lay network knowledge of the healthcare system produced more positive beliefs about the benefits of treatment and more positive expectations of treatment. Interestingly, while prompting did not result in higher intention to seek treatment, a knowledgeable lay network did strongly correlate with higher intentions. These findings pose a need to understand an individual's decision-making process after seeking treatment and services and deciding to utilize services. Additional research is also needed to understand what level of perceived network expertise is necessary to influence decision-making.

Conceptually the relationships between social networks and health care utilizations and decision-making have been clearly identified through the NEM model. The model has been tested partially to illustrate healthcare utilization decision-making, but is not without its weaknesses. One of the weaknesses of the NEM model is the over-simplification, and generalization of illness characteristics present in the social content structure as it related to illness. This understanding the illness characteristics and the resultant effect of on network utilization can be informed by health behavioral theory. Levnethal's Common Sense Model (CSM) incorporates well into the NEM framework and would add additional depth and details in defining and individuals illness representation. Incorporating the concepts of illness representation from the CSM model in-terms of identity (i.e. the label of the illness), the symptoms (i.e. the physical and psychological manifestation of the illness), the time-line (i.e. time for development, duration, and recovery time of illness), the causes, the consequences (i.e. physical, emotional, occupational, social, and functional costs), control (i.e. the degree to which the illness can be prevented, cured, and kept from progressing), and organization (i.e. the acuity, chronicity, or cyclical nature of an illness) add more specificity and clarity to understanding the individual's perceived illness representation. This perceived illness representation could be informed and developed via interactions with lay and treatment networks. Additionally, as individuals define their illness identity this will define their need and therefore utilization of social networks to aid their health-care decision-making.

Horne et al (2002) validated that illness representations impact medication adherence behaviors, but also that treatment representations are a significant factor as well. The treatment representations, necessity and concerns over treatment were strongly correlated with adherence behaviors. Additionally, research is needed to understand how these interactions with social networks and illness and treatment representations affect medication related decision-making.

Figure 2.3 provides a schematic overview that represents a conceptual model on how Leventhal's Model and the Network Episode Model can be integrated to study the community, professional, and individual influences that are involved in an individual's decision to initiate medication therapy. This framework will be used to provide the theoretical and conceptual foundation to this investigation. To briefly review the framework in terms of the previously presented findings.

- (1) The Social Content / Episodic base represents the person level characteristics that affect an individual's health care utilization, and in this case medication initiation. It is composed of four distinct constructs. The first social and geographical location has been shown through descriptive studies to affect utilization decision-making as well as use of social (both community and treatment) networks in treatment seeking and health-service utilization. The term location can be a little misleading as it is referring to location within the socio-demographic spectrum. (This particular construct has been extensively studied

elsewhere and was not discussed in this chapter. For a more extensive discussion of how socio-demographic factors can affect healthcare utilization and decision making, please see the work of Berkman. (Berkman et al., 2000; Berkman & Lochner, 2002)) The second construct, illness representation, is conceptualized based on Leventhal's model and there has been theoretical support of how social networks can impact one's illness representation, and how illness representation can affect both service and social network utilization. The current study supplements the original 5 dimensions to include necessity for treatment and concerns about adverse events based on the work of Horne. In patients with depression, based on the previous research findings by Fortune et al. (2004) timeline being difficult to conceptualize in patients with mental illness, it is suggested that it be omitted. The third construct, personal health background includes prior history of illnesses, which has been shown to affect future utilization decisions. Additionally it includes coping styles, which have been shown to be affected by social networks. Finally, organizational constraints, such as accessibility, organization, and financing of care have been shown to be significant predictors of health service utilization, and theoretically could be linked to social network use if an individual has issues with these three constraints.

(2) The second component of this framework is the lay network. As discussed earlier in this chapter, social networks have been

conceptualized in terms of their network structure, dynamics, and functions. The majority of research looking at community social networks has focused on the network structure and to a more limited extent the functions provided by the network (social support and information, and advice). There is a significant gap in terms of dynamics or content as it regards to interactions with the social network in relates to health care utilization. Research has shown that individuals utilize the community and professional networks differently, which has been shown in this model.

Finally the framework includes a desire, intention, and behavior process involving medication initiation as conceptualized by decision-science and behavioral researchers. The desire to initiate medication is similar to the previously described implementation desire and the intention represents the implementation intention as conceptualized by Bagozzi et al (2003). As stated previously stated, medication adherence has been studied, but the pre-cursor to adherence initiation and initial refill has not clearly studied. The current research focused on social/geographical location, organizational constraints and to limited extent treatment network work content (prescribing habits), while neglecting the social and behavioral processes involved in medication initiation decision making.

### **Objectives and Hypotheses**

The modified NEM model as presented in Figure 2.3 was the basis for identifying the theoretical model that will be utilized in this study. However all constructs will not be measured or captured in this study. Figure 2.4 provides a



conceptual model of the relevant constructs and proposed relationships to be tested in this study. This study focused on exploring several of the gaps identified previously. The study had three objectives. The first objective was to evaluate the impact of professional “treatment” network attitudes toward patient engagement with their “community” network. The second objective was to evaluate the impact of conflicting recommendations from community “lay” network and professional “treatment” network. The final objective was to investigate the roles and relationships of community social networks in an individual’s decision to initiate prescribed antidepressant therapy.

Consistent with Vogel et al (Vogel et al., 2007) the social networks can play a role on treatment seeking behavior in depression. This research is focused however uniquely to see if this same role translates to medication use behaviors. Beyond this exploration to test these roles based on the modified NEM model proposed earlier (Figure 2.3) we are also interested in examining factors that may affect “lay” social network’s effects on the medication initiation decision process. Illness perceptions and treatment perceptions have been supported by the work of Horne et a (2002) and others (Glattacker, Heyduck, & Meffert, 2009; Littlewood, 2009; Musumeci, 2007). The concept of social stigma and individuals perceptions of the social impact of the disease, has yet to studied in this area, but is hypothesized to affect the role one’s social network would play on medication initiation decisions.

As mentioned previously, Vogel’s work found that lay expertise or knowledge about mental illness and its treatment was important in health-seeking

behavior. Additionally Kjos' (2009) work demonstrated that individuals seek out their lay network for validation of information. However a gap exists on what happens when there is a conflict in advice between the lay and professional networks and how individuals will behave. The NEM model also proposes that the individual's professional network's attitudes and beliefs about lay network involvement in healthcare decision-making affect an individual's health behaviors, decision-making, and lay network utilization. The work of Kjos' and Vogel has shown that the lay networks are important to the individuals in health seeking and information seeking behaviors. A second gap therefore exists on actually how the attitudes and beliefs of the professional network affect decision-making. The effects of these various factors on intentions and decisions will be studied to be consistent with the Theoretical Model of Effortful Decision Making and Enactment.

It is believed that the encouragement for social network involvement alone by the professional network will be influential on individual's motivation to initiate medication therapy regardless of whether there is a confirmation or conflict in their recommendation by the individual's lay network. It is hypothesized that by encouraging network involvement, an individual's desire to initiate medication, upon the recommendation of a prescriber, will be higher than if concern about network involvement is expressed. This is based on previous research that shows that social network involvement increases treatment-seeking behaviors in adult patients. Based on the work of Bagozzi, we also hypothesized that

similarly an individual's intention to initiate medication therapy will also be higher with encouragement for "lay" network involvement.

**Hypothesis 1** Professional network encouragement for community "lay" social network involvement in healthcare management will increase the individual's desire to initiate antidepressant therapy to manage depressive symptoms.

**Hypothesis 2:** Professional network encouragement for community "lay" social network involvement in healthcare management will increase an individual's intention to initiate antidepressant therapy to managed depressive symptoms.

Additionally, we proposed that the simple act of confirming or disconfirming the advice of the professional network member by the lay network member, regardless of their encouragement or concern about the lay network being involved illness management will affect the individual's desire to initiate medication therapy. Both the desire and intention are hypothesized to be lower when a conflict occurs.

**Hypothesis 3:** Confirming advice between an individual's "professional" treatment network and their "lay" social network will result in a greater desire to initiate antidepressant medication to manage depressive symptoms when compared to conflicting advice.

**Hypothesis 4:** Conflicting advice between an individual's "professional" treatment network and "lay" social network will result in lower intention to

initiate antidepressant medication to manage depressive symptoms when compared to a confirming advice.

The effect of professional network encouragement for “lay” social network involvement in disease state management on desire and intention is proposed to be different depending on the feedback received from “lay” social networks. The proposed synergistic relationship is bi-directional. If an individual consults a “lay” network member and the network supports the recommendation of the prescriber than it is believed that the individual will have a higher desire and intention to initiate prescribed medication therapy. However, alternatively if that individual received disconfirming information from a “lay” network member, then he/she will have a decrease in desire to initiate medication therapy.

**Hypothesis 5:** Professional network encouragement for social network involvement will increase the individual's desire to initiate anti-depressant therapy to manage depressive symptoms, in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 6:** Professional network encouragement for social network involvement will decrease the individual's desire to initiate anti-depressant therapy to manage depressive symptoms in the presence of conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

Although, we consider the desire and intention to be distinct components of the initiation decision process we do not have a reason to believe that the

effect of professional network encouragement or the synergistic relationship between encouragement and lay network attitude would be different between the two components. We therefore believe that the same hypothesized effects occur on an individual's intention to initiate medication.

**Hypothesis 7:** Professional network expressed concern for social network involvement will increase the individual's intention to initiate antidepressant therapy to manage depressive symptoms in the presence of conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 8:** Professional network expressed concern for social network involvement will decrease the individual's intention to initiate antidepressant therapy to manage depressive symptoms in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social

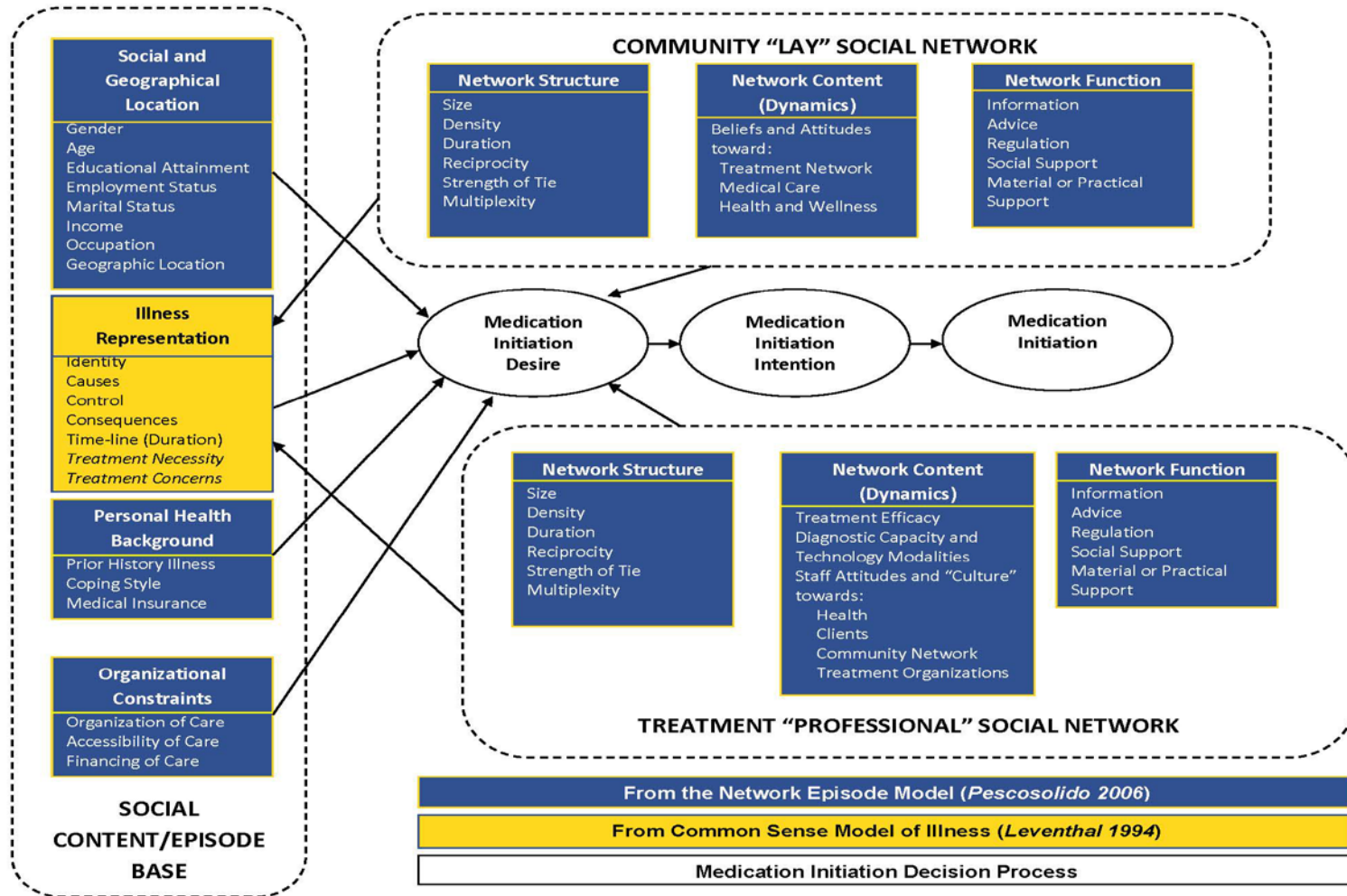


Figure 2.5 Integrated NEM and CSM Model

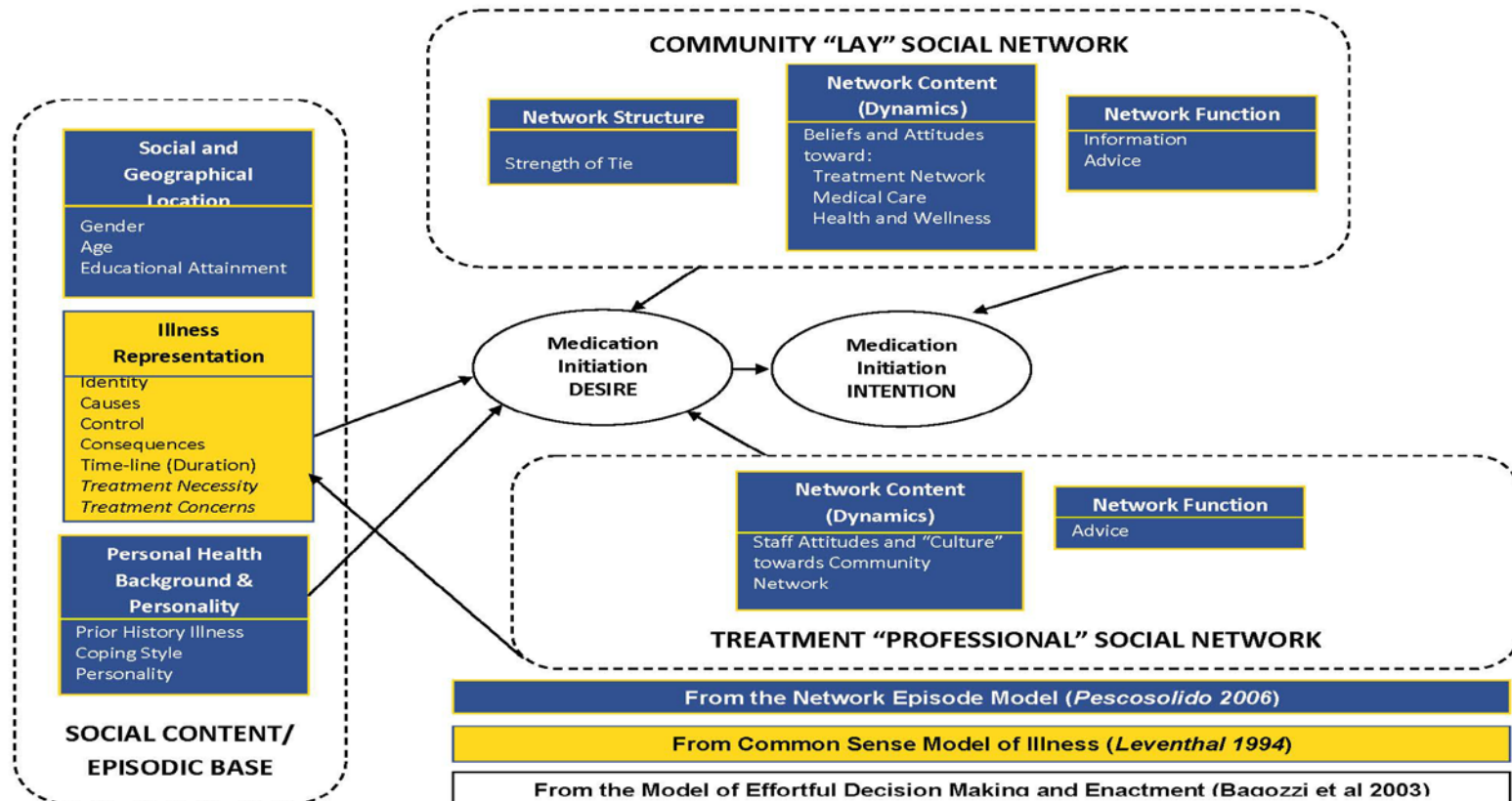


Figure 2.4 Study Conceptual Model

## **CHAPTER III**

### **Methods**

#### **Chapter Overview**

This chapter describes the methodology that was used in the study. It begins by discussing the population sampled, methodological approach, and the experimental manipulations. The *study* measures, study scenarios, pretesting process, and data collection are included. The chapter closes by providing a data analysis plan and the results of the pretest.

#### **Introduction**

This study was focused on understanding the psychological processes and social networking factors that affect an individual's decision to initiate medication therapy, using a modified Network Episode Model. The population for the current study was undergraduate, graduate, and professional students at a large research-intensive comprehensive university. The desire and intention to initiate medication therapy were the primary outcomes of interests in this study. The effects of manipulating conflicting advice between lay and professional networks, and professional network expressed attitudes toward lay network involvement were the primary foci of this study. Secondly, factors that may affect the individual's decision-making process were tested.

#### **Research Objectives**



**Objective 1:** Evaluate the impact of professional “treatment” network attitudes toward patient engagement with their “community” network

**Objective 2:** Evaluate the impact of conflicting recommendations from community “lay” network and professional “treatment” network.

**Objective 3:** Investigate the roles and relationships of community social networks in an individual’s decision to initiate prescribed antidepressant therapy.

## **EXPERIMENTAL DESIGN**

### **Methodological Approach**

A two-factor experimental design was used to test the study hypotheses. The study was randomized and utilized a post-test only design as described in Table 3.1. This design was a modification of experimental designs suggested by Shaddish, Cook and Campbell (2002). This experimental design was selected for several reasons. The first reason is that the experimental-control group design assures that the experimental manipulation is the only causative factor in the observed change of the dependent variable. This allows the study to investigate casual relationships between variables.

The two-factor design was chosen to evaluate the effect of each factor separately. The combination of the two factors could also produce an effect and will be analyzed. Finally randomization was chosen to attempt to reduce any difference between study groups prior to study manipulations.

| R | Manipulation                           | Lay Network Agreement | Lay Network Conflict |
|---|--|-----------------------|----------------------|
|   | Positive Professional Network Attitude | GROUP 1               | GROUP 2              |
|   | Negative Professional Network Attitude | GROUP 3               | GROUP 4              |

**Table 3.1. Experimental Groups and Manipulations**

### **Study Population**

The study population was students at the University of Michigan. All student enrolled at the University of Michigan's Ann Arbor Campus were eligible for inclusion in the study. This population was chosen to explore social networks and their involvement in treating depression among college students. Additionally, the population was easily reachable via email and amenable to participation in research studies.

### **Inclusion Criteria**

To be included in the study a respondent had to be enrolled at the University of Michigan, Ann Arbor Campus (on a full-time or part-time basis). The student must also have had a University of Michigan email address as this was utilized as a means to verify eligibility to participate in the study, prevent duplicate responses from individual respondents, and aided in the distribution of incentives for study participants.

## **Exclusion Criteria**

Students who did not have a university email address or who did not consent to any part of the study were excluded from the study. Those who indicated their country of origin as being outside of the United States were excluded. International students were excluded to decrease the effect of other potential cultural factors that may confound the study manipulations. All excluded individuals received access to the debriefing materials regarding campus and community depression treatment services.

## **Sample Size determination**

Two-factor ANOVA was used to test the hypotheses identified. Additionally, Structural Equation Modeling (SEM) was used to test the conceptual model relationships, and identify potential factors that may exist to fully explore Objective 2. As a result sample size determination and power analysis were conducted to identify the number of subjects needed for each of the two analysis techniques. The higher of the two sample size determinations was set as the minimum for this study.

Two-way analysis of variance with a 0.050 significance level will have 89% power to detect a variance among the 2 Factor A means of 0.100, will have 89% power to detect a variance among the 2 Factor B means of 0.100, will have 80% power to detect an interaction among the 2 Factor A levels and the 2 Factor B levels of 0.100, assuming that the common standard deviation is 1.000, when the sample size in each group is 25. With a total of four groups, this will require a total of 100 participants (Obrien & Muller, 1993).

A general rule of thumb to calculate sample size for SEM analyses the ratio of subjects to parameters to be estimated should be between 5:1 and 10:1 (Bagozzi RP & Yi Y,1988). The total number of constructs in the model to be measured is seven, which each construct being measured by 2 parameters except the social/geographical basis construct which has 4 parameters. This calculates out to a total of 17 parameters. Based on the general rule of thumb this will require between 135-170 total participants.

Based on the above calculations the minimum sample size was set at 200 with 50 per group. A pilot test was necessary for the study instrument and scenarios. Therefore, an additional 50 respondents were needed, bringing the total to 250 respondents. Participation rates for online surveys differ greatly, and typically range from 15-60% (Dillman, 2009). With a cash incentive being offered and follow-up emails it is estimated that a participation rate of 40% is achieved. Additionally, exclusions due to not meeting criteria must be taken into account. Four hundred and seventeen students were anticipated to be contacted ( $250 \times 100 / 60 = 417$ ).

### **Sampling**

Four hundred university students were identified via university public directories. Email lists were generated from the UM public directory. Additionally, student organizations were contacted to solicit respondents. Groups with a group email address listed in the directory were contacted via the listed owner/administrator. They were asked for their approval to be sent out to their respective list-serves. The method of contact, sending it out to list-serves was

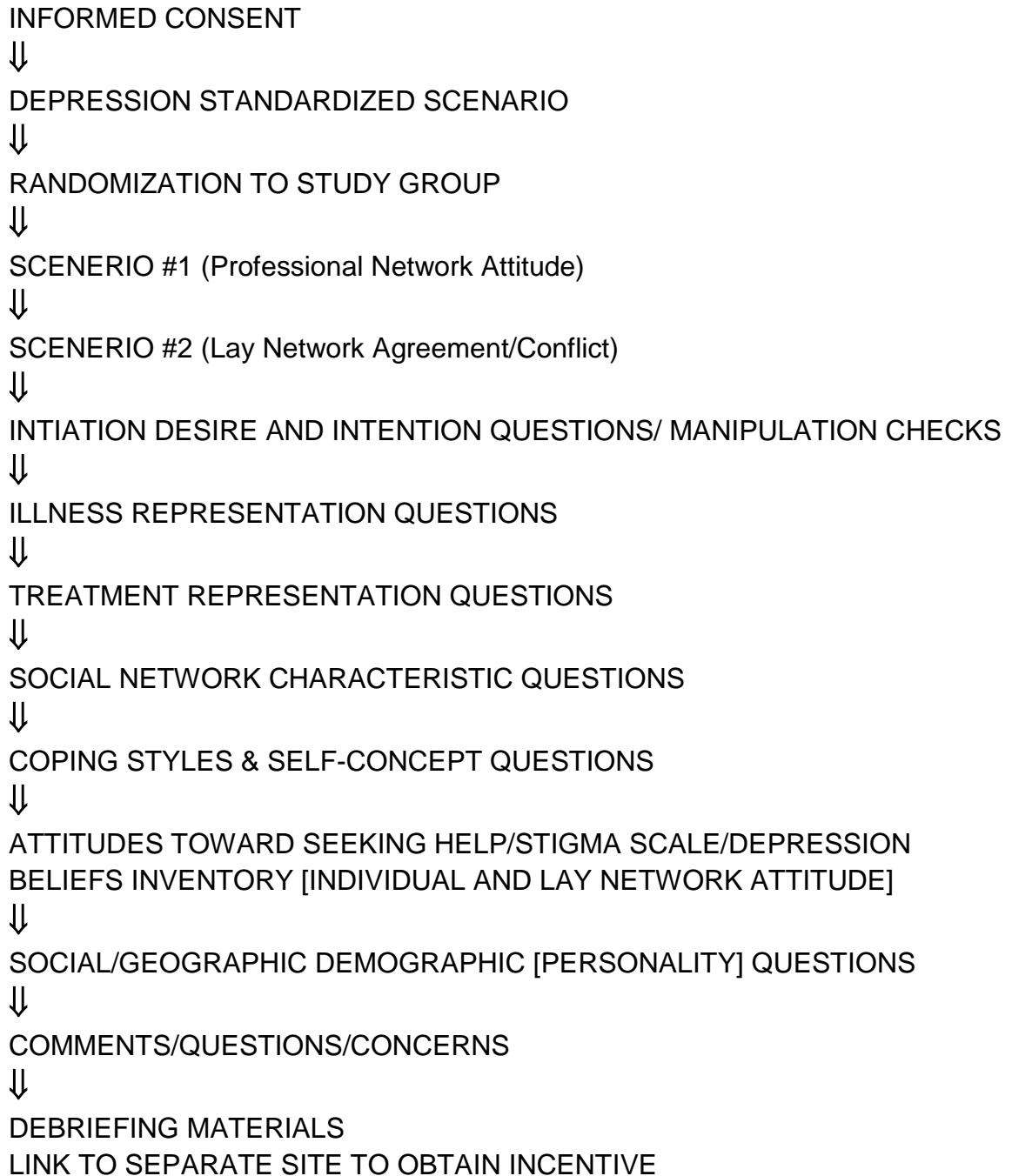
chosen, so that the researchers did not know the identity of potential respondents. Implementation procedures as described by Dillman for web surveys were utilized to enhance survey response and to maintain the integrity of the data collected (Dillman, 2009).

Dillman states to enhance participation rates of web surveys several things can be done. These include personalization of email contacts, using multiple contacts with varying messages, eliminating the pre-notice regarding survey, using short succinct messages in correspondence, carefully and strategically timing the delivery of messages, providing clear instructions to accessing survey, and providing cash incentives. To maintain the integrity of the data as well eliminate unnecessary contact with responders, Dillman also suggest providing each respondent with a unique identifier number. To maintain confidentiality of responses these two databases should be maintained separately in order to prevent the identification of individual respondent's data.

### **Data Collection**

The scenarios and questionnaire were delivered utilizing Qualtrics Research Suite by Qualtrics, Inc (Salt Lake City, UT). Students were recruited via email. Emails were sent to the email lists as described previously. The email contained an anonymous link to the survey. Potential respondents were contacted via email twice; an initial recruitment email and a second email 24-36 hours later. At the end of the survey they were provided with a link they clicked (if they so choose) to take them to a site to enter their contact information to be mailed out their incentive (\$10 Visa gift card). The Qualtrics survey management

software kept this database separate from the study database. This incentive database was only shared with the appropriate financial officers based on university policies for subject reimbursement. The participants were instructed to complete the questionnaire in one sitting. They were free to exit the survey at any point, but they were only provided with the incentive if they completed the entire survey. The ordering of questions and survey events is described in Figure 3.1. The questionnaire was estimated to take 20-25 minutes to complete. A copy of the complete survey instrument is available in Appendix A.



**Figure 3.1. Study Sequence**

## **Experimental Manipulations**

Respondents randomly received the first conflicting manipulation, professional network attitude. Professional network attitude was defined as the positive, or negative expressed attitude toward the involvement of lay network members in treatment decision-making. They were presented with one of two scenarios.

“Dr. Hand recommended Rich discuss starting his antidepressant medication therapy with someone close to him like a friend or family member. He advised Rich that talking with people who are close to him can help him better manage his treatment.– **POSITIVE PROFESSIONAL “Treatment” NETWORK ATTITUDE**

“Dr. Hand warned Rich that he should be wary of who he talked to about his antidepressant therapy. He advised that in his experience sometimes others are not always helpful or provide accurate advice to patients while managing their illness.– **NEGATIVE PROFESSIONAL “Treatment” NETWORK ATTITUDE**

The second conflict scenario was the lay network agreement-conflict. Lay network agreement was defined as providing advice that confirms the recommendation of the professional network. Respondents were presented with one of the two following scenarios.

“After Rich left Dr. Hand’s office he decided to talk to Jim a close family friend about his depression. Jim has suffered from depression in the past and has been on medication. Jim’s advice to Rich was that he should take



the medication. Jim said he has been taking a medication similar to Quartz and it has improved his energy level, the side effects have really been minimal, and it has made him feel tremendously better. ”– **LAY**

### **NETWORK AGREEMENT**

“After Rich left Dr. Hand’s office he decided to talk to Jim a close family friend about his depression. Jim has suffered from depression in the past and has tried medication. Jim’s advice to Rich was that he should not take the medication. Jim said he has been taking a medication similar to Quartz and it has not helped his depression and the side effects made him feel worse than he did before starting the medication. – **LAY NETWORK**

### **CONFLICT**

## **Standardized Depression Scenario**

All participants were provided with a standardized scenario that expressed reasons the individual has sought treatment for minor depression, the suggestion that they initiate medication therapy by the prescriber, and a prescription for a fictional antidepressant. The symptoms presented were consistent with Diagnostic and Statistical Manual of Mental Disorders v4 (DSM IV) criteria for the diagnosis of minor depressive disorder. They were provided with a standard set of risk (adverse effects) and benefits (clinical effectiveness) that were typically provided by a general practitioner upon prescribing a patient antidepressant medication. A panel of practicing clinicians reviewed the standardized case and

scenario to ensure clinical appropriateness, likeness to true patient-prescriber interaction, and completeness of information provided.

### Follow-Up

As stated previously, the respondents were randomly assigned to receive one of the four study conditions (Table 3.2). The principal investigator monitored the participation rate. If adequate participation was not achieved after 24 hours, a reminder email was sent out. Based on the work of Dillman, this should not have exceeded two reminders.

| <b>Study Construct</b>       | <b>Sub-Dimension</b> | <b>Description</b>   |
|------------------------------|----------------------|--|
| <b>Dependent Variables</b>   |                      |  |
| Initiation Decision          |                      | The individual's desire and intention to initiate medication therapy                                     |
|                              | Initiation Desire    | The motivational state of mind of an individual to initiate medication therapy                           |
|                              | Initiation Intention | An individual's self-commitment to initiate medication therapy   |
| <b>Independent Variables</b> |                      |  |
| Coping Style                 |                      | Styles or methods that an individual might use in response to depressive symptoms                        |
|                              | Active Coping        | Process of taking active steps to try to remove or circumvent symptoms                                   |
|                              | Planning             | Thinking about how to cope with the symptoms   |
|                              | Positive Reframing   | Emotion based coping style. Managing distress emotions rather than dealing directly with the symptoms    |
|                              | Acceptance           | A person accepts the reality of depressive symptoms and is actively engaged in dealing with the symptoms |
|                              | Emotional Support    | Getting moral support, sympathy, or understanding from social network                                    |
|                              | Instrumental Support | Seeking advice, assistance or information from social network  |
|                              | Venting              | Tendency to focus on depressive symptoms and to ventilate feelings about symptoms                        |
|                              | Substance Abuse      | Turning to the use of alcohol and other drugs as a way of disengaging from depressive symptoms           |
|                              | Self-Blame           | Blaming one-self as the cause for depressive symptoms  |
|                              | Humor                | Making jokes about or laughing about depressive symptoms   |

| <b>Study Construct</b>   | <b>Sub-Dimension</b>     | <b>Description</b>   |
|--------------------------|--------------------------|--|
|                          | Religion                 | Turning to religion to deal with depressive symptoms   |
|                          | Behavioral Disengagement | Reducing one's effort to deal with the stress. Sometimes even giving up the attempt to attain goals that the depressive symptoms are interfering with.   |
|                          | Denial                   | Refusal to believe that a symptom exists or trying to act as if symptoms don't exist   |
|                          | Self-Distraction         | Engagement in activities that serve to distract the person from thinking about depressive symptoms   |
| Treatment Representation |                          | Patients beliefs and expectations about medical treatment (medication)   |
|                          | Treatment Concern        | Perceptions of the potential negative consequences of taking the medicine including concerns about long-term effects, dependence and other disruptive effects  |
|                          | Treatment Necessity      | Patients' beliefs about -personal need for the medicine and how important medicine is in maintaining their health now and in the future  |
|                          | Treatment Harm           | Concerns about the potential of medication to cause harm, and comprises representations of medication as harmful, addictive, poisons and the belief that people who take medication should stop their treatment every now and then |
|                          | Treatment Overuse        | Beliefs about the notion that medicines are over-prescribed by doctors who place too much trust in them  |
| Illness Representation   |                          | Patients beliefs and expectations about an illness or symptoms   |
|                          | Consequence              | Anticipated repercussions of illness or symptoms   |
|                          | Timeline                 | Expected timeframe for a illness or symptoms (i.e. acute, chronic, cyclic)   |
|                          | Personal Control         | Individual's beliefs about ability to control symptoms or cure illness   |
|                          | Treatment Control        | Individual's beliefs about the ability of treatments to control/cure illness or symptoms   |
|                          | Identity                 | The name/label and individual assigns a set of symptoms or illness   |
|                          | Coherence                | Whether individuals think about the illness or symptoms in a coherent way  |
|                          | Emotional Representation | Individual's beliefs about how an illness or symptoms will affect them emotionally   |
|                          | Concern                  | Individual's beliefs about the perceived threat of the illness or symptoms   |
| Social Support           |                          | Measuring an individual's social network and the quality of interactions between this  |

| <b>Study Construct</b>             | <b>Sub-Dimension</b>         | <b>Description</b>   |
|------------------------------------|------------------------------|--|
| Index                              |                              | individual and social contacts   |
|                                    | Social Network Interaction   | The frequency and type of interaction and an individual has with social network members  |
|                                    | Social Network Satisfaction  | The individual perceived satisfaction with network members, interactions, and characteristics of social network  |
| Perceived Social Stigma            |                              | Individual's perceptions about severe social disapproval of personal characteristics or beliefs that are perceived to be against cultural norms as it relates to mental illness and its treatment. |
| Attitudes Toward Seeking Treatment |                              | Individual attitudes and beliefs about toward seeking psychological help or counseling   |
|                                    | Recognition of Need for Help | Individual beliefs about whether psychological or emotional problems require professional help   |
|                                    | Stigma Tolerance             | Individual's ability to disregard perceived stigma associated with psychological or emotional problems   |
|                                    | Interpersonal Openness       | An individual's willingness to disclose psychological or emotional problems to a mental health professional  |
|                                    | Confidence in Practitioners  | An individual's beliefs about the ability of mental health professionals to help with r psychological or emotional problems  |
| Self Concept                       |                              | A multi-dimensional, multi-factorial schema that encompasses all aspects of how one conceptualizes one-self  |
|                                    | Individualistic Self         | Interpersonal comparisons where one's sense of uniqueness and self-worth are derived from perceived similarities with and differences from other individuals                                       |
|                                    | Collectivistic Self          | Self-definition based on one's social group memberships, where favorable intergroup comparisons give rise to self-worth  |
|                                    | Relational Self              | The extent to which individuals define themselves in terms of dyadic connections and role relationships with others  |

**Table 3.2. Definitions of Study Domains**

## **STUDY MEASURES**

Table 3.2 provides a list of definitions for all the domains and sub-domains measured by the psychological instruments used to measure the independent and dependent variables.

### **Dependent Variables**

#### *Medication Initiation Desire (Implementation Desire)*

Two items of the four items used by Bagozzi et. al (2003) to measure implementation desire were used to measure initiation desire. Initiation desire is conceptualized as the intensity or strength of an individual's motivation to want to initiate the prescribed medication. The questions were prefaced with the directions 'If I were Rich' to have the participants act if they were the student in the scenario.

The first item stated 'My desire to start taking Quartz (antidepressant) to help manage my depression would be best described as:' using a seven-point scale with anchors being 'no desire at all' and 'very, very, high desire'. This measure had mean values of 4.00 for the control group and 5.39 for the experimental group when the scale was used by Dholakia et al (2007).

The second question stated 'I would want to start taking Quartz to help manage my depression:' using a seven-point scale with anchors 'Strongly Disagree' to 'Strongly Agree'. This measure had mean values of 4.00 for the control group and 5.69 for the experimental group when the scale was used by Dholakia et al (2007). To create the initiation desire measure the mean of the two items was calculated.

### *Medication Initiation Intention (Implementation Intention)*

The two items used to measure initiation intention were used to measure implementation intention by Bagozzi et al (2003). Medication initiation intention in our study is a measure of the level of commitment an individual has to initiate antidepressant therapy. The questions were prefaced with the directions 'If I were Rich' to have the participants act if they were the student in the scenario.

The first item stated 'The strength of my actual intention to start taking Quartz to help manage my depression would be best be described as:' using a six point scale with the anchors being 'no intention at all' and 'very strong intention'. The second item stated 'I would intend to start taking Quartz to help manage my depression:' using a six point scale with the anchors being 'No Chance at All' to One Hundred Percent Likely'.

In the Bagozzi (2003) et al study the two items summed had mean score of 9.75 and had reliability of 0.78. The scale was also used by Dholakia et. al (2007) and the first item had mean values of 3.98 and 4.98 for their control and experimental groups, respectively. The second item had mean values of 3.87 and 4.88, respectively.

## **Independent Variables**

As stated previously identifying factors that may impact medication initiation decision-making was a secondary objective of the study. These were identified and were tested by examining the proposed constructs as identified in the conceptual model as presented in Figure 2.4.

### *Social and Geographical Location*

Demographic questions regarding the participant's gender, age, educational attainment (defined as the current academic classification), race and ethnicity (U.S. Census, two-item classification system), and hometown was asked at the end of the survey. A copy of these items as used is included in the online survey in Appendix A.

We also included one personality variable. The Levels of Self-Concept Scale is a validated 15-item three-factor scale that measures an individual's perception of self in terms of individual, relational, and collective levels. The three sub-scales are divided into 5-item sections. Respondents were asked to indicate their level of agreement or disagreement with items using a 5-point scale with anchors 'Strongly Agree' and 'Strongly Disagree'. An example of an item from the relational scale is 'If a friend was having a personal problem, I would help him/he even if it meant sacrificing my time or money'.

The Levels of Self-Concept Scale has been used in a variety of general adult and student populations. The reliability of the three scales ranged from 0.60 to 0.90 in a study by Selenta and Lord (2005) examining leadership styles. A copy of these items as used is found in Appendix A.

### *Illness Representation/Illness Characteristics*

The Brief Illness Perception Questionnaire is a validated 9-item instrument that measures the 5 individual core dimensions of illness representation (cause, consequence, control, identity, and timeline) emotional representation of illness (how much an illness affects one emotionally) and illness coherence (how much an individual understands the illness) (Broadbent, Petrie, Main, & Weinman, 2006). The instrument also divides the control dimension into its sub-domains of perceived treatment control and perceived personal control. Single items measure each domain and sub-domain. The first 8 items ask the individual to rate an item related to the domain or sub-domain along a 10-point scale with two anchors. For example, the illness consequence item reads, 'How much does depression affect his (the hypothetical student's) life:' with anchors of 'No effect at all' and 'Severely affects life'. The last item for illness cause is an open-ended question which asks respondents to 'Please rank-order the three most important factors that you believe causes depression' and respondents were provided with three numbered lines on which to enter a response. A copy of the instrument as used is found in Appendix A.

The instrument was shown to have high reliability over 6 weeks (Pearson Correlations  $>0.60$ ) over all measures except personal control (0.42); high concurrent validity when compared to the illness perception questionnaire-revised and disease specific indicators, high predictive validity for a variety of chronic disease states, and high discriminant validity across a variety of chronic disease states. Additionally the instrument has been used successfully in



patients with psychosis and personality disorders (Broadbent et. Al, 2008 & Petrie et. Al, 2008). The instrument was modified for use in this study to capture the respondent's beliefs about depression.

### *Treatment Representation*

The Beliefs about Medicine Questionnaire is a validated four-factor 18-item instrument that collects information about an individual's general treatment beliefs about medication use and specific treatment beliefs about a specific prescribed class of medications (Horne et. al, 1999). The general and specific scales can be used separately or in combination. It measures four domains: treatment concern (3-items), treatment necessity (4 items), treatment overuse (3 items) and treatment harm (5-items). Respondents were asked to rate their level of disagreement with statements representing each domain along a 5-point scale with anchors 'Strong Disagree' and 'Strongly Agree'. An example of an item used measure treatment concern is 'I sometimes worry about the long-term effects of medicine'. A copy of the instrument as used is found on pages xx as part the online survey in Appendix A.

The instrument has been shown to be valid in a variety of mentally ill populations, including depression, bipolar disorders and schizophrenia. (Brown et al., 2005; Maidment et al., 2002). In the Brown et al study, which included adult patients who were currently taking antidepressants, the four factor model was tested using SEM and a fair to good fit was found (RMSEA= 0.056, CFI=0.95, GFI=0.89). Additional reliability testing showed the instrument adequate internal consistency with Cronbach's Alpha's for the four domains being 0.80, 0.75, 0.71,

and 0.70 respectively. A copy of the instrument as used is found on pages xx as part the online survey in Appendix A.

### *Personal Health Background*

The Brief COPE questionnaire measures the use of different coping styles in response to depressive symptoms. It is a 28-item instrument that has 14 scales (each scale has 2 items) that identify 8 adaptive (Active Coping, Planning, Instrumental Support, Positive Reframing, Acceptance, Religion, Emotional Support, and Humor) and 6 mal-adaptive (Denial, Substance Abuse, Venting, Behavioral Disengagement, Self-Blame, and Self-Distraction) coping styles (Carver, 1997). The instrument asked respondents to rate their response along a 4-point scale with 'I haven't been doing this at all' and 'I do this a lot as anchors'. For example an item that was used to measure active coping style read, 'I concentrate my efforts on doing something about the situation I'm in'. The instrument was shown to have high internal consistency, convergent and discriminant validity, and reliability (Meyers, 2001) in college students with correlations for the 14 domains ranging from 0.71 to 0.98. A copy of the instrument is in Appendix A.

The Patient Health Questionnaire Depression Scale (PHQ-9) is a validated 9-item instrument self-administered instrument, which has been extensively used as a screening tool for major depressive disorders (Kroenke and Spitzer, 2002). Respondents were instructed 'Over the past 2 weeks, how often have you been bothered by any of the following problems'. They were then asked to rate their frequency of experiences each of the 8 statements on a 4-

point scale with anchor 'Not at All' and 'Nearly Every Day'. The statements represent depressive symptoms such as 'Feeling down, depressed or hopeless'. A composite score was calculated. The following are the established ranges based on the summated score: 1-4 Minimal Depressive Symptoms, 5-9 Mild Depressive Symptoms, 10-14 Moderate Depressive Symptoms, 15-19 Moderately Severe Depressive Symptoms, and 20-27 Severe Depressive Symptoms.

As a screening tool the PHQ-9 has used score of greater than or equal to 10 as a cutoff for depression with high specificity and sensitivity, of 88% and 91% respectively. It has been shown to have high specificity and sensitivity when identifying patients with major depressive disorders within general populations (Kroenke and Spitzer, 2001). The instrument was used to classify participants' current depressive state. A copy of the instrument as used is found in Appendix A.

The Attitude Toward Seeking Professional Psychological Help Scale is a validated 29-item instrument that ask respondents about their attitudes and those of their social networks toward seeking help for a psychological condition. It consists of four sub-scales: recognition of need for help (8-items), tolerance of perceived stigma (5-items), interpersonal openness with health care professionals (7-items), and confidence in medical practitioners to help (9-items). Respondents were asked to rate their level of agreement with each statement along a 4-point scale with anchors 'Strongly Disagree' and 'Strongly Agree'. Several of the items are reverse coded. An example of an item from the scale is

'I would feel uneasy going to a psychiatrist because of what some people would think'.

The Attitudes Toward Seeking Professional Psychological Help Scale was developed and validated in a college student population and has been used extensively in mentally ill patients (Elhai et al, 2008). In a college student sample the instrument had high internal consistency for the total score and subdomain scores with Cronbach Alpha's ranging from 0.80 to 084 (Fischer & Farina, 1995). A copy of the instrument as used is found in Appendix A.

#### *Lay Network Perceived Attitudes*

In addition to the Attitudes toward Seeking Professional Psychological Help Scale-Short form as described previously, the Stigma Scale for Receiving Psychological help and the Depression Beliefs Inventory was utilized to assess lay network perceived attitudes about depression.

The Stigma Scale for Receiving Psychological Help is a validated 5-item self-reported scale that measures one's perceived social stigma about mental health treatment. This single factor scale asks respondents for their level of agreement-disagreement with the five items along a 5-point scale with anchors 'Strongly Disagree' to 'Strongly Agree'. An example of an item included in the scale is 'Receiving treatment for emotional or mental problems carries social stigma'.

The Stigma Scale for Receiving Psychological Help has adequate internal consistency and substantial coverage for negative attitudes toward mental health

treatment (Komiya et al 2000) in a young adult population. A copy of these items as used is found in Appendix A.

### *Social Network Structure*

Network size as well as strength was measured utilizing the abbreviated Duke Social Support Index. The abbreviated Duke Social Support Index is a validated 11-item index that has two subscales: social network interaction (4-items) and social network satisfaction (7-items). The items ask individuals to quantify the frequency of their interactions with friends and family, such as 'How many times during the past week did you spend time with someone who does not live with you?' Four items also asked them to rate their satisfaction with their interactions with their social network members such as 'You feel you have a definite role in your family and among friends' on three point scale with anchors 'Hardly ever' and 'Most of the time'. There is also one global measure of satisfaction 'How satisfied are you with the kinds of relationships you have with family and friends?' which is rated along a 'Very satisfied', 'Somewhat dissatisfied', and 'Satisfied' Scale. The higher composite scores with the individual domains indicate greater satisfaction and interaction with social network members.

The index has been validated in wide variety of ages, populations, and settings (Koenig et al., 1993). A copy of these items as used in Appendix A.

### **PILOT-TESTING/PRE-TESTING**

The online questionnaire was pre-tested in a sample of 30 university students of a similar background to the proposed study population.

This pretest was done to examine question and instruction clarity, obtain an estimate of the time to complete the survey and to test out the effectiveness of study manipulations. Modifications to the questionnaire were made as necessary. The survey was pilot-tested in 70 undergraduate students of a similar background to the proposed study population. The pilot-test was used to examine the psychometric properties of the instrument, to get a gauge of the anticipated response rate for the study, and to ensure that the selected distribution methods were effective.

### **ANALYSIS PLAN**

Data was obtained directly from the respondent entries and collected in an electronic database. Data was analyzed using IBM SPSS (Version 18.0) and LISREL (Version 8.8). Demographic data was analyzed using descriptive statistics. Differences between control and treatment groups were tested for using ANOVA for continuous variables and chi-squared for other variables. on demographic variables was expected.

**Objective 1:** Evaluate the impact of professional “treatment” network attitudes toward patient engagement with their “community” network

**Objective 2:** Evaluate the impact of conflicting recommendations from community “lay” network and professional “treatment” network.

To achieve the goals outlined in objectives1 and 2, eight experimental hypotheses were analyzed. The hypotheses were:

**Hypothesis 1** Professional network encouragement for community “lay” social network involvement in healthcare management will increase the

individual's desire to initiate antidepressant therapy to manage depressive symptoms.

**Hypothesis 2:** Professional network encouragement for community “lay” social network involvement in healthcare management will increase an individual's intention to initiate antidepressant therapy to managed depressive symptoms.

**Hypothesis 3:** Confirming advice between an individual's “professional” treatment network and their “lay” social network will result in greater desire to initiate antidepressant medication to manage depressive symptoms when compared to conflicting advice.

**Hypothesis 4:** Conflicting advice between an individual's “professional” treatment network and “lay” social network will result in lower intention to initiate antidepressant medication to manage depressive symptoms when compared to a confirming advice.

**Hypothesis 5:** Professional network encouragement for social network involvement will increase the individual's desire to initiate anti-depressant therapy to manage depressive symptoms, in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 6:** Professional network encouragement for social network involvement will decrease the individual's desire to initiate anti-depressant therapy to manage depressive symptoms in the presence of conflicting

advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 7:** Professional network expressed concern for social network involvement will increase the individual's intention to initiate anti-depressant therapy to manage depressive symptoms in the presence of conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 8:** Professional network expressed concern for social network involvement will decrease the individual's intention to initiate anti-depressant therapy to manage depressive symptoms in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

The hypotheses were tested using a two-factor ANOVA with alpha set to equal to 0.05. This will determine differences within and between treatment groups. Post-Hoc analyses were done to identify specific group differences.

**Objective 3: Investigate the roles and relationships of community social networks in an individual's decision to initiate prescribed antidepressant therapy**

To fully explore objective 3, the conceptual model based on the modified Network Episode Model as identified in Figure 2.4 was examined using Structural Equation (SEM) Modeling. The actual model was determined by reviewing the correlation matrix for each of the items that represent the constructs described in Figure 2.4. Items, which significantly correlated with the desire or intention to



initiate medication therapy, were included. The goodness of fit of the model was tested utilizing chi squared tests, root mean square error of approximation (RMSEA), the non-normalized fit index (NNFI), the comparative fit index (CFI), and the standardized root mean square residual (SRMR). Satisfactory goodness of fit will be indicated by a RMSEA or SRMR of 0.08 or lower; and a NNFI and CFI value of 0.90 or greater (Bagozzi and Yi, 1988).

### **Pre-Test Results and Modifications**

The pretest was conducted in two phases. The first step was pre-testing the scenarios and the second phase was pre-testing the entire online survey. The first phase was initiated on November 11, 2010 at 1:00pm and was closed on November 18, 2010 at 1:00pm. In this phase, we were testing the scenarios to see if individuals would recognize the hypothetical patient as experiencing depression and to see if the professional network attitude scenario emphasized the supportive attitude of the prescriber toward social network involvement in the management of depression. Participants in the pre-test were a convenience sample of professional pharmacy, graduate students, and undergraduate students attending a comprehensive university. In total, 10 respondents participated in this phase of the study. From this phase, 80% of respondents felt that after reading the depression scenario that Rich was suffering from depression. Initially, the professional network manipulation consisted of only a positive physician attitude toward lay network scenario. The alternative scenario did not have the physician mention lay social networks at all. Therefore we only tested the positive attitude scenario and we found that 90% of respondents felt

that the physician was at least a little supportive of involving one's social network in the management of their illness. Based on these positive results we moved forward and worked on finalizing the initial survey for the 2<sup>nd</sup> phase of the pretest.

The 2<sup>nd</sup> phase of pretesting was officially initiated on November 30<sup>th</sup> 2010 at 2:00pm and was closed on January 10<sup>th</sup> 2011. In total, 36 total respondents participated in the second phase of the pretest. Participants again were a convenience sample of undergraduate students, graduate students, professional students, and professional staff at major comprehensive universities. Respondents experienced the entire online survey. They were asked to take the survey but also asked: (1) Did you find it difficult to answer questions taking on Rich's perspective? (2) What was difficult about it and how do you feel we can make it easier for you as a participant to answer those questions? (3) Share any comments/questions/concerns you may have. I am particularly interested in any challenges you have experienced with the questions (4) Please identify any questions that were confusing? and (5) Asked to identify any typographical, spelling, or grammatical errors. This stage of pre-testing was used to finalize the survey that was to be used in pilot testing. Several changes were identified and made. Minor grammatical and typographical changes were made based on pre-tester recommendations. Instructions on the brief COPE were shortened to enhance clarity. The respondents on average completed the survey in 24 minutes, which was consistent with our initial findings. Other than these minor changes, 2 major changes were made as relates the experimental scenarios. Each will be described briefly below.

### *Reorganization of the Standardized Depression Scenario*

Some of the early pro/testers expressed concerns about the length and details provided in our initial depression scenario. Comments included:

*“It was a very long description with some unnecessary details” and “Perhaps a little bit more information regarding Rich's actual thoughts would be helpful-- the objective information about Rich's symptoms were helpful for assessing how his depression is affecting his life, but more subjective information regarding his sentiments might be helpful”.*

As a result the scenario was reorganized into sections. The first section provided general information about the hypothetical student and provided a reason why he was seeking treatment. In the second section, the student describes his depressive symptoms after being prompted by the physician. The third and final section, the physician expresses his diagnosis, treatment recommendation and provided general treatment effectiveness, risk, and benefit information. This reorganization allowed us to keep all the pertinent information in the scenarios as identified by the practitioners, eliminated unnecessary information, and provide the respondents with information more from the perspective of the student. The original scenario prior to reorganization is presented in Appendix B. Again 85% (26) respondents believed that the hypothetical student was at least somewhat likely suffering from depression. We therefore concluded that standardized scenario content was appropriate and with the reorganization of information it was suitable to move forward with pilot testing.

### *Modifying the Professional Network Attitude Scenario*

In the initial design we had decided that the professional network attitude scenario would consist of one scenario where the physician encouraged the involvement of social network members in management of the student's depression and a second scenario, which did not mention social network involvement. (The original professional network attitude scenarios are presented in Appendix C) The manipulation check question gauged how supportive the respondents felt the physician was of the lay social network members being involved in the management of Rich's depression. The belief among study staff, while although the practitioner expressed negative comments about his social network, they were not sure how common this was in this student population. The manipulation check question regarding support demonstrated that in the group not provided with any information regarding social network involvement, 52% (9/16) of them felt that the physician was at least a little supportive of social network involvement in the management of his depression. We therefore realized that in the absence of information regarding beliefs about network involvement were inferring information regarding physician beliefs. Since this study aims to test for the effect of professional network attitude on medication initiation decision a clear manipulation was needed. Therefore the decision was made to include the scenario in which the prescriber specifically warned the student to be cautious in involving their social network in the management of their illness.

## **Chapter IV**

### **Results**

#### **Chapter Overview**

This chapter is divided into five sections: The first section describes the results of the pilot test. The second section describes the response rates for the study. The third section provides general descriptive statistics for the study sample and analysis of differences between experimental groups to test the effectiveness of randomization. The fourth section presents the results of the hypotheses testing to achieve the goal outlined in objectives 1 and 2. It describes the results of the ANOVA tests and subsequent post-hoc analyses utilized to test for the proposed main effect and interaction effects that have been hypothesized to be attributable to the experimental manipulations in the study. These results are then analyzed. The fifth and final section describes the results of the structural model tested to look at factors influencing the decision to initiate medication therapy to achieve the goal outlined in objective 2. It also provides psychometric information for the psychological measures utilized during the study. This section also includes a graphical representation of the final model as well as the fit indices used to assess the overall fit of the model.

#### **Pilot Test**

The pilot test survey was opened to access via a university wide clinical research repository and an initial email (Appendix D) was sent out to 100

students on January 20, 2011 at 7am. A second email was sent out to another group of 213 students on January 21, 2011 at 10:30 am. Based on discussions with undergraduate students at the Midwestern institution used for student recruitment, it was learned that potential participants receive numerous emails daily from organizations requesting their participation in various campus activities. It was therefore advised a reminder email be sent approximately 24-48 hours after the initial emails to remind them of their invitation to participate in the proposed study. A final reminder email (Appendix E) was sent out to both samples on January 22, 2011 at 1:30pm. By January 24, 2011, 76 responses were received, of which 70 were usable. The usable response rate was calculated to be 22.4%. This rate was significantly lower than what was originally hypothesized (40%); therefore an adjustment to the number of emails to be sent out to obtain the desired 225 eligible surveys was increased to 750.

In addition to the adjustment in recruitment size, the accuracy of the student list was verified through the pilot. Organizations and lists were solicited from groups that had updated their listing in the organizational database during the previous semester. This resulted in the receipt of no returned emails for invalid email addresses. The pilot data were analyzed and the perceived support manipulation check question produced statistically significant differences ( $p > 0.001$ ) between the professional network treatment groups. Additionally the depression manipulation check question elicited that 85% respondents at least somewhat believed it was likely that Rich (hypothetical student) was suffering from depression. Over 92% of respondents completed the entire survey.

Reliability analysis of psychological measures and study measures showed high reliability and an analysis of response distribution showed good distribution of responses on both early and late survey questions which decreased concerns over respondent fatigue. Respondents took on average 22 to 23 minutes to complete the survey. This was in line with the 20-25 minutes reported on the consent document. As a result of the positive results from the pilot test, the pilot test was concluded. No additional modifications were made the final survey instrument and the final data collection commenced.

### **Response Rate**

Table 4.1 presents a summary of the response rate for both the pilot test and main survey. Because there were no modifications to the survey as a result of the pilot-test the sample from the pilot test were combined with the main survey sample to produce the final sample. The initial recruitment email was sent out to 752 potential respondents on January 25, 2011 at 6:30pm. A final reminder email was sent on January 26, 2011 at 11:00am. The survey was officially closed on January 26, 2011 at 3:30pm upon the receipt of 224 surveys. Surveys were analyzed and 180 completed surveys were obtained. These surveys combined with the pilot test surveys produced 250 complete surveys. After excluding those non-US born respondents 226 surveys met the study inclusion criteria. The overall response rate was therefore calculated to be 21.2%.

|  |       |
|--|-------|
| PILOT EMAILS SENT                        | 313   |
| PILOT RESPONDED SURVEYS                  | 76    |
| PILOT COMPLETED SURVEYS                  | 70    |
| PILOT RESPONSE RATE                      | 24.3% |
| PILOT EFFECTIVE COMPLETED RATE           | 22.4% |
|  |       |
| MAIN SURVEY EMAILS SENT                  | 752   |
| MAIN SURVEY RESPONDED SURVEYS            | 224   |
| MAIN SURVEY COMPLETED SURVEYS            | 180   |
| MAIN SURVEY REPOSENSE RATE               | 29.8% |
| MAIN SURVEY COMPLETED RESPONSE RATE      | 23.9% |
|  |       |
| TOTAL EMAILS SENT                        | 1065  |
| TOTAL RESPONDED SURVEYS                  | 300   |
| TOTAL COMPLETED SURVEYS                  | 250   |
| SURVEY RESPONSE RATE                     | 28.2% |
| SURVEY COMPLETED RESPONSE RATE           | 23.5% |
|  |       |
| COMPLETED SURVEYS MEETING INCL. CRITERIA | 226   |

**Table 4.1 Estimated Survey Response Rates\***

\*Link to survey was listed on a institutional clinical research repository during recruitment period. Responses specifically from this listing are not known.

## Description of Sample

Table 4.2 provides a distribution of respondents by experimental groups. After receiving a standardized depression scenario, respondents were randomized to receive one lay network attitude and professional network attitude manipulation using Qualtrics randomization tool. The randomizer uses an advanced randomization matrix pattern, which gives each respondent an equal chance to receive either manipulation. As a result, the groups produced were not of equal size. However, each group consisted of at least 50 respondents, with a range of 50-60 respondents.



| Experimental Manipulation           | Positive Professional Network Attitude | Negative Professional Network Attitude |
|-------------------------------------|--|--|
| Lay Network Confirmation            | 26.5%<br>(N=60)                        | 26.5%<br>(N=60)                        |
| Lay Network Conflicting Information | 22.1%<br>(N=50)                        | 24.8%<br>(N=56)                        |

**Table 4.2 Experimental Groups Distribution (Randomized)**

### **Social, Demographic and Prior History of Illness Characteristics**

The socio-demographic characteristics, illness history, and depressive symptoms of the sample are described in Table 4.3. Overall the sample was predominantly Caucasian (76%), female (58%), undergraduate students (66%), and from urban hometowns (86%). This distribution is consistent with the most recent demographic data available from the Midwestern university, which showed the university was 75% Caucasian, 50% female, and 64% undergraduate students. (IPEDS 2010) The mean age of the sample was 23 years of age with a standard deviation of 3.5 years. Eleven percent of the sample reported having been diagnosed with depression, which is consistent with previously reported estimates within this population of between 10-20%. Slightly more, 13% acknowledged being treated for depression. The difference in diagnosis and treatment rates has been attributed to reluctance of prescribers to the assign diagnosis of depression due to potential effects on future employment and insurability, stigma associated with depression diagnosis within various cultural groups, and the use of medication by prescribers in patients who do not meet diagnostic criteria, but the prescriber feels that the individual's depressive symptoms could improve with treatment (Nutting et al., 2002; Rost, Smith, Matthews, & Guise, 1994). Additionally, some individuals may be put on anti-

depressive medication or psychotherapy for other indications and the respondent may have considered this depressive treatment. Based on the PHQ-9 respondents on average had a score of 5.2 (+/-5.1). Based on the scale this would put these respondents on average at the low end of mild depressive symptoms. The majority of respondents (85.5%) scored 9 or less (minimal to mild depressive symptoms) with 58% scoring 4 or less (minimal depressive symptoms) on the PHQ-9. As a screening tool, the PHQ-9 has used scores of greater than or equal to 10 as a cutoff for depression with high specificity and sensitivity, of 88% and 91% respectively. (Kroenke, Spitzer & Williams 2001) Using this as the cutoff, roughly 14.5% of the respondents experienced symptoms over the past two weeks that are consistent with a diagnosis of clinical depression. This percentage is also consistent with the 10-20% prevalence rate reported previously in the literature.

Chi-squared and ANOVA analysis for difference in experimental groups on these demographic and illness/treatment history variables produced no significant differences between treatment groups at a 0.05 alpha level. This is one strong indicator that the randomization process worked as planned. Another indicator of this is to analyze for differences in groups based on psychological measures used in the testing of structural models. The results of these analyses along with a discussion of psychometric information of these measures will be described in the fifth section of this chapter regarding structural model development and testing.

|                                       | n (%)        | X <sup>2</sup> (df) | Sig.  |
|---------------------------------------|--------------|---------------------|-------|
| Race (n=224)                          |              | 19.443 (18)         | 0.365 |
| African American                      | 9 ( 4)       |                     |       |
| Asian                                 | 26 (12)      |                     |       |
| Caucasian/White                       | 170 (76)     |                     |       |
| Hispanic                              | 7 ( 3)       |                     |       |
| Native American                       | 1 (>1)       |                     |       |
| Pacific Islander                      | 1 (>1)       |                     |       |
| Other                                 | 10 ( 5)      |                     |       |
| Gender (n=225)                        |              | 3.664 ( 3)          | 0.303 |
| Male                                  | 94 (42)      |                     |       |
| Female                                | 131 (58)     |                     |       |
| Educational Attainment (n=225)        |              | 31.106 (21)         | 0.072 |
| Freshman                              | 19 ( 8)      |                     |       |
| Sophomore                             | 48 (21)      |                     |       |
| Junior                                | 37 (16)      |                     |       |
| Senior                                | 47 (21)      |                     |       |
| Professional Student                  | 14 ( 6)      |                     |       |
| Master's Student                      | 13 ( 9)      |                     |       |
| Doctoral Student (PhD)                | 41 (18)      |                     |       |
| Other                                 | 6 ( 3)       |                     |       |
| Rural-Urban Hometown (n=226)          |              | 0.996 ( 3)          | 0.802 |
| Urban                                 | 195 (86)     |                     |       |
| Rural                                 | 31 (13)      |                     |       |
| Previous Depression Diagnosis (n=225) | 24 (11)      | 1.727 ( 3)          | 0.631 |
| Previous Depression Treatment (n=225) | 29 (13)      | 0.824 ( 3)          | 0.844 |
|                                       | Mean (SD)    | F                   | Sig.  |
| Age (n=225)                           | 22.81 (3.47) | 0.773               | 0.510 |
| PHQ-9 Depression Symptoms* (n=219)    | 5.24 (5.06)  | 0.219               | 0.883 |

**Table 4.3 Socio-Demographic Characteristics, Depression Symptoms and Depression History of Experimental Groups**

\* 1-4 Minimal Depressive Symptoms, 5-9 Mild Depressive Symptoms, 10-14 Moderate Depressive Symptoms, 15-19 Moderately Severe Depressive Symptoms, 20-27 Severe Depressive Symptoms

### *Experimental Variables within Sample*

Table 4.4 provides the mean scores and standard deviations on the individual items, which constituted the desire construct, the intention construct, the decision construct, and factor loadings for each Exploratory Factor Analysis (EFA). A concern that arose when reviewing the reliability information was the high correlation between initiation intention and initiation desire items. Conceptually, these two constructs should be correlated (Table 4.5). However with high correlations and the results of EFA (Table 4.4) in which all four items loaded on the same factor, indicated there was no differentiation between the two constructs. We therefore constructed the decision scale, which represented a combination of the two constructs to represent the initial medication initiation decision (Table 4.6). This decision measure had high reliability (0.942). Consequently, we utilized this decision construct in the model testing in lieu of the two individual constructs. Additionally, the hypothesis testing was extended to test for the main and interaction effects on the combined decision construct in addition to the desire and intention constructs.

Additionally, a check was conducted to ensure that the manipulations produced the desired effects (Table 4.7). The depression scenario manipulation check produced a mean score of 5.25 on a seven point Likert scale measuring the respondent's belief that Rich was suffering from depression. There was no statistically significant difference between study groups on the depression scenario manipulation check. This was to be expected as all participants were provided with the same depression scenario information.

The professional network manipulation check question, which examined how supportive the prescribing physician seemed to be of involving lay social networks in one's care produced a statistically significant difference between those exposed to the positive and negative scenarios (Table 4.7). The results again were expected as the two groups received different experimental manipulations.

Table 4.8 presents the mean scores on the intention, desire, and decision scales for the 4 study groups. It also presents estimated overall means for each of the hypothesized main effect groups. The testing for statistical significance for differences in these means will be presented in the next section.

| Item  | Mean<br>(SD)   | Scale | Factor Loadings* |
|---|----------------|-------|------------------|
| My desire to start taking Quartz to help manage my depression [DESIRE1]                       | 3.48<br>(1.35) | 1-7   | 0.842            |
| I would want to start taking Quartz to help manage my depression [DESIRE2]                    | 4.11<br>(1.72) | 1-7   | 0.904            |
| The strength of my intention to start taking Quartz to help manage my depression [INTENTION1] | 3.42<br>(1.23) | 1-6   | 0.929            |
| I would intend to start taking Quartz to help manage my depression [INTENTION2]               | 3.39<br>(1.25) | 1-6   | 0.949            |

**Table 4.4 Experimental Individual Item Means, Scales, and Factor Loading**

*\*Eigenvalue 3.47, 86.7% of the error variance explained,*

|            | DESIRE1 | DESIRE2 | INTENTION1 | INTENTION2 |
|------------|---------|---------|------------|------------|
| DESIRE1    | 1       |         |            |            |
| DESIRE2    | 0.796   | 1       |            |            |
| INTENTION1 | 0.780   | 0.826   | 1          |            |
| INTENTION2 | 0.783   | 0.857   |            | 1          |

**Table 4.5 Experimental Measures Correlation Matrix**

| Scale                | N   | Number of items | Cronbach's alpha | Pearson's r |
|----------------------|-----|-----------------|------------------|-------------|
| Initiation Decision  | 226 | 4               | 0.941            |             |
| Initiation Intention | 226 | 2               | -----            | 0.889       |
| Initiation Desire    | 226 | 2               | -----            | 0.799       |

**Table 4.6 Reliability Testing of Dependent Constructs**

| Item  | Mean (SD)      | Scale |
|---|----------------|-------|
| How likely is that Rich is suffering from depression  | 5.25 (1.02)    | 1-7   |
| How supportive do you feel Dr. Hand is of Rich involving his family and friends in the management of his depression | 2.38 (1.18)    | 0-4   |
| <i>Positive Professional Network Attitude</i>   | 2.93 (1.08)*** |       |
| <i>Negative Professional Network Attitude</i>   | 1.87 (1.04)*** |       |

**Table 4.7 Manipulation Checks**

\*\*\* *Difference (t-test) is sig at >.001 level*

|   |                             | Initiation<br>Desire | Initiation<br>Intention | Initiation<br>Decision |
|---|-----------------------------|----------------------|-------------------------|------------------------|
| Positive Professional<br>Network Attitude | Lay Network<br>Confirmation | 3.73<br>(1.58)       | 4.18<br>(0.97)          | 3.51<br>(1.40)         |
|   | Lay Network<br>Conflict     | 3.33<br>(1.41)       | 4.09<br>(0.79)          | 3.10<br>(1.16)         |
| Negative Professional<br>Network Attitude | Lay Network<br>Confirmation | 4.40<br>(1.18)       | 4.53<br>(0.91)          | 4.12<br>(1.12)         |
|   | Lay Network<br>Conflict     | 3.64<br>(1.46)       | 4.43<br>(0.87)          | 3.52<br>(1.27)         |
| Positive Professional Network Attitude    |                             | 3.55<br>(1.51)       | 4.14<br>(0.89)          | 3.33<br>(1.31)         |
| Negative Professional Network Attitude    |                             | 4.03<br>(1.37)       | 4.48<br>(1.37)          | 3.82<br>(1.23)         |
| Lay Network Confirmation                  |                             | 4.06<br>(1.43)       | 4.35<br>(0.96)          | 3.81<br>(1.30)         |
| Lay Network Conflict                      |                             | 3.49<br>(1.44)       | 4.27<br>(0.85)          | 3.33<br>(1.29)         |

**Table 4.8 Means and Standard Deviations of Experimental Variables**

### **ANOVA Test for Objective 1**

ANOVA analyses have four assumptions that need to be met in order to be considered valid. Those assumptions are randomness, independence, homogeneity of variance, and normality. Tests of these assumptions were conducted for the desire, intention, and decision measures to assure that they were met for all proposed experimental outcomes. Based on the experimental design and randomization, randomness and independence were assumed.

To test for normality a test of skewness was performed on the desire, intention, and decision measures. It tests for symmetry in the frequency of responses. A value of between -1 to +1 is indicative of a normal distribution.

(Leach, Barrett, and Morgan 2008) The test statistics for the desire (-.250 +/- .162), intention (-.114 +/- .162) and decision (-.198 +/- .163) demonstrate the normality assumption is met for all three experimental outcome constructs.

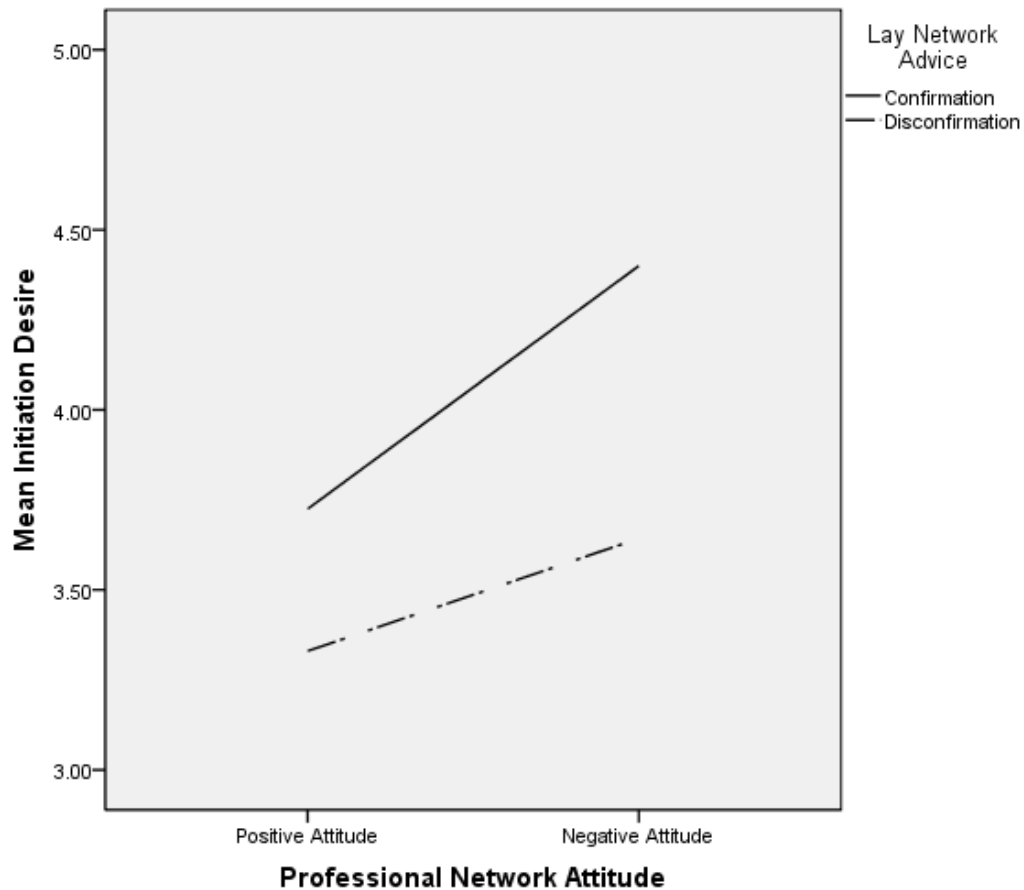
To test for homogeneity of variance Levene's Test for Equality of Variance was performed. The Levene's statistics for intention was not significant. The Levene's test for desire ( $p=0.10$ ) and decision ( $p=0.04$ ) were statistically significant. Therefore for the decision and desire variables, these variances are significantly different. SPSS however uses a regression approach to calculate ANOVA, which lessens the significance of this violation of the assumption of homogeneity of variance.

### **ANOVA Tests**

Table 4.9 presents the results of the two-factor ANOVA for the first step in the initiation decision process, desire. The test was run to compare for differences in means between the four different experimental groups. The tests were significant for the main effects of Professional Network Attitude and Lay Network Advice. However, the interaction effect of lay network advice and professional network attitude did not produce a significant F test. Figure 4.1 graphically demonstrates the lack of the interaction between lay network advice and professional network attitude. Post-Hoc analyses presented in Table 4.10 show that there is about approximately a 0.5 and 0.6 differences in mean desire scores for the professional network attitude and lay network advice manipulations respectively. Overall there was a higher desire to initiate medication by respondents when their lay network member confirmed the recommendation of



the prescriber. However, more interestingly there was a higher desire to initiate medication when the prescriber warned the individual to wary of involving their social network in the management of their disease. This was very interesting finding which suggests that in this sample individuals may value the opinions of their professional network provider more than those of the lay network when it comes to treatment decisions. The implications of this for patient care will be explored further in the discussion chapter.



**Figure 4.1 Initiation Desire**

|  | Sum of Squares | df  | Mean Square | F     | Sig.  |
|--|----------------|-----|-------------|-------|-------|
| Professional Network Attitude                      | 13.708         | 1   | 13.708      | 6.857 | 0.009 |
| Lay Network Advice                                 | 18.646         | 1   | 18.646      | 9.328 | 0.003 |
| Professional Network Attitude x Lay Network Advice | 1.842          | 1   | 1.842       | 0.922 | 0.338 |
| Error  | 443.775        | 222 | 1.999       |       |       |
| Corrected Total                                    | 478.137        | 225 |             |       |       |

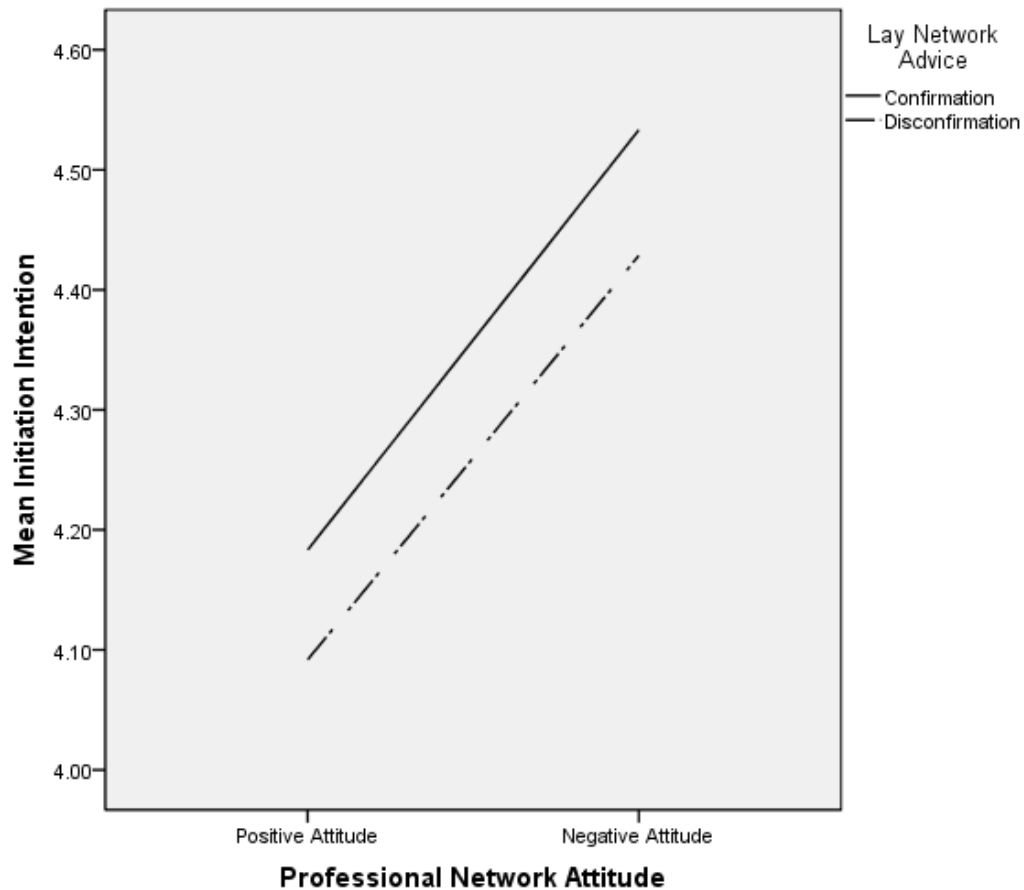
**Table 4.9 ANOVA to Test the Effect of Manipulations and the Interaction on Initiation Desire**

| (I) Group         | (J) Group         | (I – J) Mean Difference | Std. Error | Sig.  | 95% Confidence Interval |             |
|-------------------|-------------------|-------------------------|------------|-------|-------------------------|-------------|
|                   |                   |                         |            |       | Lower Bound             | Upper Bound |
| Negative Attitude | Positive Attitude | 0.494                   | 0.189      | 0.009 | 0.122                   | 0.866       |
| Lay Confirmation  | Lay Conflict      | 0.576                   | 0.189      | 0.003 | 0.204                   | 0.948       |

**Table 4.10 Post-Hoc Test for the Main Effects on Initiation Desire**

Table 4.11 presents the results of the two-factor ANOVA for the second step of the initiation decision process, intention. Again the means of the four different experimental groups were compared. When considering intention to initiate therapy, only the main effect of professional network attitude was significant. There was no main effect for lay network advice or an interaction effect between the two manipulations. Figure 4.2 graphically demonstrates that there was a lack of an interaction between the professional network attitude and lay network advice manipulations on initiation intention. Table 4.12 presents the estimated effect of professional network attitude on initiation intention. Again

interestingly there was a higher intention to initiate medication when the prescriber warned the individual to wary of involving their social network in the management of their disease. This finding was consistent with the findings as it relates to initiation desire, which further emphasizes the influence of the professional network in this population.



**Figure 4.2 Initiation Intention**

|  | Sum of Squares | df  | Mean Square | F     | Sig.  |
|--|----------------|-----|-------------|-------|-------|
| Professional Network Attitude                      | 6.587          | 1   | 6.587       | 8.249 | 0.004 |
| Lay Network Advice                                 | 0.538          | 1   | 0.538       | 0.674 | 0.674 |
| Professional Network Attitude x Lay Network Advice | 0.002          | 1   | 0.002       | 0.003 | 0.956 |
| Error  | 176.468        | 221 | 0.798       |       |       |
| Corrected Total                                    | 183.529        | 224 |             |       |       |

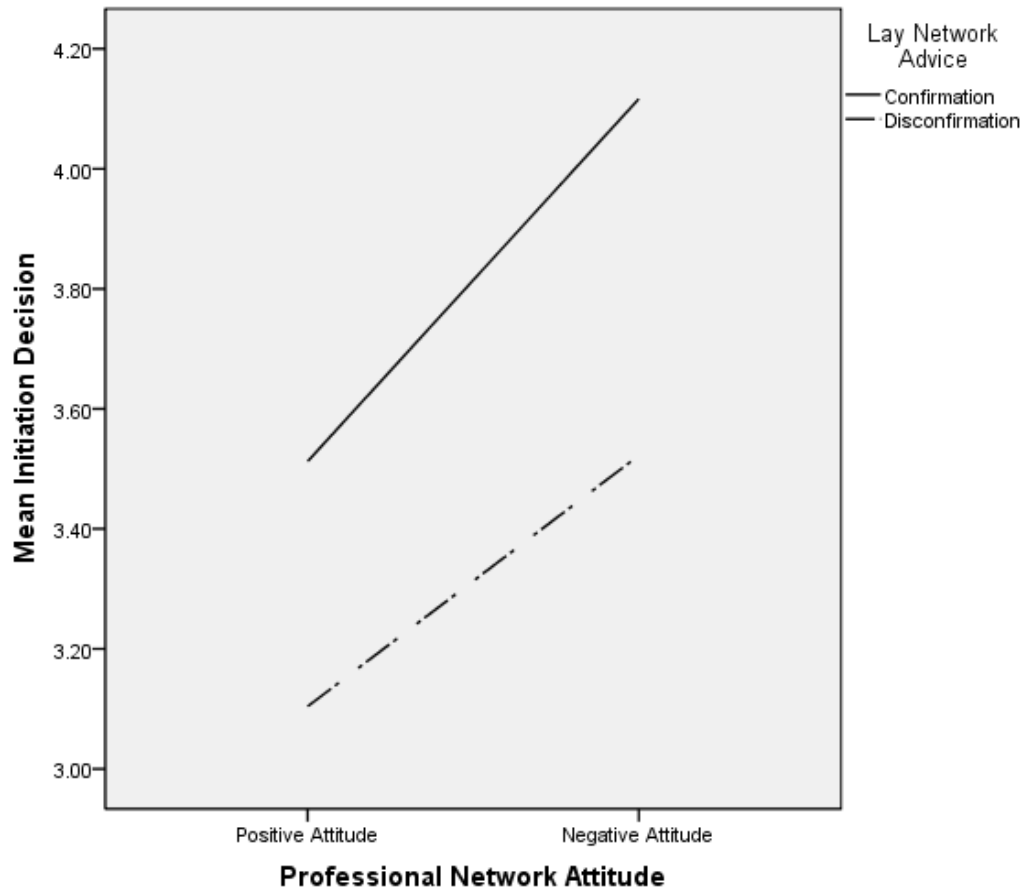
**Table 4.11 ANOVA to Test the Effect of Manipulations and the Interaction on Initiation Intention**

| (I) Group         | (J) Group         | (I – J) Mean Difference | Std. Error | Sig.  | 95% Confidence Interval |             |
|-------------------|-------------------|-------------------------|------------|-------|-------------------------|-------------|
|                   |                   |                         |            |       | Lower Bound             | Upper Bound |
| Negative Attitude | Positive Attitude | 0.343                   | 0.120      | 0.004 | 0.108                   | 0.579       |

**Table 4.12 Post-Hoc Test for the Main Effects on Initiation Intention**

Although not part of the original proposed analyses, an ANOVA analysis was also run on the decision construct. As discussed previously, there was high correlation between the desire and intention items, suggesting that they should be considered as a single decision construct. Table 4.13 presents the results for the 2-factor ANOVA to examine the main and interaction effects of the manipulations on the decision construct. The table shows, similarly to the desire construct there is a main effect of lay network advice and professional network attitude toward social network impact on the decision to initiate prescribed antidepressant therapy. Again, as seen previously there was no interactive effect between the two manipulations. Table 4.14 shows the same directionality and

similar effect size for both the lay network advice and professional network attitude manipulations. These results are consistent with the findings for initiation desire. Figure 4.3 graphically shows the lack of an interaction effect on the initiation decision.



**Figure 4.3 Initiation Decision**

|  | Sum of Squares | df  | Mean Square | F     | Sig.  |
|--|----------------|-----|-------------|-------|-------|
| Professional Network Attitude                      | 14.511         | 1   | 14.511      | 9.338 | 0.003 |
| Lay Network Advice                                 | 13.959         | 1   | 13.959      | 8.983 | 0.003 |
| Professional Network Attitude x Lay Network Advice | 0.480          | 1   | 0.480       | 0.309 | 0.579 |
| Error  | 341.875        | 220 | 1.554       |       |       |
| Corrected Total                                    | 370.464        | 223 |             |       |       |

**Table 4.13 ANOVA to Test the Effect of Manipulations and the Interaction on Initiation Decision**

| (I) Group         | (J) Group         | (I – J) Mean Difference | Std. Error | Sig.  | 95% Confidence Interval |             |
|-------------------|-------------------|-------------------------|------------|-------|-------------------------|-------------|
|                   |                   |                         |            |       | Lower Bound             | Upper Bound |
| Negative Attitude | Positive Attitude | 0.511                   | 0.167      | 0.003 | 0.181                   | 0.841       |
| Lay Confirmation  | Lay Conflict      | 0.501                   | 0.167      | 0.003 | 0.172                   | 0.831       |

**Table 4.14 Post-Hoc Test for the Main Effects on Initiation Decision**

### Results for Aim (Objective) 1

The first aim of the study was to investigate the effects of social networks (lay and professional) in the presence of a conflict of advice between lay and treatment networks in the individual's desire and intention to initiate antidepressant therapy. To accomplish this, eight hypotheses were tested. Based on the results from the ANOVA testing two hypotheses were accepted, while six of the hypotheses were rejected.

The two hypotheses as they relate to the main effects on desire and intention in regards to "lay" social network confirmation were accepted. In both

cases in confirmation situations the desire and intention was higher than in conflict situations. ANOVA tests for these hypotheses were significant.

**Hypothesis 3:** Confirming advice between an individual's "professional" treatment network and their "lay" social network will result in greater desire to initiate antidepressant medication to manage depressive symptoms when compared to conflicting advice.

**Hypothesis 4:** Conflicting advice between an individual's "professional" treatment network and "lay" social network will result in lower intention to initiate antidepressant medication to manage depressive symptoms when compared to a confirming advice.

The main effect of professional network encouragement for social network involvement on desire was statistically significant, but the effect went in a different direction than hypothesized. When prescriber's expressed concern about social network involvement, the mean desire score increased significantly. This finding was not supportive of the a priori hypothesis and therefore we must reject however it is extremely important as it relates to patient health-care provider delivered communication. This will be explored further in the final two chapters.

**Hypothesis 1** Professional network encouragement for community "lay" social network involvement in healthcare management will increase the individual's desire to initiate antidepressant therapy to manage their depressive symptoms.

There were no significant interactions identified when looking at the effect of lay network attitude on professional network attitude. Therefore the four hypotheses related to these proposed interactions and the main effect of professional network attitude on intention was not significant and therefore also was rejected.

**Hypothesis 2:** Professional network encouragement for community “lay” social network involvement in healthcare management will increase an individual's intention to initiate antidepressant therapy to manage their depressive symptoms.

**Hypothesis 5:** Professional network encouragement for social network involvement will increase the individual's desire to initiate anti-depressant therapy to manage their depressive symptoms, in the presence of a confirmation of advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 6:** Professional network encouragement for social network involvement will decrease the individual's desire to initiate anti-depressant therapy to manage depressive symptoms in the presence of conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 7:** Professional network expressed concern for social network involvement will increase the individual's intention to initiate anti-depressant therapy to manage depressive symptoms in the presence of



conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

**Hypothesis 8:** Professional network expressed concern for social network involvement will decrease the individual's intention to initiate antidepressant therapy to manage depressive symptoms in the presence of a conflicting advice regarding the initiation of prescribed antidepressant therapy between one's lay and professional social networks.

Additionally, although not originally hypothesized, both lay network confirmation and professional network attitude were found to have a significant effect on the decision to initiate antidepressant medication. However, there were no significant interaction effects between the two on the decision construct.

## **Structural Equation Analyses**

### *Properties of Psychological Measures*

#### *Reliability Information*

The study had two dependent constructs the desire (Desire) and intention (Intention) to initiate antidepressant after the exposure to two experimental manipulations. Together, these two constructs represented the initial steps of the decision process (Decision) by which an individual decides to initiate the medication therapy. Two items, whose previous use and reliability were discussed in Chapter 3, measured each of the variables. Additionally, several psychological measures were used to identify potential factors that were influential in the decision to initiate medication therapy. These measures were used as independent variables in the structural model for factors affecting

decision-making. The previous use and reliability information of these measures was discussed in Chapter 3. Table 4.15 presents a summary of the reliability information for all study constructs. This reliability information is presented in terms of Cronbach's Alpha values, which is an accepted indicator of internal consistency of scale items. The scales in this table are based on the items as they have been previously defined and validated. For detailed summary of the items that constitute each scale please see Appendix F. Scales that consisted of only two items, the Pearson's Correlation is presented. In scales consisting of two items, Cronbach's Alpha has been shown not to be an appropriate measure of internal consistency and therefore is not reported. By convention, a lenient cut-off of .60 is common in exploratory research when evaluating alphas and correlations; alpha should be at least .70 or higher to retain an item in an adequate scale; and many researchers require a cut-off of .80 for a good scale (Paterson, 1994).

Most of the scales had adequate reliability within the sample using the most liberal the lenient (.60) and adequate scale cutoff (.70). The social network interaction scale was the notable exception. This scale, which is a sub-scale of the Duke Social support index, measures the frequency that an individual has interaction with his social network. It asks questions about how many close friends and family one has within a one-hour drive, how often one talks on the phone to friend and family, and how often one attends social events or club meetings. The measure is one of the most widely used measures of social support, but may no longer represent the nature of social network interactions

within the college student populations. The scale does not include online social networking and short message service (SMS) as means of potential network interaction within this population. These modes of communication were not present during the development of this instrument and the findings suggest that revising how individuals today define social network interaction may be warranted.

As it relates to the coping styles as identified by the brief COPE, the correlations were acceptable for many of the scales. However the denial, acceptance, self-distraction, and venting had particularly poor reliability with significantly lower correlation values for denial (0.54), acceptance (0.57) and venting (0.50) compared to a previous studies (Carver, 1997). Additionally, most of the validation studies were done in community dwelling older adults, which may have more experience dealing with depressive symptoms. It is therefore possible that some of the wording and questions did not resonate with this younger sample. Additionally, it has been demonstrated as individuals move through life cycles they adopt and utilize different coping mechanisms.

Cronbach's Alpha has been adopted as the de facto gold standard of internal consistency; however it is not without its problems. There have been three major problems that have consistently been cited by social science researchers. The first problem is that alpha is dependent not only on the magnitude of the correlations among items, but also on the number of items in the scale. A scale can be made to look more 'homogenous' simply by doubling the number of items, even though the average correlation remains the same.

This leads directly to the second problem. If you have two scales which each measure a distinct aspect, and combine them to form one long scale, alpha could be high, although the merged scale is obviously tapping two different attributes. Lastly, if alpha is too high, then it may suggest a high level of item redundancy (a number of items asking the same question in slightly different ways) (Streiner & Norman, 1989).

Further analyses of several of these validated scales within the study sample using a robust exploratory factor analysis (maximum likelihood, pro-max rotation, removing load loadings that were less than 0.25) showed that for several of the scales, single factor structures were not present. As a result although they are internally consistent based on the Cronbach's Alpha calculations, they may not indeed be measuring single constructs within the sample. Upon review of previous studies that reported reliability information for many of the scales, only the internal consistency was reported, which suggests this lack of single factor structure may have been present in other studies. This has important implications that were taken into account when identifying and testing a proposed model incorporating these constructs into the medication initiation decision process. When conducting the SEM analysis the first step taken was that of developing a correlation matrix to examine each item separately for their proposed relationships with the study dependent variables instead of using the initially proposed scale measures.

Another concern that arose when reviewing the reliability information was the high correlation between initiation intention and initiation desire.

Conceptually, these two constructs should be correlated. However with high correlations and the results of EFA including all four items showed that within the sample, there was no differentiation between the two constructs. We therefore constructed the decision scale, which represents a combination of the two constructs to represent the initial medication initiation decision. This decision measure had high reliability (0.94). Consequently, we utilized this decision construct in the model testing in lieu of the two individual constructs.

Additionally, the hypothesis testing was extended to test for the main and interaction effects on the combined decision construct in addition to the desire and intention constructs.

| Scale                        | N   | Number of items | Cronbach's alpha | Pearson's r*? |
|------------------------------|-----|-----------------|------------------|---------------|
| Initiation Decision          | 226 | 4               | 0.941            |               |
| Initiation Intention         | 226 | 2               | -----            | 0.889         |
| Initiation Desire            | 226 | 2               | -----            | 0.799         |
| Treatment Concern            | 226 | 3               | 0.702            | -----         |
| Treatment Necessity          | 226 | 4               | 0.769            | -----         |
| Treatment Overuse            | 226 | 3               | 0.710            | -----         |
| Treatment Harm               | 226 | 5               | 0.678            | -----         |
| Coping Style                 |     |                 |                  |               |
| Active Coping                | 222 | 2               | -----            | 0.561         |
| Planning                     | 222 | 2               | -----            | 0.688         |
| Instrumental Support         | 222 | 2               | -----            | 0.725         |
| Positive Reframing           | 222 | 2               | -----            | 0.708         |
| Acceptance                   | 222 | 2               | -----            | 0.262         |
| Denial                       | 222 | 2               | -----            | 0.218         |
| Religion                     | 222 | 2               | -----            | 0.812         |
| Emotional Support            | 222 | 2               | -----            | 0.775         |
| Humor                        | 222 | 2               | -----            | 0.738         |
| Substance Abuse              | 222 | 2               | -----            | 0.796         |
| Venting                      | 222 | 2               | -----            | 0.403         |
| Behavioral Disengagement     | 222 | 2               | -----            | 0.612         |
| Self-Blame                   | 222 | 2               | -----            | 0.632         |
| Self-Distraction             | 222 | 2               | -----            | 0.280         |
| Individualistic Self         | 225 | 5               | 0.821            | -----         |
| Relational Self              | 225 | 5               | 0.893            | -----         |
| Collectivist Self            | 225 | 5               | 0.895            | -----         |
| Perceived Social Stigma      | 226 | 5               | 0.781            | -----         |
| Attitude Toward Depression   | 222 | 29              | 0.836            | -----         |
| Recognition of Need for Help | 222 | 8               | 0.744            | -----         |
| Stigma Tolerance             | 222 | 5               | 0.710            | -----         |
| Interpersonal Openness       | 222 | 7               | 0.628            | -----         |
| Confidence in Practitioners  | 222 | 9               | 0.737            | -----         |
| Social Support Index         | 220 | 11              | 0.812            | -----         |
| Social Network Interaction   | 221 | 4               | 0.480            | -----         |
| Social Network Satisfaction  | 220 | 7               | 0.868            | -----         |

**Table 4.15 Reliability of Psychological Measures**

### *Psychological Measures within the Sample*

Table 4.16 provides an overview of how the entire sample scored on average on the psychological measures. Several interesting observations were made within the sample. Within the sample, respondents more strongly believed that their medications (treatments) were overused (3.45 +/- .74) and had high concern about side effects (2.93 +/- .83). Conversely they did not have strong beliefs that medication caused harm (2.14 +/- .61), but did not feel that it was necessary (2.24 +/- .83) for them at this point in their life. These results would be consistent with a young adult college aged sample. This group is prone to be healthier and therefore not taking medication. At the same time they have been exposed to social media messages involving prescription medication usage, which has emphasized over-prescribing of the prescription medication and the side of effects of treatment. These messages do not translate to beliefs about individual harm in this population, because they have stronger beliefs that they are not at high risk for negative events.

As it relates to their illness representations regarding Rich's depression, they had strong representations along all domains, except for coherence (3.86 +/- 1.58). They did not feel that he had a clear understanding of his depression. This again would be expected, as often individual's associate ambivalence toward a decision as lack of understanding of the condition. The scenarios emphasized Rich's ambivalence toward his depressive diagnosis and medication initiation decision.

The sample utilized a variety of coping styles to deal with their depressive symptoms including planning, emotional support and instrumental support. There were however several that they did not self-identify as utilizing frequently: substance abuse (1.35 +/- 0.62), behavioral disengagement (1.37 +/- 0.60), denial (1.27 +/- 0.47), and religion (1.78 +/- 0.92). These items ask them how much they employ these coping styles on a not at all (1) to a lot (4) likert scale. The particularly coping styles have traditionally not been self-identified openly with the young adult age group. They are more negative types of coping behaviors. These behaviors are often considered neither socially desirable nor productive.

As it relates to self-concept, the sample defined itself the most based on the relational self or dyadic connections and role relationships with others (4.48 +/- 0.57) and the collectivist self or definition based on one's social group memberships, where favorable intergroup comparison give rise to self-worth (4.13 +/- 0.54). Respondents were asked to rate their level of agreement/disagreement with statements that define their relational, collectivist, and individualistic self. Generally speaking an increase focus on relationships and group membership status would enhance the influence of social network attitudes and beliefs on individual decision-making.

As it relates to individual attitudes toward depression and perceived social stigma, the sample overall, generally felt that there was social stigma associated with mental illness and it's treatment, but the sentiment was not very strong when respondents were asked to rate their level of agreement or disagreement about



social stigma on a five point scale (2.85 +/- 0.68). Additionally, they felt as if they recognized the need for help in individuals who experience emotional or psychological problems, felt open to discuss emotional or psychological problems with mental health professionals if necessary, felt that they could tolerate the social stigma associated with having and/or seeking treatment for a psychological or emotional problem, and had confidence in the ability of mental health practitioners to help them if they ever experienced a emotional or psychological problem. This generally positive attitude toward depression was expected, in light of recent campus-wide initiatives to increase awareness of college student mental illness and it's treatment that have occurred within the past 6 months on the campus from which this student sample was solicited.

Additionally, Table 4.16 presents the results of an ANOVA tests for differences between the experimental groups on these measures. It was believed *a priori* that the experimental manipulation should not affect how individuals score on these the measures. Of the thirty-eight psychological measures the experimental groups differed significantly at the 0.05 level on 3 or 8%. Because of the small number of differences it is likely that these differences are most like negligible and attest to the strength of the randomization. However for completeness, post-hoc analyses were done (Tukey's HSD when equal variances were present and Game's Howell analysis when the equal variance assumption was violated). The results of these analyses are presented in Tables 4.17, 4.18, and 4.19.

|                                  | Mean (SD)   | Scale | F     | Sig.   |
|----------------------------------|-------------|-------|-------|--------|
| Treatment Concern                | 2.93 (0.83) | 1-5   | 1.571 | 0.197  |
| Treatment Necessity              | 2.24 (0.83) | 1-5   | 1.942 | 0.124  |
| Treatment Overuse                | 3.45 (0.74) | 1-5   | 3.810 | 0.011* |
| Treatment Harm                   | 2.14 (0.61) | 1-5   | 1.041 | 0.375  |
| Illness Consequences             | 7.04 (1.63) | 1-10  | 0.792 | 0.499  |
| Illness Timeline                 | 5.44 (1.68) | 1-10  | 0.353 | 0.787  |
| Illness Personal Control         | 5.34 (2.04) | 1-10  | 0.314 | 0.815  |
| Illness Treatment Control        | 6.70 (1.78) | 1-10  | 0.663 | 0.575  |
| Illness Identity                 | 6.22 (1.48) | 1-10  | 1.496 | 0.217  |
| Illness Coherence                | 3.86 (1.58) | 1-10  | 3.642 | 0.014* |
| Illness Emotional Representation | 6.56 (1.73) | 1-10  | 0.381 | 0.767  |
| Illness Concern                  | 5.30 (1.82) | 1-10  | 0.584 | 0.626  |
| Active Coping                    | 2.76 (0.83) | 1-4   | 0.163 | 0.921  |
| Planning                         | 2.76 (0.85) | 1-4   | 1.630 | 0.183  |
| Positive Reframing               | 2.47 (0.91) | 1-4   | 0.508 | 0.677  |
| Acceptance                       | 2.67 (0.73) | 1-4   | 0.453 | 0.715  |
| Emotional Support                | 2.69 (0.90) | 1-4   | 1.007 | 0.391  |
| Instrumental Support             | 2.52 (0.88) | 1-4   | 0.490 | 0.689  |
| Venting                          | 2.00 (0.74) | 1-4   | 0.901 | 0.442  |
| Substance Abuse                  | 1.35 (0.62) | 1-4   | 0.568 | 0.636  |
| Self Blame                       | 2.18 (0.89) | 1-4   | 1.024 | 0.383  |
| Humor                            | 2.18 (0.93) | 1-4   | 0.084 | 0.969  |
| Religion                         | 1.78 (0.92) | 1-4   | 0.572 | 0.634  |
| Behavioral Disengagement         | 1.37 (0.60) | 1-4   | 0.516 | 0.672  |
| Denial                           | 1.27 (0.47) | 1-4   | 0.644 | 0.587  |
| Self-Distraction                 | 2.67 (0.77) | 1-4   | 0.512 | 0.674  |
| Individualistic Self             | 3.43 (0.80) | 1-5   | 0.949 | 0.584  |
| Relational Self                  | 4.48 (0.57) | 1-5   | 1.257 | 0.290  |
| Collectivist Self                | 4.13 (0.54) | 1-5   | 0.649 | 0.418  |
| Perceived Social Stigma          | 2.85 (0.68) | 1-5   | 1.066 | 0.364  |
| Attitudes Toward Depression      | 2.65 (0.25) | 1-4   | 2.074 | 0.105  |
| Recognition of Need for Help     | 2.66 (0.44) | 1-4   | 1.469 | 0.224  |
| Stigma Tolerance                 | 2.67 (0.51) | 1-4   | 0.208 | 0.891  |
| Interpersonal Openness           | 2.89 (0.40) | 1-4   | 4.110 | 0.007* |
| Confidence in Practitioners      | 2.60 (0.27) | 1-4   | 1.184 | 0.317  |
| Social Support Index             | 2.46 (0.34) | 1-3   | 0.218 | 0.883  |
| Social Network Interaction       | 2.31 (0.29) | 1-3   | 0.086 | 0.968  |
| Social Network Satisfaction      | 2.62 (0.43) | 1-3   | 0.032 | 0.992  |

**Table 4.16 Experimental Group Differences on Psychological Measures**

| (I)<br>Group           | (J)<br>Group              | (I – J)<br>Mean<br>Difference | Std.<br>Error | Sig.  | 95% Confidence Interval |             |
|------------------------|---------------------------|-------------------------------|---------------|-------|-------------------------|-------------|
|                        |                           |                               |               |       | Lower<br>Bound          | Upper Bound |
| Pos. Att. +<br>Confirm | Neg. Att. +<br>Disconfirm | 0.969                         | 0.322         | 0.017 | 0.130                   | 1.810       |

**Table 4.17 Games-Howell Post-Hoc Test for Difference in Perceived Illness Coherence**

| (I)<br>Group              | (J)<br>Group              | (I – J)<br>Mean<br>Difference | Std.<br>Error | Sig.  | 95% Confidence Interval |             |
|---------------------------|---------------------------|-------------------------------|---------------|-------|-------------------------|-------------|
|                           |                           |                               |               |       | Lower<br>Bound          | Upper Bound |
| Pos. Att. +<br>Confirm    | Neg. Att. +<br>Disconfirm | 0.397                         | 0.136         | 0.020 | 0.044                   | 0.750       |
| Pos. Att. +<br>Disconfirm | Neg. Att. +<br>Disconfirm | 0.410                         | 0.143         | 0.023 | 0.040                   | 0.779       |

**Table 4.18 Tukey's HSD Post-Hoc Test for Differences in Perceived Treatment Overuse**

| (I)<br>Group              | (J)<br>Group           | (I – J)<br>Mean<br>Difference | Std.<br>Error | Sig.  | 95% Confidence Interval |             |
|---------------------------|------------------------|-------------------------------|---------------|-------|-------------------------|-------------|
|                           |                        |                               |               |       | Lower<br>Bound          | Upper Bound |
| Neg. Att. +<br>Disconfirm | Neg. Att. +<br>Confirm | 0.229                         | 0.071         | 0.008 | 0.045                   | 0.414       |
| Neg. Att. +<br>Disconfirm | Pos. Att. +<br>Confirm | 0.220                         | 0.070         | 0.011 | 0.038                   | 0.402       |

**Table 4.19 Games-Howell Post-Hoc Test for Differences in Attitude Toward Openness**

Structural equation analysis was utilized to identify factors affecting the initiation decision process as proposed by a modified Network Episode Model Framework. As discussed previously, because of the single factor structure for the decision construct the desire and intention items were combined to form a single construct. The first step performed to identify appropriate constructs from the model was to evaluate the correlations between the decision construct and the psychological measures that were identified to represent key components of

the medication initiation process as defined by the modified NEM model. Bivariate Pearson correlations were calculated using a list-wise exclusion method. Of all the initially proposed constructs only components of treatment representation (treatment concerns, treatment necessity, and treatment overuse), illness representation (illness consequences, illness identity, personal control over illness, treatment control over illness), and the individual's beliefs about depression and its treatment (confidence in mental health care professionals and recognition of need for professional help) were significantly correlated ( $p \leq 0.05$ ) with the decision to initiate antidepressant therapy in the sample. Table 4.20 displays the correlations that were used in the structural model testing.

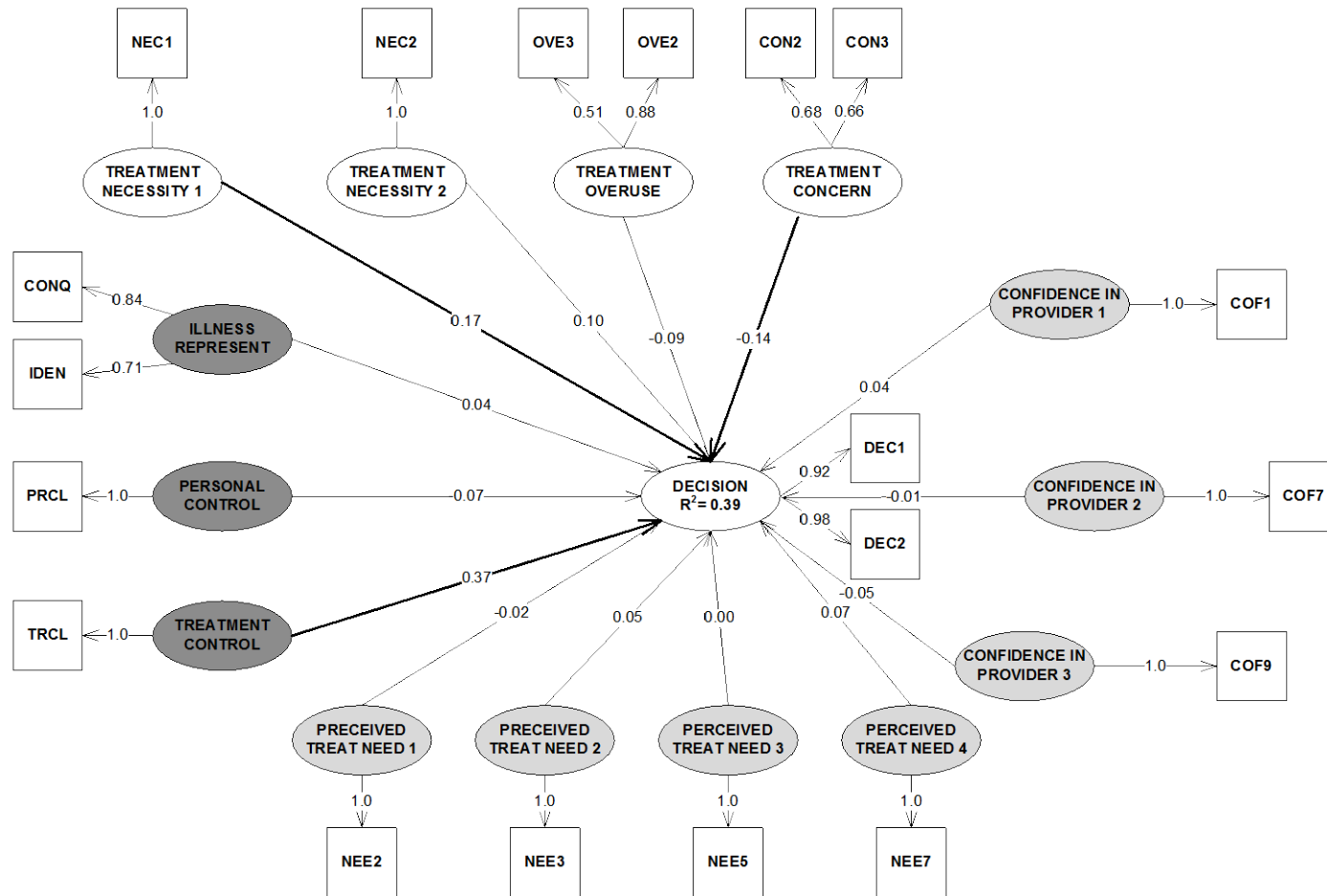
The final model produced, depicted in Figure 4.4, had a very good fit as indicated by the fit indices in Table 4.21. However, the standardized betas were not very large. This is largely due to the large number of single item constructs that emerged. However each of the constructs identified conceptually are logically linked to the initiation decision. Specifically that the individual belief about the ability of treatment (medication) to help manage or treat depression, their concerns about the safety of medication, and their beliefs about the necessity of medication to treat illness had the strongest impact on the initiation decision.

|          | DEC1        | DEC2        | CON<br>2    | CON<br>3    | OVE2        | OVE3        | NEC1        | NEC2       | CON<br>Q    | IDEN        | PRCL        | TRCL       | NEE2       | NEE3       | NEE5       | NEE7       | COF1       | COF7       | COF9 |  |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|------------|------------|------------|------------|------------|------------|------------|------|--|
| DEC1     | 1           |             |             |             |             |             |             |            |             |             |             |            |            |            |            |            |            |            |      |  |
| DEC2     | .900<br>**  | 1           |             |             |             |             |             |            |             |             |             |            |            |            |            |            |            |            |      |  |
| CON<br>2 | -.315<br>** | -.261<br>** | 1           |             |             |             |             |            |             |             |             |            |            |            |            |            |            |            |      |  |
| CON<br>3 | -.181<br>** | -.182<br>** | .445<br>**  | 1           |             |             |             |            |             |             |             |            |            |            |            |            |            |            |      |  |
| OVE2     | -.257<br>** | -.203<br>** | .270<br>**  |             | 52          | 1           |             |            |             |             |             |            |            |            |            |            |            |            |      |  |
| OVE3     | -.293<br>** | -.281<br>** | .380<br>**  | .356**      |             | .453<br>**  | 1           |            |             |             |             |            |            |            |            |            |            |            |      |  |
| NEC1     | .324<br>**  | .304<br>**  | -.096       | -.179**     | -.217<br>** | -.285<br>** | 1           |            |             |             |             |            |            |            |            |            |            |            |      |  |
| NEC2     | .150<br>*   | .162<br>*   | -.053       | .100        | -.057       | -.099       | .263<br>**  | 1          |             |             |             |            |            |            |            |            |            |            |      |  |
| CON<br>Q | .230<br>**  | .253<br>**  | -.156<br>*  | -.181<br>** | -.125       | -.106       | .034        | .026       | 1           |             |             |            |            |            |            |            |            |            |      |  |
| IDEN     | .178<br>**  | .258<br>**  | -.081       | -.042       | -.067       | -.081       | .040        | .033       | .591<br>**  | 1           |             |            |            |            |            |            |            |            |      |  |
| PRCL     | -.276<br>** | -.278<br>** | .009        | .128        | .141<br>*   | .063        | -.246<br>** | -.131      | -.368<br>** | -.279<br>** | 1           |            |            |            |            |            |            |            |      |  |
| TRCL     | .429<br>**  | .508<br>**  | -.212<br>** | -.200<br>** | -.109       | -.208<br>** | .128        | -.021      | .369<br>**  | .397<br>**  | -.308<br>** | 1          |            |            |            |            |            |            |      |  |
| NEE2     | .145<br>*   | .139<br>*   | -.060       | .005        | -.077       | .066        | .026        | .233<br>** | .121        | .115        | -.193<br>** | .192<br>** | 1          |            |            |            |            |            |      |  |
| NEE3     | .198<br>**  | .188<br>**  | -.086       | -.038       | -.218<br>** | -.075       | .032        | .117       | .118        | .153<br>*   | -.152<br>*  | .182<br>** | .321<br>** | 1          |            |            |            |            |      |  |
| NEE5     | .169<br>*   | .133<br>*   | -.074       | -.117       | .027        | .031        | .109        | .027       | .063        | .106        | .006        | .193<br>** | .304<br>** | .285<br>** | 1          |            |            |            |      |  |
| NEE7     | .171<br>*   | .162<br>*   | -.057       | .104        | -.052       | .084        | .038        | .147<br>*  | .043        | .135<br>*   | -.132<br>*  | .185<br>** | .499<br>** | .355<br>** | .333<br>** | 1          |            |            |      |  |
| COF1     | .183<br>**  | .190<br>**  | -.161<br>*  | -.173<br>** | -.016       | -.074       | .139<br>*   | -.006      | .126        | .152<br>*   | -.103       | .347<br>** | .159<br>*  | .293<br>** | .213<br>** | .154<br>*  | 1          |            |      |  |
| COF7     | .145<br>*   | .143<br>*   | -0.02       | -.022       | -.092       | -.027       | .196<br>**  | .064       | .011        | .053        | -.225<br>** | .168<br>*  | .169<br>*  | .234<br>** | .244<br>** | .248<br>** | .152<br>*  | 1          |      |  |
| COF9     | .200<br>**  | .226<br>**  | -.135<br>*  | -.061       | -.059       | -.021       | .111        | .047       | .179<br>**  | .143<br>*   | -.034       | .304<br>** | .303<br>** | .413<br>** | .394<br>** | .336<br>** | .392<br>** | .279<br>** | 1    |  |

**Table 4.20 Correlation Matrix (See Appendix F for individual items)**

\*\* Correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.05 level (2-tailed)



**Figure 4.4 Structural Model**

| Model | N   | Chi-Square | df | Sig. | NNFI | CFI  | SRMR | RMSEA |
|-------|-----|------------|----|------|------|------|------|-------|
| Model | 226 | 95.08      | 58 | .001 | 0.92 | 0.97 | 0.03 | 0.053 |

**Table 4.21 Structural Model Fit Statistics**

### **Results for Aim (Objective) 3**

The results of the structural equation analysis demonstrated that of all the constructs proposed by the modified NEM model, illness characteristics and representations, treatment representations, and attitudes toward depression and its treatment were the only constructs that significantly impacted the decision to initiate antidepressant therapy. In the sample, the desire and intention to initiate medication were so strongly correlated it was not possible to delineate the effects of the study constructs on each of the constructs separately. Additionally, because single items represented several of the constructs the etas were not large, despite the good fit of the overall model.

## **CHAPTER V**

### **Discussion**

#### **Introduction**

The discussion of relevant findings is divided into three sections. The first section discusses the characteristics of the sample. This includes demographic characteristics and prior history of illness characteristics, response rate and a discussion of the psychological measures. The next section will review the findings as they relate to Objectives 1 and 2. Findings related to professional network expressed attitude toward social network involvement will be discussed, followed by the findings for lay network advice, and finally discussion of the interaction between the two. The last section of the chapter discusses the results as they relate to objective 3. It will begin by discussing the psychological measures reliability, the importance of illness representation, importance of treatment representations, and the importance to attitudes toward seeking help in the medication initiation decision process.

#### **Characteristics of the Sample**

##### **Response Rate**

The effective response rate for the study was 21%. This response rate was significantly lower than the expected response rate of 40%. However, this low rate is largely due to the extraordinary amount of emails university students receive daily asking them to participate in activities or organizations, purchase



products or services, and even participate in other research studies. This therefore creates unique challenges when using email as the primary means of recruitment for studies. Some things that were instituted to help improve response rate was making the subject line more marketable, emphasizing the incentives and short time expectation, sending out a second email 24-36 hours after the initial email, and promptly processing incentives to encourage prompt response for potential future research activities. Despite these challenges, the email medium afforded the researcher a shortened collection time of a matter of days versus weeks using traditional mail distribution, automated data collection, and real-time processing of subject incentive payments.

### **Response Bias**

As result of the strong anonymity that was encouraged by the university investigational review board (due the sensitivity of the topics covered in the study) the identification of non-responders was not feasible. However, examining the potential effects of early responders versus late responders was possible. This was carried out to examine if those who responded to initial recruitment emails were significantly different from those that responded to reminder emails. A secondary analysis was conducted for differences on social demographic, prior history of illness, and psychological measures was done to see if there were any statistical differences between those who responded after the first and second notification. There were no statistically significant ANOVA or chi-squared tests between the early and late responders on the social demographic and psychological measures.

## **Social Demographic and Prior History of Illness Characteristics**

The sample recruited was representative of the target university student population. However there were a limited number of under-represented minorities (i.e. African American, Native American, and Hispanic) as compared to the total university student population. Additionally, there are a significant number of international students within the student population that were excluded by the study design. This was intentional to eliminate the impact of culture on the experiment. Therefore, the generalizability of our results to a diverse university student population is limited which is an opportunity for future research to study.

The sample's self-reports of depression and scores on the depression inventory were consistent with the published 10-20% prevalence rate of clinical depression reported in college student populations. Additionally, as mentioned in Chapter 2 the sample was representative of the Midwestern university student population when compared to IPEDS Data.

## **Psychological Measures**

An interesting finding from our study demonstrated that doing a more stringent factor analysis of the established scales used showed that despite reasonably good alpha's, the scales were actually measuring more than one construct. Upon further review of the previous literature that has used these scales found Cronbach's alpha values reported. Upon review of the individual items that constitute these scales as reported in Appendix F, many of the scales could be viewed as measuring different concepts.

Despite these challenges, the sample's scores on these measures brought to light an important finding as it relates to the importance of age and potentially generational identity. The majority of these instruments and scales were developed prior to the birth of the current sample. Since a variety of social, political, and economic issues have changed society so that the beliefs, values, and attitudes of the younger generation are different from those of the earlier generations. Additionally, the social network and support measures established in the published literature do not reflect changes in communication and social networking behaviors of younger adults in a world of Facebook, Twitter, and other electronic social networks. These changes in the necessitate researchers to critically review the appropriateness of established sociometric measures.

### **Randomization Check**

The randomization checks demonstrated that the scenarios produced the desired effects.

### **Distinction Between Initiation Desire and Intention**

We were unable to obtain a clear distinction between initiation desire and intention. Nadkarni et al. (2010) had a similar challenge when they were examining self-care behaviors in patients with diabetes. This could be due to the inability of respondents to distinguish between the two constructs. Within a healthcare treatment context, subjects may not be able to separate desires and intentions. This may be explained by the inherent desire from a physical or emotional need for treatment that could enhance or sustain life. Consequently, patients could automatically link their intention and desire to initiate a prescribed

therapy because the alternative would result in death or disability. Patients, however, can differentiate clearly between intention and the act of taking or using medication treatments. In these cases patients are not acutely aware of their desire/intention to use a prescribed medical treatment, but can actually physically discern that they did not carry out the act of using treatment (behavior).

Another potential reason respondents were unable to delineate desire from intention could be due to the question ordering. Respondents, in both studies (the current and Nadkarni et al.) were asked questions related to the intention and desire sequentially. Respondents may simply base their response to the subsequent question on the previous question. Respondents may feel that it is only logical that if they desire to take medication therapy then they intend on taking. Therefore, they are attempting to conform to the social norms and match their desires with their intentions. This effect could be an artifact of the inherent life sustaining impact of medication. It would be interesting to see in future research if patients evaluating elective medication treatment (e.g. lifestyle drugs and cosmetic treatments) could better differentiate desire from intention when compared to medically necessary treatments.

## **Objectives 1 and 2: Experimental Manipulation**

### **Professional Network Attitude**

Professional network attitude toward social network involvement in management of illness only had a significant impact on initiation desire and not intention. Additionally the effect was in an opposite direction as predicted. As the prescriber expressed concern about social network involvement (negative

attitude toward patient engagement with lay “community” network), patient desire to initiate medication increased. There are several plausible explanations.

The expression of concern by prescriber could have been seen by the respondent as a desire to personalize their care. Prescribers specifically expressed their knowledge based on their experiences with lay “community” networks. Stepping outside of the routine medical discussion may have demonstrated additional insight shared by the prescriber with the patient. Correspondingly, the respondent may feel that the prescriber understands him as a patient and the relationships he has with family and/or friends. Therefore by expressing this concern, they are expressing their personal concern about their care. The literature has shown that provider-patient relationship can enhance the acceptance of recommendations and improve communication between patients and providers (Piette, Schillinger, Potter, & Heisler, 2003)

A second explanation relates to the concept of subjective and objective expertise. The work of Kjos (2009) has shown that patients use their professional and lay networks for different purposes when seeking medication related information. They see healthcare providers as more of a source of objective information and their lay network as sources of subjective information. However, little is known about how patients differentiate between and perceive subjective and objective advice from healthcare professionals.

Based on the proposed conceptual model rooted in the NEM, there would be a proposed relationship between patient preference for subjective and

objective information and patient characteristics (e.g. personality, coping styles, type of health condition, severity of health condition, etc.).

A third potential explanation is the role of experience. Based on the respondent's self-reported experiences with depression, the majority of the sample has never been diagnosed or treated for depression. Therefore, their experience may be limited with medication use decisions and also with mental illness. In cases of lack of experience or knowledge, individuals tend to follow the advice of a perceived expert (Eastin, 2001; Reiss, Gibson, & Walker, 2005). In this study, the prescriber could have been seen as the perceived subject matter expert and by expressing concern over the involvement of non-experts (lay social networks) in the process provided the respondent with additional evidence of the prescriber's expertise which would increase the likelihood to disregard advice received from non-experts. Additionally, experience is also related to age. Our sample consisted of a fairly narrow, homogenous age population, so the effect of age could not be fully explored.

### **The Interaction between Lay Network Advice and Professional Network Attitude**

There were no statistically significant interactions between professional network attitude and lay network advice. However, based on the NEM model, this may be expected. The NEM proposes that the relationship between the network utilization, course of illness, and social-geographical characteristics is a dynamic one. The study attempted to isolate specific constructs and manipulate them, but maybe there are other important constructs that moderate or mediate

the relationship between the “lay” and professional “networks”. Items such as age, educational attainment, disease severity, and medical insurance may be important variables that make the interaction more salient. Alternatively, patients may disregard the opinion of their professional network in regard to their lay network interactions. Consequently, their health care provider’s opinion of their friend or families’ ability to provide advice would not influence their intentions or actual medication adherence decisions.

### **Objective 3: Model Testing**

As it relates to model testing a fairly good fitting model was identified, however the relationships were for the most part were weak. This can be largely attributable to the large number of single-item constructs that are present in the model. Unfortunately, the scales, despite being from commonly utilized and validated within social science research did not produce items that were highly or moderately correlated in our sample. At first there may seem to be something unique about our sample, but many of these scales were validated and tested in college student populations. Upon further review it could be hypothesized that the actual items may be measuring other distinct constructs within the scope of the more abstract validated and reliable construct. For example looking at the items from the interpersonal openness construct of the ATTSPH scale in Appendix F on page xxx demonstrates that several of the items could potentially represent different aspects of openness. “It is probably best not to know everything about oneself” may be more related to openness to oneself, while “There are experiences in my life I would not discuss with anyone” relates more

to an individual's openness to share with others. This is just one of many examples that are present in the instruments utilized. It is just another clear example of how Cronbach's Alpha should not be the only tool in assessing reliability. The SEM model identified theoretically relevant and statistically significant constructs that support these findings.

### **Illness Representations**

Not surprisingly treatment control seemed to be the most salient in the decision to initiate medication therapy. If an individual believes that medication (treatment) can control or improve the disease then he is more likely to utilize it (Moss-Morris et al., 2002). Our study supports this relationship, which has significant implications for future practice. In our study the objective effectiveness of the medication was controlled through study design. However the subjective effectiveness was varied through the confirming-conflict manipulations.

### **Treatment Representations**

As it relates to Horne's treatment necessity (the belief about how necessary treatment (medication) is to treat illness and sustain health) and treatment concern (concerns about side effects of the medications offered significant but diverging effects on the decision to initiate medication therapy) these variables predicted subjects' intentions to initiate medication. Those who expressed more concerns about side effects were less likely to initiate medication. Conversely, those who saw medication as necessary to control their condition were more likely to initiate medication. Our study supports the work of Horne and his colleagues and expands it to the initiation process of medication



use behaviors, specifically for antidepressants (Horne, Clatworthy, Polmear, & Weinman, 2001; R. Horne et al., 2004; Horne, Petrie, Weinman, & Vincent, 2000; Horne, Pearson, Leake, Fisher, & Weinman, 1999; Horne & Weinman, 1997).

An interesting area of research for the future should determine the effect of “lay” and “professional” network information and advice on general medication beliefs patients have. General views are considered things such as opinions about how medications are used by prescribers in general, perceptions about the abuse potential of drugs and societal views of medication use. These general views are theoretically shaped by information from a variety of sources rather than one single interaction. Consequently, the views of others (social network members) are influential in an individual shaping of these general views on treatment. It would be interesting to examine how lay and professional network members are used in the development of the general views about treatments and their use.

## **CHAPTER VI**

### **Conclusion**

#### **Introduction**

This chapter is divided into three sections. The first section provides conclusions along with discussion of the implications of these conclusions on pharmacy practice. The second section discusses study limitations. The final section suggests future directions for research.

#### **Conclusions and Implications on Pharmacy Practice**

This study found that professional “treatment” networks and community “lay” networks are influential on the desire to initiate medication therapy. Specifically that professional “treatment” networks concern toward social “community” network involvement can increase the desire to initiate antidepressant therapy. Although the scenario was presented using the physician as the source of information, these same situations occur in everyday in community pharmacy practice. Pharmacists are available in the community to address questions patients may have as a result of information provided by the lay social network members. Additionally, pharmacists are giving information out to members of their “lay” social network who will in-turn share this information with their fellow network members. Therefore, pharmacists’ attitude toward

encouraging their patients and customers to involve their social networks in their care is pivotal.

Based on our findings, to have the greatest impact on medication initiation behaviors, new services should focus on addressing concerns about medication use, the ability of medication to control disease and illness, and the necessity of using medication to treat or alleviate a condition. These types of activities could be provided through group based medication management programs, virtual or face-to-face community groups or support groups, or through informal networks of providers and patients. It is important that whatever interventions they design that they be tailored for the population being served

From this study we also found that disconfirming or confirming advice from lay network members alone can increase and decrease both the desire and intention to initiate medication therapy, respectively. The caveat is that this effect will most likely occur whether the advice is based actual evidence or pure speculation. The next challenge for pharmacists is to implement programs and services to empower patients and providers to be good navigators of information and advice. These programs should occur within the communities they serve to best infiltrate these networks. Our findings indicate that health care professionals should acknowledge the information patients are likely to receive from family/friends, television, etc. and encourage them to talk to their health care provider when there is conflicting information or questions. However, it is important to remember that we found that professional network attitude toward social network involvement was important in the patient's decision to initiate

medication therapy. Therefore, pharmacists should be careful not to discount social network involvement and the information individuals receive from social network members, but rather help them use the information effectively, efficiently, and safely.

### **Study Limitations**

This study had several limitations. Due to the mode of data collection and the necessity for anonymity, the true effect of non-response bias could not be accessed. The study population was fairly homogenous, consisting of residents primarily from one large Midwestern state, which may not be generalizable to other institutions, although this was not the intent of this study. Because of challenges with the reliability and validity of several of the study scales, many of the constructs could not be adequately measured. The study was cross-sectional and did not follow through to the actual behavioral implementation, which could be different, than what they expressed. The study did not utilize actual patients, whose experience level would be different than students.

### **Recommendations for Future Research**

Future research in this area should be focus on several areas. First, scales and instruments need to be revised and re-evaluated for reliability and validity. A challenge faced in our study stemmed from items not being correlated and scales not loading as single factor. Additionally, social network measurement instruments need to be updated to incorporate generational changes in modes of communication and interaction.

As second area involves the role of subjective and objective expertise as it relates to “lay” and “treatment” network individuals. From our study we found the advice to be important. The next step is to further define expertise as perceived by patients and to differentiate between types of expertise (i.e. lay versus health professional). Then researchers can study the use of different types of advice by patients. Our findings for the effect of professional network attitude toward social network involvement on initiation desire should be replicated in another population. Our findings could be an artifact of age, experience, or type of student population used. Replicating this in a different population will enable us to explore these effects.

A longitudinal experiment or study that follows the complete medication use process will allow us to connect self-reported attitudes and beliefs to actual patient behavior. This could be accomplished by linking prospective survey methods with secondary claims or health utilization data. This type of study could involve testing more completely the modified network episode model as proposed in this study. Many of the constructs we were unable to measure such as actual patient behaviors could be obtained through this integrated approach and provide researchers and practitioners with a clearer view of social network involvement in the medication use process.

## APPENDIX A

### Experimental Scenarios and Online Survey Instrument

Beginning on the next screen you will be provided with a scenario involving Rich, an undergraduate student. While reading the scenario, we would like for you to take on the role of Rich. Imagine that you are Rich and having the same experiences as being described. Please be sure to click the next button after reading each screen. At the end of the scenario you will be asked to respond to a few questions about how you would act if you were Rich. Please click the next button below to proceed to the scenario.

#### STANDARD DEPRESSION SCENERIO

Rich is a sophomore student in chemistry at the university. He has signed up to spend a semester in London next Fall as part of the university's study abroad program. So he made an appointment with the University Health Services (UHS) to get his health clearance forms completed for his semester abroad.

Rich goes to UHS and has his physical with Dr. Hand. Dr. Hand proceeds with the physical and begins to fill out the study abroad medical clearance forms. As part of the process, Dr. Hand asks Rich a series of questions to assess his mental well-being. He begins to ask Rich about his energy level and whether there have been any recent changes in his activities such as socializing, studying, sleeping or eating.

Rich tells Dr. Hand that he has not been feeling like himself for a while. He finds himself tired most of the time and does not feel like hanging out with his friends. He has always been an avid tennis player, playing with his friends almost daily, but over the past month he has lost interest. Despite not playing tennis religiously, he has lost 5 pounds over the past month, because he has lost his appetite. He has been struggling to keep his grades up due to his inability to stay focused while studying. Lately, he also noticed that he seems to get into arguments with people about small things.

Dr. Hand said that he is concerned. He tells Rich that he is physically fine, but he is worried about him mentally. He believes Rich is suffering from depression. While Dr. Hand does not think Rich is having a major depressive episode, he feels like his depression could continue to get worse without treatment.

Rich is a little unsure about how to feel about Dr. Hand's diagnosis, but he does know he has not been himself and wants to feel better. Dr. Hand recommends that Rich meet with a counselor to discuss how he is feeling and start on medication. He tells Rich that research has shown people with depression have the best response when therapy is used in conjunction with medication. So he writes him a prescription for Quartz, an antidepressant medication. He tells him that no medication is without side effects, but Quartz's side effects are minimal when compared to other antidepressants and it will take 4-6 weeks for him to start feeling better.

#### PROFESSIONAL NETWORK MANIPULATION

Q6. Based on what Dr. Hand told him, Rich is still not sure if he should take the medication. Dr. Hand recommended Rich discuss starting his antidepressant

medication therapy with someone close to him like a friend or family member. He advised Rich that talking with people who are close to him can help him better manage his treatment. Dr. Hand gave Rich his clearance forms, the prescription for Quartz, and had Rich see the receptionist on the way out to schedule his follow-up appointments. As Rich leaves the office, he is still unsure about taking medication. **[POSTIVE ATTITUDE]**

**OR**

Q7 Based on what Dr. Hand told him, Rich is still not sure if he should take the medication. Dr. Hand warned Rich that he should be wary of who he talked to about his antidepressant therapy. He advised that in his experience sometimes others are not always helpful or provide accurate advice to patients while managing their illness. Dr. Hand gave Rich his clearance forms, the prescription for Quartz, and had Rich see the receptionist on the way out to schedule his follow-up appointments. As Rich leaves the office, he is still unsure about taking medication. **[NEGATIVE ATTITUDE]**

#### **LAY NETWORK MANIPULATION**

Q8 After Rich left Dr. Hand's office he decided to talk to Jim a close family friend about his depression. Jim has suffered from depression in the past and has been on medication. Jim's advice to Rich was that he should take the medication. Jim said he has been taking a medication similar to Quartz and it has improved his energy level, the side effects have really been minimal, and it has made him feel tremendously better. **[CONFIRMATION]**

**OR**

Q9 After Rich left Dr. Hand's office he decided to talk to Jim a close family friend about his depression. Jim has suffered from depression in the past and has tried medication. Jim's advice to Rich was that he should not take the medication. Jim said he has been taking a medication similar to Quartz and it has not helped his depression and the side effects made him feel worse than he did before starting the medication. **[CONFLICT]**

### Initiation Desire

Q11 My desire to start taking Quartz to help manage my depression would be best described by: **[DESIRE1]**

- No Desire at All (1)
- Very Weak Desire (2)
- Weak Desire (3)
- Moderate Desire (4)
- Strong Desire (5)
- Very Strong Desire (6)
- Very, Very Strong Desire (7)

Q12 I would want to start taking Quartz to help manage my depression. **[DESIRE2]**

- Strongly Disagree (1)
- Disagree (2)
- Somewhat Disagree (3)
- Neither Agree nor Disagree (4)
- Somewhat Agree (5)
- Agree (6)
- Strongly Agree (7)

### Initiation Intention

Q14 The strength of my actual intention to start taking Quartz to help manage my depression would be best described as: **[INTENTION 1]**

- No Intention at All (1)
- Very Weak Intention (2)
- Weak Intention (3)
- Moderately Strong Intention (4)
- Strong Intention (5)
- Very Strong Intention (6)

Q15 I would intend to start taking Quartz to help manage my depression. **[INTENTION 2]**

- No Chance at All (1)
- Highly Unlikely (2)
- Neither Unlikely nor Likely (3)
- Likely (4)
- Highly Likely (5)
- One Hundred Percent Likely (6)



**Manipulation Checks**

Q16 How likely is it that Rich is suffering from depression? **[MANIPULATION 1]**

- Very Unlikely (1)
- Unlikely (2)
- Somewhat Unlikely (3)
- Undecided (4)
- Somewhat Likely (5)
- Likely (6)
- Very Likely (7)

Q17 How supportive do you feel Dr. Hand is of Rich involving his family in the management of his depression? **[MANIPULTION 2]**

- Not at all supportive (1)
- A little supportive (2)
- Supportive (3)
- Very supportive (4)
- Not sure/Unknown (5)

**ILLNESS REPRESENTATION**

Q19 how much does depression affect his life?

|                            |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| No effect at all (1)       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Severely effects life (10) |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |

Q20 How long do you think his depression will continue?

|                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| A very short time (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Forever (10)          |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |

Q21 How much control do you feel Rich has over his depression?

|  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Absolutely<br>no control<br>(1)<br>Extreme<br>amount of<br>control<br>(10) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Q22 How much do you think treatment will help his depression?

|   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Not at all<br>(1)<br>Extremely<br>helpful<br>(10) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Q23 How many symptoms of depression do you think he is experiencing?

|  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| No<br>symptoms<br>at all (1)<br>Many<br>severe<br>symptoms<br>(10) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Q24 How concerned do you think Rich is about his depression?

|  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Not at all<br>concerned<br>(1)<br>Extremely<br>concerned<br>(10) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Q25 How well do you feel Rich understands his depression?

|   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Doesn't understand at all: Understands very clearly (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Q26 How much do you think depression affects Rich emotionally (e.g. does it make him angry, scared, upset, or depressed) ?

|   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Not at all affected emotionally: Extremely affected emotionally (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Q27 Please list in rank-order the three most important factors that you believe causes depression. The most important causes are:

1. (1)
2. (2)
3. (3)

**TREATMENT REPRESENTATIONS**

Q31 We want to gain a better understanding about your beliefs regarding medication in general. Please indicate your level of agreement with the following statements.

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Doctors use too many medicines (1)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| If doctors had more time with patients, they would prescribe fewer medicines (2) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Doctors place too much trust in medicines  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| (3)<br>Natural remedies are safer than medicines                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (4)<br>Most medicines are addictive  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (5)<br>People who take medicines should stop their treatment every now and again (6) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (7)<br>Medicines do more harm than good  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (8)<br>All medicines are poisons   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (9)<br>Medicine protects me from becoming worse                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (10)<br>My health, right now, depends on medicine                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (11)<br>Without my medicine, I would be very ill                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (12)<br>My life would be impossible without medicine                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| (12)<br>I sometimes worry about the long-term effects of medicine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (13)<br>Having to take medicine worries me                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (14)<br>Medicine disrupts my life (15)                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

### DEPRESSION SYMPTOMS

Q32 Over the past 2 weeks, how often have you been bothered by any of the following problems?

|  |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| Little interests or pleasure in doing things (1)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Feeling down, depressed or hopeless (2)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Trouble falling or staying asleep or sleeping too much (3)                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Feeling tired or having little energy (4)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Poor appetite or overeating (5)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Feeling bad about yourself or that you are a failure or have let yourself or your family | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| <p>down (6)</p> <p>Trouble concentrating on things, such as reading the newspaper or watching television (7)</p> <p>Moving or speaking so slowly that other people have noticed or the opposite, being so fidgety or restless that you have been moving around a lot more than usual (8)</p> <p>Thoughts that you would be better off dead, or of hurting yourself in some way (9)</p> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q33 If you checked off any problems, how difficult have these problems made it for you to do your work (school work), take care of things at home, or get along with other people?

- Not difficult at all (1)
- Somewhat difficult (2)
- Very difficult (3)
- Extremely difficult (4)

#### COPING STYLES

Q34 These items deal with ways you cope with the depressive symptoms in your life. Depressive symptoms feelings can include sadness, loneliness, or hopelessness. We want to know to what extent you've been doing what the item says. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

|                   |                       |                       |                       |                       |
|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I turn to work or | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|

|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| other activities to take my mind off things (1)                             |                       |                       |                       |                       |
| I concentrate my efforts on doing something about the situation I am in (2) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I say to my self "this isn't real" (3)                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I use alcohol or other drugs to make myself feel better (4)                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I get emotional support from others (5)                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I give up trying to deal with it (6)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I take action to try to make the situation better (7)                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I refuse to believe it is happening (8)                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I say things to let my unpleasant feelings escape (9)                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I get help and advice from other people (10)                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I use alcohol or other drugs to help me get through it (11)                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I try to see it in a different light, to make it seem                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| more positive<br>(12)   |                       |                       |                       |                       |
| I criticize myself<br>(13)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I try to come up<br>with a strategy<br>about what to do<br>(14)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I get comfort and<br>understanding<br>from someone<br>(15)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I give up the<br>attempt to cope<br>(16)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I look for<br>something good<br>in what is<br>happening (17)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I make jokes<br>about it (18)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I do something to<br>think about it<br>less, such as<br>going to movies,<br>watching TV,<br>reading,<br>daydreaming,<br>sleeping, or<br>shopping (19) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I accept the<br>reality of the fact<br>that is happening<br>(20)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I express my<br>negative feelings<br>(21)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I try to find<br>comfort in my<br>religion or<br>spiritual beliefs<br>(22)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| I try to get advice or help from other people about what to do (23) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I learn to live with it (24)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I think hard about what steps to take (25)                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I blame myself for things that happened (26)                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I pray or meditate (27)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I make fun of the situation (28)                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**PREVIOUS HISTORY OF ILLNESS**

Q35 Have you ever been diagnosed with depression by a healthcare professional?

- Yes (1)
- No (2)

Q36 Have you ever been treated for depression by a healthcare professional?

- Yes (1)
- No (2)

Answer If Have you ever been treated for depression by a healthcare... Yes Is Selected

Q37 My treatment included all of the following (check all that apply):

- Medication (1)
- Psychotherapy/Therapy (2)
- Counseling (3)
- Other (4) \_\_\_\_\_

**SOCIAL NETWORK INDEX (INTERACTION AND SATISFACTION)**

Q38 How many persons within one hours travel of your home do you feel you can depend on or feel very close to? Do not include members of your own family.

Q39 How any times during the past week did you spend time with someone who does not live with you? For example, you went to see them or they came to visit you, or you went out together?

- None (1)
- Once (2)
- Twice (3)
- Three Times (4)
- Four (5)
- Five (6)
- Six (7)
- Seven or More (8)

Q40 How many times did you talk to someone (friends, relatives or others) on the telephone in the past week (either they called you, or you called them)?

- None (1)
- Once (2)
- Twice (3)
- Three Times (4)
- Four (5)
- Five (6)
- Six (7)
- Seven or More (8)

Q41 About how often did you go to meetings of social clubs, religious meetings or other groups that you belong to in the past week?

- None (1)
- Once (2)
- Twice (3)
- Three times (4)
- Four (5)
- Five (6)
- Six (7)
- Seven or more (8)

Q42 Please select the answer that best reflects your feelings about your interactions with your family and friends

|   |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|
| My family and friends (i.e. people important to you) understand you (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| You feel useful to  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|
| your family and friends (2)  |                       |                       |                       |
| You know what is going on with your family and friends (3)                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When talking with my family and friends I feel listened to (4)                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| You feel you have a definite role (place) in your family and among friends (5)       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can talk about my deepest problems with at least some of my family and friends (6) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q43 How satisfied are you with the kinds of relationships you have with your family and friends?

- Very dissatisfied (1)
- Somewhat dissatisfied (2)
- Satisfied (3)

**ATTITUDES TOWARD SEEKING HELP FOR PSYCHOLOGICAL OR EMOTION PROBLEMS**

Q44 Please indicate your level of agreement or disagreement with the following statements.

|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| Although there are clinics for people with mental troubles, I would not have much faith in them (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| If a good friend asked my advice about a mental problem, I might recommend that                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| <p>he see a psychiatrist (2)</p> <p>I would feel uneasy going to a psychiatrist because of what some people would think (3)</p> <p>A person with a strong character can get over mental conflicts by himself, and would have little need of a psychiatrist (4)</p> <p>There are times when I have felt completely lost and would have welcomed professional advice for a personal or emotional problem (5)</p> <p>Considering the time and expense involved in psychotherapy, it would have doubtful value for a person like me (6)</p> <p>I would willingly confide intimate matters to an appropriate person if I thought it might help me or a member of my family (7)</p> <p>I would rather</p> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| live with certain mental conflicts than go through the ordeal of getting psychiatric treatment (8)              |                       |                       |                       |                       |
| Emotional difficulties, like many things, tend to work out by themselves (9)                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There are certain problems which should not be discussed outside of one's immediate family (10)                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| A person with a serious emotional disturbance would probably feel most secure in a good mental hospital (11)    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| If I believed I was having a mental breakdown, my first inclination would be to get professional attention (12) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Keeping one's mind on a job is a good solution for avoiding personal worries and concerns (13)                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Having been a psychiatric   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| <p>patient is blot on a person's life (14)</p>  |                       |                       |                       |                       |
| <p>I would rather be advised by a close friend than by a psychologist, even for an emotional problem (15)</p>                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <p>A person with an emotional problem is not likely to solve it alone; he is likely to solve it with professional help (16)</p> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <p>I resent a person who is professionally trained (or not) who wants to know about my personal difficulties (17)</p>           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <p>I would want to get psychiatric attention if I was worried or upset for a long period of time (18)</p>                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <p>The idea of talking about problems with a psychologist strikes me as a poor way to get rid of emotional conflicts (19)</p>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <p>Having been mentally ill carries with it a burden of shame</p>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| (20)<br>There are experiences in my life I would not discuss with anyone (21)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It is probably best not to know everything about oneself (22)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| If I were experiencing a serious emotional crisis at this point in my life, I would be confident that I could find relief in psychotherapy (23)          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There is something admirable in the attitude of a person who is willing to cope with his conflicts and fears without resorting to professional help (24) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| At some future time I might want to have psychological counseling (25)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| A person should work out his own problems getting psychological counseling would be a last resort (26)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Had I received   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |   |   |   |   |
|---|---|---|---|---|
| <p>treatment in mental hospital, I would not feel that it ought to be "covered up" (27)</p> <p>If I thought I needed psychiatric help, I would get it no matter who knew about it (28)</p> <p>It is difficult to talk about personal affairs with highly educated people such as doctors, teachers and clergymen (29)</p> | <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> |
|---|---|---|---|---|



**PERCEIVED SOCIAL STIGMA**

Q45 Please indicate your level of agreement or disagreement with the following statements.

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Receiving treatment for emotional or mental problems carries social stigma (1)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It is a sign of personal weakness or inadequacy to receive treatment for emotional or mental problems (2)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| People will see a person in a less favorable way if they come to know that he or she has received treatment for emotional or mental problems (3) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It is advisable for a person to hide from people that he or she has been treated for emotional or mental problems (4)                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| People tend to like less those who are receiving   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| professional help for emotional or mental problems (5) |  |  |  |  |  |
|--|--|--|--|--|--|

**LEVELS OF SELF CONCEPT**

**Q46 Individualistic Self**

|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I thrive on opportunities to demonstrate that my abilities or talents are better than those of other people (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have a strong need to know how I stand in comparison to other students (2)                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I often compete with my friends (3)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I feel best about myself when I perform better than others (4)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I often find myself pondering over ways that I am better or worse off   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                                 |  |  |  |  |  |
|---------------------------------|--|--|--|--|--|
| than other people around me (5) |  |  |  |  |  |
|---------------------------------|--|--|--|--|--|

Q47 Relational Self

|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| If a friend was having a personal problem, I would help him/her even if it meant sacrificing my time or money (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I value friends who are caring empathic individuals (2)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It is important to me that I uphold my commitments to significant people in my life (3)                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Caring deeply about another person such as a close friend or relative is important to me (4)                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Knowing that a close other acknowledges and values the  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| role that I play in their life makes me feel like a worthwhile person (5) |  |  |  |  |  |
|---|--|--|--|--|--|

**Q48 Collectivist Self**

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Making a lasting contribution to groups that I belong to, such as my department/school/college, is important to me (1)                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When I become involved in a group project, I do my best to ensure its success (2)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I feel great pride when my team or group does well, even if I'm not the main reason for success (3)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I would be honored if I were chosen by an organization or club that I belong to, to represent them at a conference or meeting (4)                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When I'm part of a team, I am concerned about the group as a whole instead of whether individual team members like me or whether I like them (5) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Demographics**

Q49 Please select your gender

- Male (1)
- Female (2)

Q50 Please indicate your current official academic standing

- Undergraduate Freshman (1)

- Undergraduate Sophomore (2)
- Undergraduate Junior (3)
- Undergraduate Senior (4)
- Professional Student (i.e. PharmD, JD, DDS, MD, etc.) (5)
- Master's Graduate Student (6)
- Doctoral Graduate Student (7)
- Other (8) \_\_\_\_\_

Q51 What year were you born (4 digit year)?

Q52 What race do you most identify yourself with?

- White/Caucasian (1)
- African American (2)
- Hispanic (3)
- Asian (4)
- Native American (5)
- Pacific Islander (6)
- Other (7) \_\_\_\_\_

Q53 Please indicate your country of origin prior to attending college.

- Afghanistan (1)
- Albania (2)
- Algeria (3)
- Andorra (4)
- Angola (5)
- Antigua and Barbuda (6)
- Argentina (7)
- Armenia (8)
- Australia (9)
- Austria (10)
- Azerbaijan (11)
- Bahamas (12)
- Bahrain (13)
- Bangladesh (14)
- Barbados (15)
- Belarus (16)
- Belgium (17)
- Belize (18)
- Benin (19)
- Bhutan (20)
- Bolivia (21)
- Bosnia and Herzegovina (22)
- Botswana (23)
- Brazil (24)

- Brunei Darussalam (25)
- Bulgaria (26)
- Burkina Faso (27)
- Burundi (28)
- Cambodia (29)
- Cameroon (30)
- Canada (31)
- Cape Verde (32)
- Central African Republic (33)
- Chad (34)
- Chile (35)
- China (36)
- Colombia (37)
- Comoros (38)
- Congo, Republic of the... (39)
- Costa Rica (40)
- Côte d'Ivoire (41)
- Croatia (42)
- Cuba (43)
- Cyprus (44)
- Czech Republic (45)
- Democratic People's Republic of Korea (46)
- Democratic Republic of the Congo (47)
- Denmark (48)
- Djibouti (49)
- Dominica (50)
- Dominican Republic (51)
- Ecuador (52)
- Egypt (53)
- El Salvador (54)
- Equatorial Guinea (55)
- Eritrea (56)
- Estonia (57)
- Ethiopia (58)
- Fiji (59)
- Finland (60)
- France (61)
- Gabon (62)
- Gambia (63)
- Georgia (64)
- Germany (65)
- Ghana (66)

- Greece (67)
- Grenada (68)
- Guatemala (69)
- Guinea (70)
- Guinea-Bissau (71)
- Guyana (72)
- Haiti (73)
- Honduras (74)
- Hong Kong (S.A.R.) (75)
- Hungary (76)
- Iceland (77)
- India (78)
- Indonesia (79)
- Iran, Islamic Republic of... (80)
- Iraq (81)
- Ireland (82)
- Israel (83)
- Italy (84)
- Jamaica (85)
- Japan (86)
- Jordan (87)
- Kazakhstan (88)
- Kenya (89)
- Kiribati (90)
- Kuwait (91)
- Kyrgyzstan (92)
- Lao People's Democratic Republic (93)
- Latvia (94)
- Lebanon (95)
- Lesotho (96)
- Liberia (97)
- Libyan Arab Jamahiriya (98)
- Liechtenstein (99)
- Lithuania (100)
- Luxembourg (101)
- Madagascar (102)
- Malawi (103)
- Malaysia (104)
- Maldives (105)
- Mali (106)
- Malta (107)
- Marshall Islands (108)

- Mauritania (109)
- Mauritius (110)
- Mexico (111)
- Micronesia, Federated States of... (112)
- Monaco (113)
- Mongolia (114)
- Montenegro (115)
- Morocco (116)
- Mozambique (117)
- Myanmar (118)
- Namibia (119)
- Nauru (120)
- Nepal (121)
- Netherlands (122)
- New Zealand (123)
- Nicaragua (124)
- Niger (125)
- Nigeria (126)
- Norway (127)
- Oman (128)
- Pakistan (129)
- Palau (130)
- Panama (131)
- Papua New Guinea (132)
- Paraguay (133)
- Peru (134)
- Philippines (135)
- Poland (136)
- Portugal (137)
- Qatar (138)
- Republic of Korea (139)
- Republic of Moldova (140)
- Romania (141)
- Russian Federation (142)
- Rwanda (143)
- Saint Kitts and Nevis (144)
- Saint Lucia (145)
- Saint Vincent and the Grenadines (146)
- Samoa (147)
- San Marino (148)
- Sao Tome and Principe (149)
- Saudi Arabia (150)



- Senegal (151)
- Serbia (152)
- Seychelles (153)
- Sierra Leone (154)
- Singapore (155)
- Slovakia (156)
- Slovenia (157)
- Solomon Islands (158)
- Somalia (159)
- South Africa (160)
- Spain (161)
- Sri Lanka (162)
- Sudan (163)
- Suriname (164)
- Swaziland (165)
- Sweden (166)
- Switzerland (167)
- Syrian Arab Republic (168)
- Tajikistan (169)
- Thailand (170)
- The former Yugoslav Republic of Macedonia (171)
- Timor-Leste (172)
- Togo (173)
- Tonga (174)
- Trinidad and Tobago (175)
- Tunisia (176)
- Turkey (177)
- Turkmenistan (178)
- Tuvalu (179)
- Uganda (180)
- Ukraine (181)
- United Arab Emirates (182)
- United Kingdom of Great Britain and Northern Ireland (183)
- United Republic of Tanzania (184)
- United States of America (185)
- Uruguay (186)
- Uzbekistan (187)
- Vanuatu (188)
- Venezuela, Bolivarian Republic of... (189)
- Viet Nam (190)
- Yemen (191)
- Zambia (192)

Zimbabwe (193)

Answer If Country List United States of America Is Selected

Q54 For US Residents Only: Please indicate the zip-code of your hometown (place where you spent the majority of your life before you attending college).

## APPENDIX B

### Original Standard Depression Scenario

Rich is normally an outgoing sophomore chemistry major at the university. Over the past couple of months, Rich has not been feeling like himself. He finds himself tired most of the time and does not feel like hanging out with his friends. He has always been an avid tennis player, playing with his friends almost daily, but over the past month he has lost interest. Despite not playing tennis religiously, he has lost 5 pounds over the past month, because he has lost his appetite. He has been struggling to keep his grades up due to his inability to stay focused while studying. Lately, he also noticed that he seems to get into arguments with people about small things.

Rich has signed up to spend a semester in London next Fall as part of the university's study abroad program. So he made an appointment with the University Health Services (UHS) to get his health clearance forms completed for his semester abroad. Rich goes to UHS and has his physical with Dr. Hand. Dr. Hand proceeds with the physical and begins to fill out the study abroad medical clearance forms. He begins to ask Rich about his energy level and Rich tells Dr. Hand how he has been feeling over the past couple of months. Dr. Hand said that he is concerned. Dr. Hand tells Rich that he is physically fine, but he is worried about him mentally. He believes Rich is suffering from depression. While Dr. Hand does not think Rich is having a major depressive episode, he feels like his depression could continue to get worse without treatment.

Rich is a little unsure about how to feel about Dr. Hand's diagnosis, but he does know he has not been himself and wants to feel better. Dr. Hand recommends that Rich meet with a counselor to discuss how he is feeling and start on medication. He tells Rich that research has shown people with depression have the best response when therapy is used in conjunction with medication. So he writes him a prescription for Quartz, an antidepressant medication. He tells him that no medication is without side effects, but Quartz's side effects are minimal when compared to other antidepressants and it will take 4-6 weeks for him to start feeling better.

## APPENDIX C

### Original Professional Network Scenarios

Based on what Dr. Jahed told him, Rich is still not sure if he should take the medication. Dr. Jahed encouraged Rich to discuss starting his antidepressant medication therapy with someone close to him like a friend or family member. He advised Rich that talking with people who are close to him can help him better manage his treatment. Dr. Jahed gave Rich his clearance forms, the prescription for Quartz, and had Rich see the receptionist on the way out to schedule his follow-up appointments. **POSITIVE PROFESSIONAL NETWORK ATTITUDE**

Based on what Dr. Jahed told him, Rich is still not sure if he should take the medication. Dr. Jahed gave Rich his clearance forms, the prescription for Quartz, and had Bill see the receptionist on the way out to schedule his follow-up appointments. **NO PROFESSIONAL NETWORK ATTITUDE**

## APPENDIX D

### Recruitment Email

Daniel Lane and Dr. Suzan Kucukarslan of the University of Michigan, Department of Social and Administrative Sciences invite you to be a part of a research study that looks at how individuals make decisions to initiate medication (HUM0044619). It involves a 20 minute online survey. You will be compensated with a \$10 visa gift card for your time.

Those who have participated so far have described this study as extremely interesting and easy to complete. Your participation would be greatly appreciated, as it is important to the completion of our project, which we have worked on in the last year (involving a dissertation of a PhD student).

The only requirement to participate is to be a student at the University of Michigan. **Please click on the link below to be taken to a site that will take you to our online study site. If you do not want to participate, simply delete this email.**

### LINK

Thanks,

Daniel C. Lane, PharmD  
Department of Clinical, Social, and Administrative Sciences  
University of Michigan College of Pharmacy  
[dclane@umich.edu](mailto:dclane@umich.edu) (Email)  
(734) 936-1505

## APPENDIX E

### Follow-Up Email

Daniel Lane and Dr. Suzan Kucukarslan of the University of Michigan, Department of Social and Administrative Sciences invite you to be a part of a research study that looks at how individuals make decisions to initiate medication (HUM0044619). It involves a 20 minute online survey. You will be compensated with a \$10 visa gift card for your time.

Thanks to those who have participated so far! Your participation is greatly appreciated. Those, who have participated so far have described this study as very interesting and easy to complete. Your participation would be greatly appreciated, as it is important to the completion of our project, which we have worked on in the last year (involving a dissertation of a PhD student).

The only requirement to participate is to be a student at the University of Michigan. **Please click on the link below to be taken to a site that will take you to our online study site. If you do not want to participate, simply delete this email.**

### LINK

Thanks,

Daniel C. Lane, PharmD  
Department of Clinical, Social, and Administrative Sciences  
University of Michigan College of Pharmacy  
[dclane@umich.edu](mailto:dclane@umich.edu) (Email)  
(734) 936-1505

## **APPENDIX F**

### **Individual Psychological Scale Items**

| <i>COPING STYLES</i>   | I haven't been doing this at all<br>(1) | I do this a little bit<br>(2) | I do this a medium amount<br>(3) | I do this a lot<br>(4) |
|--|---|-------------------------------|----------------------------------|------------------------|
| <i>Active Coping</i>   |   |                               |                                  |                        |
| I concentrate my efforts on doing something about the situation I'm in | 20<br>9%                                | 83<br>37%                     | 72<br>32%                        | 50<br>22%              |
| I take action to try to make the situation better                      | 21<br>9%                                | 60<br>27%                     | 76<br>34%                        | 68<br>30%              |
| <i>Planning</i>  |   |                               |                                  |                        |
| I try to come up with at a strategy about what to do                   | 17<br>8%                                | 59<br>26%                     | 83<br>37%                        | 65<br>29%              |
| I think hard about what steps to take                                  | 24<br>11%                               | 78<br>35%                     | 73<br>33%                        | 49<br>22%              |
| <i>Positive Reframing</i>  |   |                               |                                  |                        |
| I try to see it in a different light, to make it seem more positive    | 46<br>21%                               | 71<br>32%                     | 72<br>32%                        | 34<br>15%              |
| I look for something good in what is happening                         | 39<br>17%                               | 71<br>32%                     | 73<br>33%                        | 40<br>17.9%            |
| <i>Acceptance</i>  |   |                               |                                  |                        |
| I accept the reality of the fact that the symptoms are happening       | 22<br>10%                               | 67<br>30%                     | 76<br>34%                        | 57<br>26%              |
| I learn to live with it  | 22<br>10%                               | 82<br>37%                     | 82<br>37%                        | 38<br>17%              |
| <i>Humor</i>   |   |                               |                                  |                        |
| I make jokes about it  | 54<br>24%                               | 69<br>31%                     | 60<br>27%                        | 39<br>17%              |
| I make fun of the situation  | 84<br>37%                               | 83<br>37%                     | 35<br>16%                        | 22<br>10%              |
| <i>Religion</i>  |   |                               |                                  |                        |
| I try to find comfort in my religion or spiritual beliefs              | 117<br>52%                              | 54<br>24%                     | 33<br>15%                        | 20<br>9%               |
| I pray or meditate   | 115<br>51%                              | 66<br>29%                     | 25<br>11%                        | 18<br>8%               |
| <i>Emotional Support</i>   |   |                               |                                  |                        |
| I get emotional support from others                                    | 26<br>12%                               | 77<br>34%                     | 65<br>29%                        | 57<br>25%              |
| I get comfort and understanding from other people                      | 22<br>10%                               | 76<br>34%                     | 73<br>33%                        | 52<br>23%              |
| <i>Instrumental Support</i>  |   |                               |                                  |                        |
| I get advice or help from other people about what to do                | 35<br>16%                               | 68<br>30%                     | 75<br>33%                        | 46<br>20%              |
| I get help and advice from other people                                | 33<br>15%                               | 91<br>41%                     | 67<br>30%                        | 33<br>15%              |



| <i>COPING STYLES</i>  | I haven't been doing this at all<br>(1) | I do this a little bit<br>(2) | I do this a medium amount<br>(3) | I do this a lot<br>(4) |
|---|---|-------------------------------|----------------------------------|------------------------|
| <i>Self Distraction</i>   |   |                               |                                  |                        |
| I turn to work or other activities to take my mind off things   | 32<br>14%                               | 79<br>35%                     | 62<br>27%                        | 52<br>23%              |
| I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping | 23<br>10%                               | 70<br>31%                     | 71<br>32%                        | 59<br>26%              |
| <i>Denial</i>   |   |                               |                                  |                        |
| I say to myself "this isn't real."  | 177<br>79%                              | 28<br>12%                     | 16<br>7%                         | 4<br>2%                |
| I refuse to belief that it is happening   | 185<br>83%                              | 30<br>13%                     | 7<br>3%                          | 1<br>0.4%              |
| <i>Venting</i>  |   |                               |                                  |                        |
| I say things to let my unpleasant feeling escape  | 109<br>49%                              | 73<br>33%                     | 29<br>13%                        | 13<br>6%               |
| I express my negative feelings  | 42<br>19%                               | 109<br>49%                    | 50<br>22%                        | 22<br>10%              |
| <i>Substance Abuse</i>  |   |                               |                                  |                        |
| I use alcohol or other drugs to make myself feel better   | 156<br>70%                              | 52<br>23%                     | 13<br>6%                         | 3<br>1%                |
| I use alcohol or other drugs to help me get through it  | 172<br>77%                              | 37<br>17%                     | 10<br>4.5%                       | 4<br>2%                |
| <i>Behavioral Disengagement</i>   |   |                               |                                  |                        |
| I give up trying to deal with it  | 142<br>63%                              | 64<br>28%                     | 15<br>7%                         | 4<br>2%                |
| I give up the attempt to cope   | 179<br>80%                              | 32<br>14%                     | 6<br>3%                          | 6<br>3%                |
| <i>Self-Blame</i>   |   |                               |                                  |                        |
| I criticize myself  | 52<br>23%                               | 92<br>41%                     | 46<br>20%                        | 34<br>15%              |
| I blame myself for things that happened   | 75<br>33%                               | 79<br>35%                     | 45<br>20%                        | 25<br>11%              |

| <i>PERCEIVED SOCIAL STIGMA</i>   | Strongly Disagree | Disagree   | Neither Agree nor Disagree | Agree      | Strongly Agree |
|--|-------------------|------------|----------------------------|------------|----------------|
|  | (1)               | (2)        | (3)                        | (4)        | (5)            |
| Receiving treatment for emotional or mental problems carries social stigma   | 3<br>1%           | 32<br>14%  | 34<br>15%                  | 135<br>60% | 20<br>9%       |
| It is a sign of personal weakness or inadequacy to receive treatment for emotional or mental problems  | 48<br>21%         | 110<br>49% | 46<br>20%                  | 18<br>8%   | 2<br>1%        |
| People will see a person in a less favorable way if they come to know that he or she has received treatment for emotional or mental problems | 8<br>4%           | 46<br>21%  | 69<br>31%                  | 89<br>40%  | 11<br>5%       |
| It is advisable for a person to hide from people that he or she has been treated for emotional or mental problems                            | 25<br>11%         | 87<br>39%  | 69<br>31%                  | 38<br>17%  | 5<br>2%        |
| People tend to like less those who are receiving professional help for emotional or mental problems  | 22<br>10%         | 79<br>35%  | 76<br>34%                  | 42<br>19%  | 5<br>2%        |

| <i>SELF CONCEPT</i>   | Strongly Disagree | Disagree  | Neither Agree nor Disagree | Agree      | Strongly Agree |
|---|-------------------|-----------|----------------------------|------------|----------------|
|   | (1)               | (2)       | (3)                        | (4)        | (5)            |
| <i>Individualistic Self</i>   |                   |           |                            |            |                |
| I thrive on opportunities to demonstrate that my abilities or talents are better than those of other people | 8<br>4%           | 40<br>18% | 43<br>19%                  | 97<br>44%  | 32<br>14%      |
| I have a strong need to know how I stand in comparison to other students                                    | 6<br>3%           | 35<br>16% | 45<br>20%                  | 105<br>48% | 29<br>13%      |
| I often compete with my friends   | 9<br>4%           | 45<br>20% | 39<br>18%                  | 107<br>47% | 20<br>9%       |
| I feel best about myself when I perform better than others  | 9<br>4%           | 28<br>13% | 48<br>21%                  | 99<br>45%  | 36<br>16%      |

| <i>SELF CONCEPT</i>   | Strongly Disagree | Disagree  | Neither Agree nor Disagree | Agree      | Strongly Agree |
|---|-------------------|-----------|----------------------------|------------|----------------|
|   | (1)               | (2)       | (3)                        | (4)        | (5)            |
| I often find myself pondering over ways that I am better or worse off than other people around me                             | 19<br>9%          | 53<br>24% | 45<br>20%                  | 83<br>38%  | 20<br>9%       |
| <i>Relational Self</i>  |                   |           |                            |            |                |
| If a friend was having a personal problem I would help him/her even if it meant sacrificing my time or money                  | 1<br>0.5%         | 2<br>1%   | 9<br>4%                    | 112<br>50% | 98<br>44%      |
| I value friends who are caring empathic individuals   | 1<br>0.5%         | 3<br>1%   | 6<br>3%                    | 92<br>41%  | 120<br>54%     |
| It is important to me that I uphold my commitments to significant people in my life   | 1<br>0.5%         | 1<br>0.5% | 9<br>4%                    | 72<br>32%  | 139<br>63%     |
| Caring deeply about another person such as a close friend or relative is important to me                                      | 1<br>0.5%         | 2<br>1%   | 10<br>4%                   | 66<br>30%  | 143<br>64%     |
| Knowing that a close other acknowledges and values the role that I play in their life make me feel like a worthwhile person   | 1<br>0.5%         | 5<br>2%   | 14<br>6%                   | 78<br>35%  | 124<br>56%     |
| <i>Collectivist Self</i>  |                   |           |                            |            |                |
| Making a lasting contribution to groups that I belong to, such as my department/school/college, is important to me            | 2<br>1%           | 13<br>6%  | 36<br>16%                  | 113<br>51% | 58<br>26%      |
| When I become involved in a group project, I do my best to ensure success   | 2<br>1%           | 5<br>2%   | 14<br>6%                   | 119<br>54% | 82<br>37%      |
| I feel great pride when my team or group does well, even if I'm not the main reason for success                               | 1<br>0.5%         | 6<br>3%   | 15<br>7%                   | 128<br>58% | 72<br>32%      |
| I would be honored if I were chosen by an organization or club that I belong to, to represent them at a conference or meeting | 0<br>0%           | 4<br>2%   | 15<br>7%                   | 113<br>51% | 90<br>40%      |

| <i>SELF CONCEPT</i>   | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree      | Strongly Agree |
|---|-------------------|----------|----------------------------|------------|----------------|
|   | (1)               | (2)      | (3)                        | (4)        | (5)            |
| When I'm part of team, I am concerned about the group as a whole instead of whether individual members like me or whether I like them | 1<br>0.5%         | 16<br>7% | 37<br>17%                  | 111<br>50% | 57<br>26%      |

| <i>ATTITUDES TOWARD DEPRESSION AND IT'S TREATMENT</i>   | Strongly Disagree | Disagree   | Agree      | Strongly Agree |
|---|-------------------|------------|------------|----------------|
|   | (1)               | (2)        | (3)        | (4)            |
| <i>Recognition of Need for Help</i>   |                   |            |            |                |
| A person with a strong character can get over mental conflicts by himself, and would have little need of a psychiatrist                             | 15<br>7%          | 59<br>26%  | 116<br>52% | 34<br>15%      |
| There are times when I have felt completely lost and would have welcomed professional advice for a personal or emotional problem                    | 22<br>10%         | 51<br>23%  | 106<br>47% | 45<br>20%      |
| Considering the time and expense involved in psychotherapy, it would have doubtful value for a person like me                                       | 20<br>9%          | 80<br>36%  | 104<br>46% | 20<br>9%       |
| Emotional difficulties, like many things, tend to work out by themselves  | 8<br>4%           | 114<br>51% | 82<br>37%  | 20<br>9%       |
| I would want to get psychiatric attention if I was worried or upset for a long period of time   | 8<br>4%           | 43<br>19%  | 144<br>64% | 29<br>13%      |
| There is something admirable in the attitude of a person who is willing to cope with his conflicts and fears without resorting to professional help | 8<br>4%           | 94<br>42%  | 104<br>46% | 18<br>8%       |
| At some future time I might want to have psychological counseling   | 11<br>5%          | 71<br>32%  | 123<br>55% | 19<br>18%      |
| A person should work out his own problems getting psychological counseling would be a last resort   | 7<br>3%           | 89<br>39%  | 115<br>51% | 13<br>6%       |

| <i>ATTITUDES TOWARD<br/>DEPRESSION AND IT'S<br/>TREATMENT</i>  | Strongly<br>Disagree | Disagree   | Agree      | Strongly<br>Agree |
|--|----------------------|------------|------------|-------------------|
|  | (1)                  | (2)        | (3)        | (4)               |
| <i>Stigma Tolerance</i>  |                      |            |            |                   |
| I would feel uneasy going to a psychiatrist because of what some people would think  | 13<br>6%             | 91<br>41%  | 83<br>37%  | 37<br>16%         |
| Having been a psychiatric patient is blot on a person's life   | 8<br>4%              | 38<br>17%  | 126<br>56% | 51<br>23%         |
| Having been mentally ill carries with it a burden of shame   | 8<br>4%              | 66<br>30%  | 110<br>49% | 40<br>18%         |
| Had I received treatment in mental hospital, I would not feel that it ought to be "covered up"                             | 28<br>13%            | 115<br>51% | 73<br>33%  | 8<br>4%           |
| If I thought I needed psychiatric help, I would get it no mater who knew about it  | 10<br>5%             | 83<br>37%  | 111<br>50% | 20<br>9%          |
| <i>Interpersonal Openness</i>  |                      |            |            |                   |
| I would willingly confide intimate matters to an appropriate person if I thought it might help me or a member of my family | 2<br>1%              | 19<br>8%   | 141<br>63% | 62<br>28%         |
| There are certain problems which should not be discussed outside of one's immediate family                                 | 10<br>4%             | 68<br>30%  | 108<br>42% | 38<br>17%         |
| Keeping one's mind on a job is good solution for avoiding personal worries and concerns                                    | 5<br>2%              | 110<br>49% | 91<br>40%  | 18<br>8%          |
| I resent a person who professionally trained (or not) who wants to know about my personal difficulties                     | 2<br>1%              | 16<br>7%   | 130<br>58% | 76<br>34%         |
| There are experiences in my life I would not discuss with anyone   | 21<br>9%             | 82<br>36%  | 89<br>29%  | 32<br>14%         |
| It is probably best not to know everything about oneself   | 4<br>2%              | 38<br>17%  | 113<br>51% | 66<br>30%         |
| It is difficult to talk about personal affairs with highly educated people such as doctors, teachers and clergymen         | 13<br>6%             | 54<br>24%  | 117<br>53% | 39<br>18%         |
| <i>Confidence in Practitioners</i>   |                      |            |            |                   |
| Although there are clinics for people with mental troubles, I would not have much faith in them                            | 7<br>3%              | 50<br>22%  | 138<br>61% | 29<br>13%         |
| If a good friend asked my advice about a mental problem, I might recommend that he see a psychiatrist                      | 3<br>1%              | 32<br>14%  | 162<br>72% | 27<br>12%         |

| <i>ATTITUDES TOWARD<br/>DEPRESSION AND IT'S<br/>TREATMENT</i>  | Strongly<br>Disagree | Disagree   | Agree      | Strongly<br>Agree |
|--|----------------------|------------|------------|-------------------|
|  | (1)                  | (2)        | (3)        | (4)               |
| I would rather live with certain mental conflicts than go through the ordeal of getting psychiatric treatment                              | 8<br>4%              | 53<br>25%  | 114<br>50% | 49<br>22%         |
| A person with a serious emotional disturbance would probably feel most secure in good mental hospital                                      | 34<br>15%            | 126<br>56% | 56<br>25%  | 8<br>4%           |
| If I believed I was having a mental breakdown, my first inclination would be to get professional attention                                 | 29<br>13%            | 122<br>55% | 60<br>27%  | 12<br>5%          |
| I would rather be advised by a close friend than a psychologist, even for an emotional problem   | 27<br>12%            | 116<br>52% | 70<br>31%  | 10<br>5%          |
| A person with an emotional problem is not likely to solve it alone; he is likely to solve it with professional help                        | 12<br>5%             | 109<br>49% | 96<br>43%  | 7<br>3%           |
| The idea of talking about problems with a psychologists strikes me as a poor way to get rid of emotional conflicts                         | 8<br>4%              | 26<br>12%  | 140<br>62% | 50<br>22%         |
| If I were experiencing a serious emotional crisis at this point in my life, I would be confident that I could find relief in psychotherapy | 13<br>6%             | 89<br>40%  | 108<br>48% | 14<br>6%          |

| <i>TREATMENT REPRESENTATIONS</i>   | Strongly Disagree<br>(1) | Disagree<br>(2) | Neither Agree nor Disagree<br>(3) | Agree<br>(4) | Strongly Agree<br>(5) |
|--|--------------------------|-----------------|-----------------------------------|--------------|-----------------------|
| <i>Treatment Concern</i>   |                          |                 |                                   |              |                       |
| I sometimes worry about the long-term effects of medicine                    | 9<br>4%                  | 26<br>12%       | 32<br>14%                         | 122<br>54%   | 36<br>16%             |
| Having to take medicine worries me   | 22<br>10%                | 58<br>26%       | 43<br>19%                         | 89<br>40%    | 13<br>6%              |
| Medicine disrupts my life  | 79<br>35%                | 79<br>35%       | 45<br>20%                         | 19<br>8%     | 3<br>1%               |
| <i>Treatment Necessity</i>   |                          |                 |                                   |              |                       |
| Medicine protects me from getting worse                                      | 9<br>4%                  | 30<br>13%       | 63<br>28%                         | 106<br>47%   | 17<br>8%              |
| My health, right now, depends on medicine                                    | 115<br>51%               | 62<br>27%       | 16<br>7%                          | 21<br>9%     | 11<br>5%              |
| Without my medicine, I would be very ill                                     | 123<br>54%               | 57<br>25%       | 23<br>10%                         | 15<br>6.7%   | 7<br>3.1%             |
| My life would be impossible without medicine                                 | 113<br>50%               | 60<br>27%       | 28<br>12%                         | 14<br>6%     | 10<br>4%              |
| <i>Treatment Overuse</i>   |                          |                 |                                   |              |                       |
| Doctors use too many medicines   | 5<br>2%                  | 25<br>11%       | 64<br>28%                         | 99<br>44%    | 33<br>15%             |
| If doctors had more time with patients, they would prescribe fewer medicines | 2<br>1%                  | 43<br>19%       | 62<br>27%                         | 104<br>46%   | 15<br>7%              |
| Doctors place too much trust in medicines                                    | 3<br>1%                  | 46<br>20%       | 60<br>27%                         | 96<br>43%    | 21<br>9%              |
| <i>Treatment Harm</i>  |                          |                 |                                   |              |                       |
| Natural remedies are safer than medicines                                    | 27<br>12%                | 79<br>35%       | 74<br>33%                         | 36<br>16%    | 9<br>4%               |
| Most medicines are addictive   | 65<br>29%                | 71<br>32%       | 59<br>26%                         | 27<br>12%    | 3<br>1%               |
| People who take medicines should stop their treatment every now and again    | 65<br>29%                | 71<br>32%       | 59<br>26%                         | 27<br>12%    | 3<br>1%               |
| Medicines do more harm than good   | 60<br>27%                | 107<br>48%      | 47<br>21%                         | 10<br>4%     | 1<br>0.5%             |
| All medicines are poisons  | 162<br>72%               | 45<br>20%       | 12<br>5%                          | 4<br>2%      | 2<br>1%               |

| <i>SOCIAL NETWORK SATISFACTION</i>  | Hardly Ever              | Some of the Time             | Most of the Time |
|---|--------------------------|------------------------------|------------------|
|   | (1)                      | (2)                          | (3)              |
| My family and friends (i.e. people important to you) understand you                         | 9<br>4%                  | 73<br>32%                    | 143<br>64%       |
| You feel useful to your family and friends  | 5<br>2%                  | 67<br>30%                    | 153<br>68%       |
| You know what is going on with your family and friends                                      | 7<br>3%                  | 74<br>33%                    | 144<br>64%       |
| When talking with my family and friends, I feel listen to                                   | 5<br>2%                  | 61<br>27%                    | 159<br>71%       |
| You feel you have definite role (place) in your family and among friends                    | 12<br>5%                 | 48<br>21%                    | 165<br>73%       |
| I can talk about my deepest problems with at least some of my family and friends            | 27<br>12%                | 51<br>23%                    | 147<br>65%       |
|   | Very dissatisfied<br>(1) | Somewhat dissatisfied<br>(2) | Satisfied<br>(3) |
| How satisfied are you with the kinds of relationships you have with your family and friends | 16<br>7%                 | 55<br>24%                    | 155<br>69%       |

| <i>SOCIAL NETWORK INTERACTION</i>   | (1)       | (2)        | (3)        |
|---|-----------|------------|------------|
|   | 0         | 1-2        | >2         |
| How many persons within one hour's travel of your home do you feel you can depend on or feel very close to? Do not include members of your own family.                                  | 10<br>5%  | 56<br>25%  | 155<br>70% |
| How many times during the past week did you spend time with someone who does not live with you? For example, you went to see them or they came to visit your, or you went out together? | 0<br>0%   | 35<br>20%  | 140<br>80% |
|   | 0-1       | 2-5        | >5         |
| How many times did you talk to someone (friends, relatives or others) on the telephone in the past week (either they called you, or you called them)?                                   | 6<br>4%   | 117<br>76% | 32<br>21%  |
| About how often did you go to meetings of social clubs, religious meetings or other groups that you belong to in the past week  | 61<br>28% | 144<br>66% | 14<br>6%   |



| <i>DEPRESSIVE SYMPTOMS</i>   | Not at All<br>(1) | Several Days<br>(2) | More than Half of the Days<br>(3) | Nearly Every Day<br>(4) |
|--|-------------------|---------------------|-----------------------------------|-------------------------|
| Little interests or pleasure in doing things   | 120<br>53%        | 80<br>36%           | 17<br>8%                          | 8<br>4%                 |
| Feeling down, depressed or hopeless  | 117<br>52%        | 83<br>37%           | 11<br>5%                          | 12<br>5%                |
| Trouble falling or staying asleep or sleeping too much   | 80<br>36%         | 91<br>40%           | 25<br>11%                         | 29<br>23%               |
| Feeling tired or having little energy  | 60<br>27%         | 111<br>49%          | 32<br>14%                         | 22<br>10%               |
| Poor appetite or overeating  | 138<br>61%        | 58<br>26%           | 19<br>8%                          | 10<br>4%                |
| Feeling bad about yourself or that you are a failure or have let yourself or your family down  | 131<br>59%        | 57<br>26%           | 15<br>7%                          | 14<br>6%                |
| Trouble concentrating on things, such as reading the newspaper or watching television  | 139<br>62%        | 56<br>25%           | 15<br>7%                          | 14<br>6.3%              |
| Moving or speaking so slowly that other people have noticed or the opposite, being so fidgety or restless that you have been moving around a lot more than usual | 204<br>91%        | 18<br>8%            | 2<br>1%                           | 1<br>0.5%               |
| Thoughts that you would be better off dead, or hurting yourself in some way  | 213<br>95%        | 9<br>4%             | 1<br>0.5%                         | 2<br>1%                 |

|  | 1         | 2          | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        |                                |
|--|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------------------|
| <i>How much does depression affect his life?</i>   |           |            |           |           |           |           |           |           |           |           |                                |
| No effect at all   | 1<br>0.5% | 1<br>0.5%  | 7<br>3%   | 12<br>5%  | 11<br>5%  | 28<br>12% | 76<br>34% | 56<br>25% | 23<br>10% | 11<br>5%  | Severely effect life           |
| <i>How long do you think his depression will continue?</i>   |           |            |           |           |           |           |           |           |           |           |                                |
| A very short time  | 2<br>1%   | 3<br>1%    | 26<br>12% | 29<br>13% | 60<br>27% | 50<br>22% | 30<br>13% | 17<br>7%  | 7<br>3%   | 2<br>1%   | Forever                        |
| <i>How much control do you feel Rich has over his depression?</i>  |           |            |           |           |           |           |           |           |           |           |                                |
| Absolutely no control  | 3<br>1%   | 10<br>4%   | 43<br>19% | 32<br>14% | 26<br>12% | 39<br>17% | 35<br>16% | 27<br>12% | 9<br>4%   | 2<br>1%   | Extreme amount of control      |
| <i>How much do you think treatment will help his depression?</i>   |           |            |           |           |           |           |           |           |           |           |                                |
| Not at all   | 2<br>1%   | 2<br>1%    | 13<br>6%  | 11<br>5%  | 20<br>9%  | 32<br>14% | 64<br>28% | 57<br>25% | 17<br>8%  | 7<br>3%   | Extremely Helpful              |
| <i>How many symptoms of depression do you think he is experiencing?</i>  |           |            |           |           |           |           |           |           |           |           |                                |
| No Symptoms at all   | 0<br>0%   | 1<br>0.5%  | 11<br>5%  | 16<br>7%  | 37<br>16% | 58<br>26% | 60<br>27% | 33<br>15% | 9<br>4%   | 1<br>0.5% | Many severe symptoms           |
| <i>How concerned do you think Rich is about his depression?</i>  |           |            |           |           |           |           |           |           |           |           |                                |
| Not at all concerned   | 1<br>0.5% | 15<br>6.6% | 29<br>13% | 43<br>19% | 29<br>13% | 49<br>22% | 40<br>18% | 14<br>6%  | 5<br>2%   | 1<br>0.5% | Extremely concerned            |
| <i>How well do you feel Rich understands his depression?</i>   |           |            |           |           |           |           |           |           |           |           |                                |
| Doesn't understand at all  | 6<br>3%   | 29<br>13%  | 76<br>34% | 59<br>26% | 17<br>8%  | 23<br>11% | 7<br>3%   | 9<br>4%   | 0<br>0%   | 0<br>0%   | Understands very clearly       |
| <i>How much do you think depression affects Rich emotionally (e.g. does it make him angry, scared, upset, or depressed)?</i> |           |            |           |           |           |           |           |           |           |           |                                |
| Not at all affected emotionally  | 2<br>1%   | 3<br>1%    | 12<br>5%  | 14<br>6%  | 20<br>9%  | 27<br>9%  | 85<br>38% | 47<br>21% | 10<br>4%  | 6<br>3%   | Extremely emotionally affected |

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