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Seung Hwan (Mark) Lee, *University of Western Ontario*

Supervisor: June Cotte, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Business

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THE STRUCTURAL IMPORTANCE OF CONSUMER NETWORKS

(Thesis format: Integrated-Article)

by

Seung Hwan (Mark) Lee

Richard Ivey School of Business

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

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THE UNIVERSITY OF WESTERN ONTARIO
School of Graduate and Postdoctoral Studies

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Abstract

This dissertation contains three essays that investigate how a consumer's social network position (i.e., a person's location within a web of relationships) plays an important role in the way that consumer influences and exchanges information with others. Using social capital theory as the conceptual framework, I demonstrate that a consumer's location within a network (network centrality) has an effect on their ability to influence others and, conversely, on others' ability to influence them. I also show that network positions influence the type of information that is sought from others (information about the self or information about others). Moreover, I demonstrate that people's perceptions of their own social capital may not coincide with their actual stores of social capital, revealing how this discrepancy may yield certain social benefits and social costs. Together, the findings of this research contribute to our understanding of consumer networks and further emphasize the relevance and importance of social network positions and social capital.

Essay 1 provides a framework for understanding the association between network centrality and the flow of consumer influence. Overall, people see themselves as opinion leaders when they perceive that they are central (i.e., popular) within their networks. However, these self-assessments are sometimes at odds with the perceptions of the rest of the network members. Counter-intuitively, the findings demonstrate that consumers who perceive themselves to be central in networks are quite susceptible to the influence of others.

Essay 2 further extends the investigation of network centrality to information-seeking behavior. The results demonstrate that network centrality is positively related to a consumer's rate of seeking information from other network members. Interestingly, people occupying degree central positions tend to seek information about their own consumer behavior (i.e., feedback), while people occupying betweenness central positions tend to seek information about the behavior of other consumers.

Finally, Essay 3 focuses on the instrumental and detrimental role of the individual's materialism in social network development. Based on an experimental study and a separate longitudinal field study of a social network, I demonstrate that materialistic consumers are susceptible to a *perceptual network fallacy* (a mismatch between individuals' perceptions of their social networks versus their actual social networks, as rated by others) over time. Results from the longitudinal field study demonstrate that materialistic individuals overestimated the number of friends they had in their social networks in two separate time periods. Further, materialistic individuals overestimated the growth of their social networks over time. A follow-up experimental study reveals that materialistic consumers overestimated the extent to which others desired to develop friendships with them. Using the latest social network analysis techniques, I demonstrate the unique advantages and disadvantages of occupying central positions in social networks.

Keywords: Social Networks, Social Capital, Network Centrality, Opinion Leadership, Susceptibility to Interpersonal Influence, Information-Seeking, Materialism, Perceptual Network Fallacy.

Co-Authorship Statement

I hereby declare that this thesis incorporates some material that is a result of joint research. Essay 1 was in the *Journal of Consumer Psychology* co-authored with Dr. June Cotte and Theodore J. Noseworthy. As the first author, I was in charge of all aspects of the project including formulating research questions, literature review, research design, data collection, analyzing the data, and preparing the first complete draft of the manuscript. With the above exception, I certify that this dissertation and the research to which it refers, is fully a product of my own work. Overall, this dissertation includes 3 original papers, with the first essay already published in an academic journal.

Essay 1 – Status: *Published*

Lee, Seung Hwan (Mark), June Cotte, and Theodore J. Noseworthy (2010) "The Role of Network Centrality in the Flow of Consumer Influence" *Journal of Consumer Psychology, 20(1)*, 66-77.

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Table of Contents

CERTIFICATE OF EXAMINATION ……………………... ii

Abstract ……………………... iii

Co-Authorship Statement ……………………... v

Acknowledgements ……………………... vii

Table of Contents ……………………... viii

List of Tables, Figures, & Appendices ……………………... x

Prelude ……………………... 1

Introduction ……………………... 4
    Network Centrality: Degree & Betweeness Centrality
    Social Capital Theory
    Social Capital & Network Centrality

Dissertation Format & Overview ……………………... 17

Overview of Methodology: Social Network Analysis ……………………... 19

References ……………………... 21

Essay 1: "The Role of Network Centrality in the Flow of Consumer Influence"

Introduction ……………………... 25
    Influence in Networks
    Opinion Leadership
    Opinion Leadership & Centrality
    Susceptibility to Interpersonal Influence
    Susceptibility to Interpersonal Influence & Centrality

Study 1 ……………………... 35

Study 2 ……………………... 47

General Discussion ……………………... 51
    Limitation and Directions for Future Research

References ……………………... 60

Essay 2: “Asking About You and Asking About Me: Information-Seeking in Networks”

Introduction ……………………... **63**
    Information-Seeking in Networks
    Theoretical Development

Study 3 ……………………... **68**

Study 4 ……………………... **80**

General Discussion ……………………... **84**

References ……………………... **88**

Essay 3: “The Instrumental and Detrimental Role of Materialism in Development of Social Networks: Drivers of Perceptual Network Fallacy”

Introduction ……………………... **91**

Theoretical Framework ……………………... **95**
    Materialism is Instrumental to Network Development
    Materialism is Detrimental to Network Development

Study 5 ……………………... **99**

Study 6 ……………………... **107**

General Discussion ……………………... **118**

References ……………………... **124**

Final Thoughts & Directions for Future Research ……………………... **127**

References ……………………... **135**

List of Tables, Figures, & Appendices

TABLES

Table 1: Overall Means, SD, and Correlations – Study 1 ……………………**43**
Table 2: OLS/MRQAP Regression Results – Study 1 ……………………**46**
Table 3: Overall Means, SD, and Correlations – Study 2 ……………………**50**
Table 4: OLS/MRQAP Regression Results – Study 2 ……………………**51**
Table 5: Scale Items for Essay 2 ……………………**72**
Table 6: Overall Means, SD, and Correlations – Study 3 ……………………**76**
Table 7: OLS/MRQAP Regression Results – Study 3 ……………………**77**
Table 8: Overall Means, SD, and Correlations – Study 4 ……………………**82**
Table 9: OLS/MRQAP Regression Results – Study 4 ……………………**84**
Table 10: Overall Means, SD, and Correlations – Study 5 ……………………**102**
Table 11: Treatment Means and SD – Study 6 ……………………**115**

FIGURES

Introduction

Figure 1: A Network Diagram ……………………**8**
Figure 2: Seniors Activity Club Network Diagra ……………………**48**
Figure 3: College Dormitory Network Diagram ……………………**103**
Figure 4: Experimental Stimuli ……………………**110**
Figure 5: Mat x Convo on Friendship Desirability (Self) ……………………**116**
Figure 6: Mat x Convo on Friendship Desirability (Partner) ……………………**116**

Appendix A:
Degree Centrality Histograms for the Network Studies ……………………**136**

Appendix B:
Copyright Release/Permission Letter ……………………**141**

Prelude

The decline in the effectiveness of traditional media methods has generated a burgeoning interest in the study of social networks (individuals' social groups). Indeed, a number of studies have suggested that buyers tend to value the opinions of their peers more so than formal marketing channels, such as advertisements and promotional events (Berkman & Gilson, 1986; Flynn, Goldsmith, & Eastman, 1996; Price & Feick, 1984). As a result, consumers rely increasingly on their social networks as resources for product information, evaluations, and recommendations to help with their purchase decisions (Brown & Reingen, 1987; Gershoff, Broniarczyk, & West, 2001).

Given the important role of social networks in consumer decision-making, network research has been gaining momentum in the marketing literature (Van den Bulte & Wuyts, 2007). Marketing research has explored, but has been limited to, the areas of diffusion and adoption of products and services (Brown & Reingen, 1987; Rogers, 1995; Watts & Dodds, 2007; Van den Bulte & Joshi, 2007), opinion leadership (Becker, 1970; Burt, 1999; Kratzer & Lettl, 2009), word-of-mouth communications (Duhan et al., 1997; Brown & Reingen, 1987; Reingen & Kernan, 1986), belief sharing and systems (Sirsi, Ward, & Reingen, 1996; Ward & Reingen, 1990), lead users (Kratzer & Lettl, 2009), branding use and preferences (Reingen et al., 1984; Ward & Reingen, 1990), information transmission (Franzen & Nakamoto, 1993; Goldenberg, Libai, & Muller, 2001), consumer transactions (DiMaggio & Louch, 1998), and virtual and P2P communities (Dholaki, Bagozzi, & Pearo, 2004; Song & Walden, 2007). Amid the handful of research dedicated to this domain, researchers have overlooked the importance of consumers' *structural positions* in networks (i.e., a position that an individual occupies in their social group) and, consequently, its influence on consumer behavior (Van den Bulte & Wuyts, 2007). This lack of emphasis on the structural properties of networks suggests that we are still unsure of the social benefits and costs associated with occupying particular network positions. To explore that gap, my work focuses on the attributes and outcomes of attaining and maintaining certain network positions (for example, being popular in a network).

This dissertation features three essays that are designed to explore the influence of network positions on consumer behavior. Namely, what benefits or costs do consumers gain by occupying certain positions in their social networks? What are the characteristics of the consumers who occupy these exclusive positions? Finally, what characteristics lead to attainment and maintenance of these positions? These over-arching questions function as the guiding roadmap for this dissertation. Thus, the focus of this research is to investigate how structural positions in networks (in particular, how central a person is in a network) play an integral role in the way consumers interact, influence, or exchange information with one another. It aims to contribute to the extant literature by being one of the first studies in the marketing literature to integrate the structural positions of networks with consumer-behavior concepts. But more importantly, this dissertation offers key insights to both academics and marketers, as the studies reveal linkages between network positions and the social benefits (and costs) borne from those positions. With this knowledge, researchers can further delve into understanding the impact of a particular network position on consumer behavior. Similarly, marketers can use this information to revise their traditional strategy towards a more network-oriented strategy, updating their marketing tactics for the 21st century.

Introduction

A *network* is a composite of specific entities and the pattern of relationships that bind these entities together (Iacobucci & Hopkins, 1992). A social network is a specific kind of network, one in which the nodes are social entities (often referred to as “actors”) or a defined set of persons (Ibarra, 1993). In general, a typical network has two main properties: a set of defined actors, and a collection of relationships that tie these actors together (Wasserman & Faust, 1994).

People can be linked with other people in a variety of ways. One such way is through building and maintaining ties in their friendship networks (Baldwin et al., 1997). Friendship ties are often characterized by a high frequency of interactions, which has been found to be useful in providing emotional and financial support, as well as in providing an avenue for information and resource exchange (Gibbons & Olk, 2003). In marketing, friendship networks are important to consumers because they serve as a medium for disseminating and exchanging product information and referrals (Brown & Reingen, 1987; Rogers, 1995).

Friends are important because they act as a word-of-mouth channel for consumer information (Ryu & Han, 2009). They also provide guidance (for information search) and support (in the form of decision-making confirmation/disconfirmation), and they engage others in product and service experiences (Anderson, 1998; Flynn et al., 1996). Thus, friendship networks are important because they facilitate access to information, resources, and opportunities (Burt, 1992; Podolny & Baron, 1997). While different types of social networks are known to exist (e.g., work networks), the focus of this dissertation is to examine the role of structural positions in social networks bound by friendships.

Granovetter (1985) argued that economic transactions are embedded in the *structure* of a social network. That is, social structure determines our choice of economic trading partners and the way we interact with them. Social structure also constrains who has access to what information, thus affecting the flow of information that takes place within a social network. For instance, members in structurally advantageous positions (Burt, 1992) can choose to release and withhold information, giving them unique advantages over others in a network. Individuals occupying these advantageous positions can gain greater brokerage opportunities, have better access to information and resources, be better able to coordinate information-sharing, and have greater control and power over their network (Burt, 1992; Gibbons & Olk, 2003; Mehra, Kilduff, & Brass, 2001). In short, these individuals may accrue greater benefits as a result of occupying a specific network position (Baldwin, Bedell, & Johnson, 1997; Podolny & Baron, 1997).

Social network positions are important to consumers because the patterns of interactions and connections that exist within a group of individuals may provide better opportunities or advantages for individuals, above and beyond their personal characteristics. In other words, the structure of relationships (*who* one is tied to and *how* one is tied to them) may provide individuals with benefits because “social advantage is created by a person’s location in a structure of relationships” (Burt, 1992, p.4). Within a consumer’s social network, there are certain network positions that can provide individuals with a more optimum social structure that offers privileged access to knowledge, information, and resources (Uzzi, 1996). The social structure of a network can enhance or restrict who has access to what information, subsequently affecting individual behavior (Carley, 1986; Sirsi et al., 1996). One of the ways in which consumers can achieve such a position is to become *central* in the network (Burt, 1992; Freeman, 1979).

Network Centrality: Degree Centrality and Betweenness Centrality

Network centrality is defined as the interconnectedness between the individual and other members in the network (Freeman, 1979). It contributes to the understanding of communication and to the information flow within a network structure (Ibarra, 1993). Individuals who are central in their networks tend to be more active (i.e., continuously working to maintain and manage contacts), have shorter paths of contact to others within their broad social network, and have more ties with other central members in the network (Faust, 1997). Network centrality has also been used as a measure of one's popularity, prominence, and/or power in a network (Borgatti, 2005; Freeman, 1979). Individuals who are centrally located in a network tend to have higher access to others and have a larger number of people who are willing to share information and resources with them; they tend to possess unique social advantages for acquiring information and resources (Cross, Borgatti, & Parker, 2001; Mehra et al., 2006). Centrality also implies greater control over resource and information acquisition because central individuals can choose from a greater number of alternative members in the network in order to satisfy their wants and needs (Sparrowe et al., 2001). Moreover, research has shown that centrality leads to positive outcomes, such as information access, enhanced reputation, social support, and opportunities to influence others (Kratzer & Lettl, 2009; Mehra, Kilduff, & Brass, 1998).

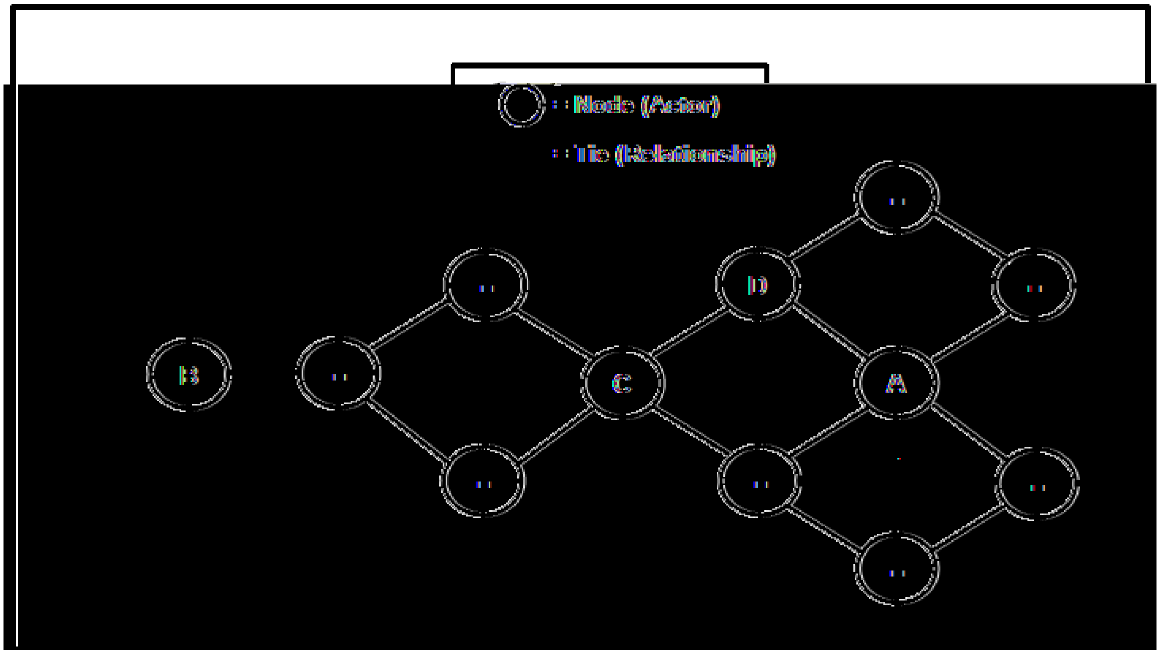
Network centrality is measured by examining the number of direct relationships the individual has with others or by assessing the extent to which an individual links otherwise unconnected cliques or individuals (Freeman, 1979). Thus, centrality can be defined by the number of ties (quantity of ties) or the configuration of ties (strategic location of ties) that a network member might have. While multiple measures of centrality are known to exist in the network literature, this dissertation focuses on the two most commonly used types of network centrality: *degree centrality* and *betweenness centrality*. Degree centrality is the total number of nodes to whom one is directly connected. Betweenness centrality is the frequency with which a node falls between pairs of nodes on the shortest paths connecting them. A more detailed explanation of the two centrality measures is provided below.

Degree centrality. Degree centrality is the extent to which a person is connected to others in a social network (Brass & Burkhardt, 1992). It is measured by the number of relationship ties a focal actor has in his/her network (Wasserman & Faust, 1994). Individuals with high degree centrality have been shown to have relatively quicker access to information, more accurate perceptions of the network, and greater power and influence over the network (Brass & Burkhardt, 1993; Casciaro, 1998). An actor with high degree centrality occupies a structural position that acts as a source for large volumes of information exchange and other resource transactions (Wasserman & Faust, 1994). In contrast, a peripheral actor (low in degree centrality) maintains very few relations and thus is structurally located in the outside margins of the network structure.

In Figure 1, Actor *A* has the highest degree centrality since he is connected to more people than anyone else in the network (Actor *A* = 6 direct ties, degree centrality score of 6). The second most-connected person in the network is Actor *D* with 5 direct ties. The person with the lowest degree centrality is Actor *B*, who is connected to only one other person, giving him a degree centrality score of 1 (peripheral actor). Therefore, degree centrality is calculated by the sum of direct ties an individual has with other members in the network.

Figure 1

A Network Diagram



Degree centrality can be further defined in terms of *in-degree centrality* and *out-degree centrality*. Out-degree centrality is the extent to which the focal actor has identified others as a close friend. In-degree centrality is the extent to which others in the network have identified the focal actor as a close friend. These two assessments yield different characteristics. Degree centrality reflects one's popularity within a network (Freeman, 1979). Out-degree centrality is concerned with an individual's perception of his or her own popularity, whereas in-degree centrality is concerned with the individual's actual popularity, as rated by others in the network (Freeman, 1979).

Betweenness centrality. Betweenness centrality is defined as the extent to which a person falls between pairs of other people on the shortest path (geodesics) connecting all other individuals in the network (Freeman, 1979). That is, an individual is high in betweenness centrality if he/she strategically holds a position in a network such that he/she provides links to otherwise unconnected individuals. Thus, betweenness centrality "allows access to people who are disconnected from each other" (Mehra et al., 2001, p.121). A person with high betweenness centrality represents a critical junction point since, if one were to remove the betweenness central person from the network, the common tie between individuals and/or between cliques would likely break (Burt, 1999).

A presence of a high betweenness central actor indicates that a node can reach other nodes in a network using a shorter path. In other words, if one were to remove the node with the largest betweenness centrality, the path between other pairs of nodes would be lengthened. For example, if persons A and C are connected only through person D (see Figure 1), then D would fall "between" A and C. Hence, D would be in control of any resources (such as information) that flow between A and C. Therefore, D would be in a position to play the part of a ‘broker’ or a ‘gatekeeper’ of information between A and C (Scott, 2000).

As brokers of the network, individuals who are high in betweenness can influence the network by withholding or distorting information in transmission. That is, they have greater control and influence over how the flow of information occurs in networks (Burt, 1999). Furthermore, people in these positions can withhold, disclose, and/or modify information in order to manipulate others’ perceptions and attributions of power (Brass & Burkhardt, 1992). These advantages provide them with better access to information opportunities within their social network.

Betweenness centrality is calculated by assigning higher values to those who link unconnected regions in the network (Borgatti, 2005; Freeman, 1979). In Figure 1, Actor C occupies the highest betweenness position. This is because Actor C represents a point of failure where, if we were to remove him from the network, the common link that connects the two major subgroups would be broken. Therefore, despite Actor C having only four direct ties to the entire network, Actor C’s unique network position is vital since he represents the critical point of failure.

Social Capital Theory

Occupying a central position (either degree or betweenness) reflects greater social capital (Burt, 2000). Over several decades, scholars in various academic disciplines have contributed to the understanding of social capital (e.g., Burt, 2005; Brehm & Rahn, 1997;

Ciabattari, 2007; Coleman, 1988; Fukuyama, 1995; Ibarra, 1995; Inglehart, 1997; Knoke, 1999; Lin, 2001; Portes & Sensenbrenner, 1993; Putnam, Leonardi, & Nanetti, 1993; Stam & Elfring, 2008; Woolcock, 1998). While varying definitions have existed across many disciplines, the consensus seems to be that social capital is derived from the network of relations that exist among actors (Coleman, 1988). In this section, I first review the literature on social capital theory and then provide an overview of how social capital is linked to network centrality.

Coleman (1988) conceptualizes social capital as individuals' ability to exploit social structure (network ties, configuration, and formation). That is, social capital is not a personal asset, such as human capital (e.g., skills, qualifications, and knowledge, etc.) (Coleman, 1988); it is not the property of the individual but rather a form of capital that is embedded in their ties to others in the network (Burt, 2000). Social capital is different from other forms of capital (human, cultural, etc.) because it resides in social relationships, whereas, other types of capital reside within the individual (Burt, 2000). It is important to acknowledge that social capital cannot be the possessed goods of the individual; rather, it is the resources that are accessible through an individual's direct and indirect ties (Burt, 1992). Therefore, social capital is a function of social relationships (Burt, 2000). Given that social capital is embedded in the structure of social networks, it is important to examine network compositions (unique combination of nodes and ties); social capital provides individuals with the opportunity to achieve their objectives (e.g., using your social capital to find better deals on products) through their social relationships (Coleman, 1988). Thus, in this dissertation, I focus on the structural elements (how individual networks are structured) of social capital.

Extending from Coleman’s framework, Nahapiet and Ghoshal (1998, p.243) define social capital as the “sum of the actual and potential resources embedded within, available through, and derived from the network of relations possessed by an individual or social unit.” Social capital is the social connections among a group of people and the values residing within and between these social connections (Borgatti, Jones, & Everett, 1998). That is, individuals and/or subgroups in a network can accrue social capital by leveraging certain connections they have with one another within that network (Paxton, 1999). While it has been established in the literature that social capital can be created at varying levels of a social structure (Paxton, 1999; Putnam et al., 1993), the focus here is on the micro (i.e., individual) level of social capital. Thus, the emphasis lies on the benefits accrued from the relationship ties *within* the network rather than at the macro level (inter-network analysis).

Individuals in a network build social capital by interacting with one another, which in turn develops trust and norms of future behavior (Blau, 1964). Social capital arises from the mutual obligations and reciprocity that provide individuals with social and economic advantages (Constant, Sproull, & Kiesler, 1996). Thus, social capital tends to be high in social networks that have greater norms, reciprocity, and social trust, such as friendship networks (Coleman, 1988; Gamm & Putnam, 1999; Putnam, 1995). As individuals build relationships with one another, this process creates a network of interdependent social exchanges wherein certain individuals become important partners for exchanges of resources and information, as well as instrumental and social support (Burt, 1992). Hence, individuals can accrue disproportionate social capital, depending on their network position and the structural configuration of the network. This finding implies that certain network positions may be more advantageous than others because individuals can garner higher social capital through their unique sets of social relationships and, in consequence, garner greater personal benefits (Burt, 1992).

Social capital theory suggests that *who* a person is connected to and *how* these individuals are connected to each other enable people to accrue greater social capital (Burt, 1992). Given that advantages may arise from the “who” and the “how” of these network connections, network centrality may lead to greater social capital (Brass and Burkhardt, 1992). Individuals located in degree and betweenness central positions will accrue greater social capital because they occupy positions that allow them to take advantage of their network structure for information and resources (Coleman, 1990). This finding suggests that *where* people are located (i.e., network position) and the social structure of a network function together as a way to increase one’s social capital (Nahapiet & Ghoshal, 1998).

Social Capital & Network Centrality

Burt (2000) posits that social capital is a function of individuals’ structural position within the network, not of the characteristics or the identity of the individual. Burt also suggests individuals in central positions (degree or betweenness) tend to accrue the greatest amount of social capital because they occupy positions that are structurally advantageous in acquiring social benefits (Mehra et al., 2001). Individuals in degree central positions accrue their social capital from their increased ability to reach or connect to others who are nearby (Burt, 1997). As networks develop, individuals gain opportunities to interact with one another to develop trust and create norms for future behavior, which in turn builds social capital through mutual obligation (Blau, 1964).

Based on Coleman's theory of social capital (1988), individuals in highly interconnected, dense networks tend to generate advantages by developing shared meanings and trust within the immediate network. A cohesive network characterized by high density and mutuality among ties fosters important interactions, all of which facilitate the development of cultural norms and the flow of information exchange (Coleman, 1988; Ibarra & Andrews, 1993). Individuals in these positions are linked to more people; thus, they garner more opportunities to exchange resources with others (Brass & Burkhardt, 1992). Having a close network of friends facilitates the transfer of complex knowledge, increasing the willingness and motivation to invest time and effort in sharing knowledge with others (Reagans & McEvily, 2003). That is, individuals occupying this position will have the social advantages of receiving greater amounts of quality information. Thus, social capital may be generated from occupying a *degree central* position.

Building on Granovetter's (1973) "strength of weak ties" theory (i.e., weak links provide individuals with information advantage), Burt (1992) theorizes about the advantages that arise from spanning disconnected clusters within the social network. According to Burt, individuals spanning these clusters build social capital for themselves because one will receive non-redundant information and ideas from unconnected parts of the network. Individuals in high betweenness positions build social capital because they connect members from different parts of the network (Mehra et al., 2001). Since they link unconnected individuals, subgroups, and/or cliques from different parts of the network, betweenness central individuals are in an advantageous position to become a major channel of information and influence (Ibarra, 1993; Kratzer & Lettl, 2009). They will have the social advantages of receiving diverse information from diverse sources (Mehra et al., 2001). In addition, occupying a betweenness central position provides individuals with more diverse and timely access to information, greater control over resources, and greater visibility to others in the network (Burt, 1992). These individuals enjoy the advantages of having better access to information and more control over others by building relationships with unconnected clusters in the network (Podolny & Baron, 1997). Thus, social capital may also be generated from occupying a *betweenness central* position.

Recent research suggests that individuals can occupy a *hybrid* central position (e.g., a position high in degree and betweenness centrality) (Burt, 2005; Reagans & McEvily, 2003; Schilling & Phelps, 2007). Occupying a hybrid position provides individuals with the greatest amount of social capital, since degree centrality provides individuals with the trust and collaboration of their immediate network *combined* with betweenness centrality, which provides non-redundant information from different parts of the social network (Burt, 2005; Reagans & McEvily, 2003). Occupying a hybrid position may provide individuals with the maximum benefits that can be used to generate social advantages.

Given that occupying central positions may lead to the accumulation of social capital, the primary objective of this dissertation is to investigate how network centrality plays an integral role in the way consumers build social capital benefits from these positions. Using social capital theory as the theoretical framework, this dissertation emphasizes the important role of network centrality (the structural element) in social networks and the resulting exchange in social capital. It focuses on how certain positions in networks play an integral role in the way consumers *influence* and *exchange* information with one another. Overall, this dissertation directly contributes to the marketing literature in two ways. First, using social capital theory as the theoretical framework, I demonstrate that *where* the consumer is located within a network (network centrality) affects an individual's ability to influence others within in the network. I also show that network positions influence the type of information that is sought from others (information about the self or information about others). Second, I demonstrate that people's perception of their social capital may not coincide with their actual store of social capital, and show that this discrepancy may yield different personal outcomes. The lack of exploration in the properties of social networks suggests that despite the large amount of consumer research devoted to social relationships, the link between network positions and the social benefits associated with occupying these structural positions remains relatively unknown. In response, this dissertation contains three essays that uncover the structural importance of consumer networks.

Dissertation Format and Overview

Essay 1 provides a framework for understanding the association between network centrality and the flow of influence in a consumer network. I demonstrate that a consumer’s position in a social network is related to both opinion leadership and susceptibility to interpersonal influence. In two field network studies (a network of students and a network of seniors), the results show that people see themselves as opinion leaders when they perceive that they are popular (i.e., central) in the network. However, these self-assessments are sometimes at odds with the perceptions of the rest of the network. Counter-intuitively, the findings demonstrate that consumers who are central in networks are quite susceptible to the influence of others. These findings extend the field’s knowledge by demonstrating an association between network centrality and the flow of consumer influence.

Essay 2 follows by examining this association between network centrality and the information-seeking behavior of consumers. I further build on the argument that social capital generates information-exchange benefits. In two network studies (a seniors’ club and a food and culinary club), the data reveal the importance of both the *number* of social ties and the *position* of those ties in the flow of information through a social network. The results demonstrate that network centrality is positively related to seeking information from other network members. Interestingly, the findings further reveal that people who occupy degree central positions tend to seek information about their own consumer behavior, while people who occupy betweenness central positions tend to seek information about the consumer behavior of others. Extending Essay 1, this essay further recognizes the social benefits associated with occupying central positions.

While Essays 1 and 2 examined the effect of network position on the creation and sharing of social capital, Essay 3 examines the formation of social networks and one particular influence on that formation. Specifically, the latter essay investigates the instrumental and detrimental role of individuals' materialism in the development of social networks. First, findings from a longitudinal field study of an emerging social network reveal that materialism is instrumental to an individual's social network development (i.e., materialistic people made more social connections over time, i.e., network centrality). However, a caveat is that this benefit was perceptual, not actual. That is, there appeared to be a discrepancy between consumers' perceptual social network versus their actual social network, a phenomenon I call the *perceptual network fallacy*. Materialistic individuals overestimated the number of friends they had in their social network in two separate time periods. Further, materialistic individuals overestimated the growth of their social network over time. A follow-up experimental study (with a different sample) shows that individuals overestimated their *friendship desirability* (their own desirability as a friend to others) after a discussion about product possessions. Together, this research makes conceptual advances to the field of social networks and also offers marketing implications and suggestions for understanding the role of materialistic consumption in developing networks.

Overview of Methodology: Social Network Analysis

Social network analysis (SNA) has emerged as an important technique for understanding the structures of relationships and the effects of relationship on behavior (Wasserman & Faust, 1994). Rogers and Kincaid (1981, p.24) define SNA as “a method of research for identifying the communication structure of a system, in which relational data about communication flows are analyzed by some type of interpersonal relationships as the unit of analysis.” Social network analysis seeks to reveal the way that patterns and structures of relationships can explain behavior and outcomes beyond individual or group differences (Wasserman & Faust, 1994).

One of the main strengths of network analysis is that it enables researchers to locate the structural positions (e.g., network centrality) of individuals in a social network (Valente & Davis, 1999). Network analysis investigates the quantitative structural properties of networks that cannot be extracted from a study of individuals or dyadic relationships (Webster & Morrison, 2004). Further, the collected network data allows researchers to trace the connections between individuals (linkages and ties), which cannot be realized through a traditional sample survey methodology. Other marketing studies that have attempted to capture relational data using traditional sample survey methodology and retrospective data suffer from inaccurately describing the properties of networks and connections between individuals (Reingen & Kernan, 1986). In the marketing literature, researchers studying networks have typically gathered information on the characteristics of networks, such as size, frequency of interaction, or relationship type, all from the perspective of the focal actor (Webster & Morrison, 2004). With SNA, information is gathered from all members of the network. One of the strengths of this dissertation is its unique focus on the structural properties of consumer networks, an important but often overlooked determinant of behavior.

There are clear advantages to using network analysis to evaluate the patterns of relationships. Reingen and Kernan (1986) suggest that with network data, researchers are able to explicate and include interpersonal relationship components in the analysis, the lack of which is a shortcoming of other methodologies. Another advantage of SNA comes from its ability to identify key actors in networks (Borgatti, 2006), such as the most central actor in the network, which is a key position of interest in this dissertation. As outlined previously, a review of consumer research journals yields only a small number of articles that utilize this unique network methodology (e.g. Kratzer & Lettl, 2009; Reingen & Kernan, 1986). Therefore, in addition to its theoretical contributions, this dissertation also provides a contribution to the marketing literature from a methodological standpoint. Furthermore, this dissertation goes beyond the static view of networks (e.g., a cross-sectional network studies) by conducting a longitudinal network study (Essay 3) to examine the development of an individual’s social network as it occurs over time.

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Essay 1

The Role of Network Centrality in the Flow of Consumer Influence[1]

How do consumers influence one another? In the past, studies have generally followed one of two traditions. At the micro-level, researchers have studied how individual actors interact with other actors to transmit information and influence one another (Katz & Lazarsfeld, 1955). At a more macro-level, researchers have studied how the structure of channels and networks direct the flow of information and influence (Brown & Reingen, 1987; Granovetter, 1973). Our study is situated in the latter tradition. We examine the structural elements of social networks as they determine how consumers interact, influence or exchange information with one another. With the recent burgeoning of interest in peer-to-peer networks, we believe it is an apt time to revisit social network theory for a nuanced study of how influence manifests in a consumer network.

Influence in Networks

Katz and Lazarsfeld's (1955) model of a two-step flow of communication stands as one of the seminal models for marketing research (Burt, 1999; King & Summers, 1970). Information is passed on from marketers to market influencers (e.g., opinion leaders), which subsequently is passed on to other consumers within the influencer's respective network. The model rests on two rudimentary assumptions: (1) the market influencer has the *ability* to diffuse information, and (2) the market influencer has access to a *network* of people by which to exercise this ability. As such, research in this field has diverged, with the dominant stream focusing on the *ability* and characteristics of market influencers to pass on the information, and the other stream focusing on how the structural aspects of *networks* affect information exchange and word-of-mouth (e.g., Brown & Reingen, 1987; Reingen & Kernan, 1986; Sirsi, Ward, & Reingen, 1996).

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Given the emphasis put on both streams in the past 60 years, surprisingly little attention has been devoted to integrating the two. Our research aims to incorporate the *ability of the influencer* with *the structure of the network* by examining how the structural positions of actors within social networks are associated with opinion leadership and susceptibility to influence. As interpersonal influence is a social phenomenon, the extent to which individuals are influenced by others should be dependent not only on the relationship components of social networks, but also on the actor's structural position within their network. In a novel way, we demonstrate that the structural position of an actor in a network is not only related to their ability to be opinion leaders, but also to the extent to which they are more susceptible to interpersonal influence.

The literature on both opinion leadership and consumer susceptibility to interpersonal influence has largely ignored, at least from an empirical standpoint, the structural dimensions of consumers' networks. Previous network researchers have predominantly focused on the relationship components of networks such as strength (weakness) of ties, homophily, and reference groups (e.g., Brown & Reingen, 1987; Granovetter, 1973). This happened despite scholars emphasizing the importance of social location (i.e., structural position) and the degree of relationship these consumers have with other consumers inside their network (Burt, 1999). This lack of emphasis on the properties of social networks suggests that despite the large amount of research devoted to the topic, we are still unsure whether the influence on others is related to structural position, and if consumers become more susceptible to interpersonal influence when they occupy certain structural positions in their network. To address this gap, our research focuses on how a favorable network position (i.e., being in the center of a network) is associated with opinion leadership as well as susceptibility to interpersonal influence.

Social Networks and Marketing

Social networks are composites of interactions and connections that exist amongst a group of individuals (Iacobucci & Hopkins, 1992). Interactions within a social network are governed by two primary components: (1) individual-to-individual relationships and (2) the structural dimension encompassing those relationships (Gibbons & Olk, 2003). People can be linked with other people in a variety of ways. One way is through building and maintaining ties in their friendship networks (Baldwin, Bedell, & Johnson, 1997). Friendship ties are often characterized by a high frequency of interactions, have been found to be useful in providing emotional and financial support, as well as being an avenue for information and resource exchange (Gibbons & Olk, 2003). In marketing, friendship networks are important to consumers because they provide an avenue to disseminate and exchange product information and referrals (Brown & Reingen, 1987).

Diffusion of innovation theory posits that new ideas, practices, and objects become known and spread within and between communities largely through interpersonal communications (Gatignon & Robertson, 1985). Individuals within a friendship networks act as a word-of-mouth channel and as role models to inspire others to imitate their behavior (Ryu & Han, 2009). Such friends provide advice and guidance for the search, purchase, and use of products, they provide support with decision making (confirmation/disconfirmation), and they engage others in the consumption experience (Flynn, Goldsmith, & Eastman, 1996).

Network theories have been applied to a wide range of marketing issues, including diffusion and adoption of products and services (Brown & Reingen, 1987), word-of-mouth communications (Brown & Reingen, 1987; Reingen & Kernan, 1986), branding use and preferences (Reingen, Foster, Brown, & Seidman, 1984; Ward & Reingen, 1990), information acquisition (Granovetter, 1973), and relationship marketing (Achrol, 1996). We also know from network research that common membership in cohesive subgroups is associated with common brand use and preference, and that consumers with structurally equivalent positions in social networks have similar brand preferences (Reingen et al., 1984; Sirsi et al., 1996; Ward & Reingen, 1990). It is not just about being in a network, but where one is located in that network: one's structural network position.

Structural Network Position

Research has shown that an individual can occupy structural positions within a network that afford greater access to information, resources, and opportunities (Burt, 1992; Mehra, Kilduff, & Brass, 2001). Individuals in these positions tend to have higher brokerage opportunities and are better at coordinating information sharing across other actors within the network (Burt, 1992; Mehra et al., 2001). Because these individuals are well connected with others, they are in a better position to leverage their relationships to influence others and diffuse information. However, individuals in these positions may also have difficulty coordinating their relationships. Because unproductive contacts tend to expire over time, individuals must sustain a minimum interaction frequency to maintain ties and preserve their structural position (Burt, 2000). The increased responsibility of maintaining ties may require consumers to become more susceptible to influence as they work to protect their structural position.

One way to occupy a structurally advantageous position is to be central in one's network (Gibbons & Olk, 2003). Individuals who are central tend to be more active (continuously working to maintain contacts) and have more ties with other central members in the network (Faust, 1997). Centrality can be defined as either the number of ties (quantity) or the configuration of ties (strategic location). In our research, we are concerned with both *degree centrality* (a quantity measure) and *betweenness centrality* (a location measure).

Degree centrality is defined by the number of ties that are directly linked to the focal person (Freeman 1979; Wasserman & Faust, 1994). It reflects one's popularity within a network (Van Den Bulte & Wuyts, 2007). Degree centrality can be further defined in terms of *in-degree centrality* and *out-degree centrality*. Out-degree centrality is the extent to which the focal actor has identified others as a close friend. In-degree centrality is the extent to which others in the network have identified with the focal actor as a close friend. The two yield different characteristics. Out-degree centrality is concerned with an individual's self-perception of his or her own popularity, whereas in-degree centrality is concerned with the individual's popularity as rated by others in the network (Van Den Bulte & Wuyts, 2007).

Betweenness centrality is defined as the extent to which a person falls between pairs of other people on the shortest path connecting individuals in the network (Freeman, 1979; Mehra et al., 2001). For instance, an individual is high in betweeness centrality if he/she strategically holds a position in a network such that he/she provides links to otherwise unconnected individuals. A person high in betweenness centrality represents a potential point of failure, whereby if one were to remove this person from the network, the common ties between individuals and cliques could break (Burt, 1999).

We believe that consumers in these central positions have different characteristics than those who are on the periphery of the social network, and this has important implications for marketing. Specifically, we expect individuals in these positions to be more likely to exert influence, and yet be highly influenced by others. We examine these issues of influence through opinion leadership and susceptibility to interpersonal influence. In the following sections, we briefly review the literature on opinion leadership and consumer susceptibility to interpersonal influence, and discuss how network centrality may relate to these important marketing variables.

Opinion Leadership

Opinion leaders can influence the purchase behavior of other consumers because they are more involved and knowledgeable in their product field and are known to consult a greater number of sources (e.g., media) more frequently than the average consumer (Flynn et al., 1996). Opinion leaders also play a critical role in diffusing information across social systems and usually engage in word of mouth (WOM) behaviors with a particular predisposition towards an issue (Gatignon & Robertson, 1985). People are willing to listen to, and be influenced by, opinion leaders because they are in a desirable social position, and are often seen as a competent, unbiased source of information.

Katz (1957) originally conceptualized opinion leadership as a combination of factors. These factors include tendency, competence, and location. Tendency refers to how opinion leaders need to have an affinity to influence others, competence refers to an appropriate level of experience, and location refers to the need to be somewhat socially connected inside a network (Burt, 1999; Flynn et al., 1996; King & Summers, 1970). In this research, we focus on the location factor, unpacking the association between network centrality (both degree and betweenness centrality) and opinion leadership.

We expect *degree centrality* to be associated with opinion leadership for three reasons. First, individuals with high degree centrality have more ties to other individuals, from whom they can gain network information and resources. The more direct the ties that individuals accumulate, the more informed and aware they become about each individual member (Carley & Krackhardt, 1996). Consequently, they gain access to more diverse information about the network. Even though the information gathered may be redundant, it can be verified or disconfirmed. This ability to continuously update existing information allows central people to accumulate higher quality information (Coleman, 1988), which in turn allows them to be more strategic when targeting information receivers (Gibbons & Olk, 2003). Second, we believe that having a greater number of ties will be associated with opinion leadership. In order to influence others, there has to be nodes of people to whom the focal actor can distribute the information (Katz & Lazarsfeld, 1955). Thus, we expect that people with larger number of ties will also have greater influence than those with smaller number of ties. Third, individuals who are high in degree centrality usually have a greater self-perception of having power in their network (Brass & Burkhardt, 1993). Consistent with identity-based motivation theory (Oyserman, 2009), we expect central people to engage in identity-congruent actions. Thus, an elevated perception of power provides these individuals with the confidence necessary to be more outspoken about a variety of topics. For these three reasons, it is likely that there will be a positive association between degree centrality and opinion-leadership.

People high in *betweenness centrality* are known as the gatekeepers of information due to their unique broker position (Gibbons & Olk, 2003). Individuals occupying this position have the ability to share, withhold, or manipulate information as they pass it on to others (Burt 1999). Given this enhanced opportunity to diffuse and coordinate information, these individuals are privileged by their ability to span and integrate different clusters of people and subgroups within the network. The most effective opinion leaders are not necessarily the leaders of the network, but brokers within the network (Burt, 1999). These are the people who are more expressive with their ideas, more likely to have their ideas be valued by others, and less likely to have their ideas ignored by others (Burt, 2004). Therefore, we expect betweenness centrality to be positively related to opinion leadership, because individuals in these highly central positions not only have greater access to subgroups of individuals across the network, but also hold the unique advantage of being able to provide others with information that is perceived to be of high value.

Consumer Susceptibility to Interpersonal Influence

Consumer susceptibility to interpersonal influence is defined as the need to identify or enhance one's image through the acquisition of products and brands that conform to the desires of others (Bearden, Netemeyer, & Teel, 1989). Interpersonal influence has two separate dimensions: informational and normative (Deutsch & Gerrard, 1955). Informational influence is the tendency to accept information from others as evidence of reality, or to make inferences based on others' behavior, while normative influence is the tendency to conform to the expectations of others (Bearden et al., 1989; Deutsch & Gerrard, 1955).

We expect *degree centrality* to be positively related to consumer susceptibility to interpersonal influence for several reasons. Central individuals have greater prospects of forging diverse ties with others in the network, and advice from these diverse social ties will be more useful than advice from less diverse ties (Constant, Sproull, & Kiesler, 1996). Since advice from more people is usually more useful than advice from fewer people, this will provide individuals with greater opportunity to learn about the topic. More advice can also help confirm and disconfirm certain information, which can assist in adjudicating conflicting information. This line of reasoning suggests that people in central positions are more likely to receive useful advice than those in the periphery parts of the network, and thus are also more susceptible to influence in part because they are receiving a higher quantity of useful information. Moreover, because central individuals are known to have a desire for maintaining their position (Baldwin et al., 1997), they may be motivated to scan the network for information that is viewed as trendy or popular. This motivation to keep up with the current trends of the network encourages them to be more open and susceptible to information provided by others. Therefore, counter-intuitively, we believe individuals with high degree centrality will be more susceptible to peer influence than those with low degree centrality.

We also expect that as a result of having access to more (and more diverse) information, *betweenness centrality* will be positively associated with consumer susceptibility to interpersonal influence. As we outlined above, one advantage of being between others in one's network is the possibility of receiving non-redundant information and innovations from unconnected parts of the network (Burt 1992). As such, individuals in these brokering positions have the potential to receive the most diverse amounts of information, and more of it. Especially if this information is high quality, consumers in this position will be vulnerable to influence from this information (i.e., influence from others).

Moreover, individuals in the betweenness central position may play a role in satisfying the needs of different cliques, subgroups, and individuals in the network. Because of their unique brokering position, they will likely be more attentive to their reputation and image within different subgroups in the network (Mehra et al., 2001). In order to satisfy and meet the norms of multiple groups, they may need to be more open-minded and susceptible to the ideas and activities endorsed by these subgroups to maintain their structural position. Therefore, we expect there to be a positive relationship between betweenness centrality and susceptibility to interpersonal influence.

We examine influence in consumer networks with two studies of disparate social networks, using a survey-based approach to social network analysis. The strengths of this approach include locating the structural position of actual consumers in the network, outlining the structural properties of networks that cannot be extracted from a study of individuals, and tracing the interpersonal relationships between individuals (Reingen & Kernan, 1986; Webster & Morrison, 2004). In addition, because the data is based on collecting *who talks to whom* and *who influences whom*, we are able to track the degree of influence between people (Wasserman & Faust, 1994). A final advantage is the ability to identify key actors (centrality) in the network (Borgatti, 2006).

Study 1

In this study, we collected data from a group of 125 members of an ethnic social club at a large Canadian university. To become a member of this social club, students were required pay a membership fee at the beginning of each academic year to have access to the services and activities offered by the club. Some of these services included social dinners, sports day, academic presentations, karaoke nights, banquet formals, and a talent competition. Registered members received special entry and/or discounts to participate in these activities. We chose this group as a research destination because a formally bounded network is useful in identifying members who are central to their network (Scott, 2000). This allows us to better capture the *structure* of relationships in a real network (Reingen & Kernan, 1986), and the use of a formally bounded network to study structural properties is consistent with previous network studies in consumer behavior (Reingen et al., 1984).

Network data was collected using an online questionnaire. To encourage participation, we provided monetary incentives of $5. In total, 75 of 125 students registered as members participated in our study, for a response rate of 60%.

We collected network data using the roster method (Scott, 2000; Wasserman & Faust, 1994). In this method, participants were provided with an alphabetical listing of the names of all of the club members, and we asked each person to rate their degree of friendship (closeness) with each member on the list. We chose the roster method over alternative methods for several reasons. The roster method allows us to map out the patterns of relationships between all actors - a requirement necessary to determine centrality properties among the actors. It is also a widely used method in social network research (e.g., Gibbons & Olk, 2003; Mehra et al., 2001). More importantly, the use of the roster method is preferred over alternative methods because it is not subject to recall bias; otherwise participants have a tendency to only report their strongest ties, providing an incomplete view of the macro social network (Wasserman & Faust, 1994).

Measures

Centrality. In this study, we measured two types of centrality: degree centrality and betweenness centrality. To measure degree centrality (in-degree and out-degree centrality), we created a 75x75 friendship matrix generated from the network data to calculate each participant’s in-degree and out-degree centrality scores. In-degree centrality was calculated by taking the total number of members nominating the focal person as a “close friend.” We chose close friends as our level of analysis, as this criterion resulted in an identification of strong-tie networks (Sirsi et al., 1996). The focal actor received a score of 1 for every time someone nominated the focal actor as a close friend and 0 for any other cases. That is, in-degree centrality is *others’ views* of the person’s centrality. Out-degree centrality is equal to the total number of people the focal person nominated as close friends. The focal individual received a score of 1 for every nomination of someone he/she designated as a close friend. That is, out-degree centrality is *one’s own view* of one’s centrality.

We also used the 75x75 matrix based on the close friendship data to calculate the betweenness centrality scores of each participant in the network. We used symmetric data for the friendship matrix, such that the friendship was coded as a 1 when both members of a dyad identified each other as a close friend. In all other cases, the relationship between the dyad was coded as 0. Use of symmetric data is recommended to enhance interpretability of betweenness centrality scores (Mehra et al., 2001). Finally, we entered the 75x75 friendship matrix into the social networks software UCINET (Borgatti, Everett, & Freeman, 2007) to calculate the differences in the centrality scores for each member compared to every other member.

The creation of difference centrality scores is necessary because we analyzed the data using multiple regression quadratic assignment procedure (MRQAP; Gibbons & Olk, 2003; Krackhardt, 1993). MRQAP is a method that has been used in social network analysis and is useful in analyzing dyadic sets of data. MRQAP is a non-parametric test that tests for structural similarity between two matrices. The analysis tests the likelihood that the existing correlations between the matrices have resulted by chance. More specifically, the null hypothesis is that the permutations of columns and rows of both the independent and dependent variable are equal to one another (see Gibbons & Olk, 2003 for a more extensive review). Because each member's betweenness centrality scores are dependent on the entire structure of the network (and independence between observations cannot be assumed), the use of a non-parametric test, like MRQAP, is necessary to overcome the problems of non-independence of data points.

Opinion Leadership (OL-a). Opinion leadership was measured using a scale adapted by Flynn et al. (1996). We chose to use this scale over Childers' (1986) opinion leadership scale as we are interested in observing the flow of influence, as were Flynn et al., rather than product communication, which was Childers' focus. The 6-item opinion leadership scale was scored on a 7-point Likert-type scale ranging from 1 to 7 with descriptive anchors "Strongly Disagree" and "Strongly Agree". However, we dropped 2 of the 6 items as they did not load well on the OL construct after our test for unidimensionality. Confirmatory factor analysis revealed that the remaining 4 items all loaded .78 and higher with adequate fit (CMIN/DF = 1.16, NNFI = .93 CFI = .99, RMSEA = .047), thereby indicating unidimensionality (Steenkamp & Van Trijp, 1991).

Because opinion leadership is most appropriately measured with domain-specific instruments, we modified the scale to directly represent opinion leadership regarding the club's events and activities (Flynn et al., 1996). Sample items from the scale include, "People that I know participate in club XYZ's events and activities based on what I have told them" and "I often influence people's opinion about XYZ's events and activities." The internal consistency (Cronbach alpha) of the 4-item measure of opinion leadership was .90.

Consumer Susceptibility to Interpersonal Influence (CSII-a). Consumer susceptibility to interpersonal influence was measured using a scale developed by Bearden et al. (1989). This scale has 12 items, reflecting the two separate dimensions (informational and normative) and includes both sub-dimensions of normative influence (value expressiveness and utilitarian behavior.) The 12-item scale was scored on a 7-point Likert-type scale ranging from 1 to 7 with descriptive anchors "Strongly Disagree" and "Strongly Agree". Sample items from the scale are, "I achieve a sense of belonging by purchasing the same products and brands that others purchase" (normative) and "I frequently gather information from friends and family before I buy (informational). The Cronbach alphas for the normative dimension and the informational dimension were .92 and .82, respectively.

Alternative Measurements of OL and CSII. We also devised an alternative method of operationalizing the two constructs (OL and CSII) using the network data itself. There are two main reasons for assessing our ideas in this alternative way. First, both opinion leadership and consumer susceptibility to interpersonal influence are self-reported, and this could lead to biases due to both common methods and social desirability. Instead, what we created are, in essence, others' views of a focal actor's opinion leadership and CSII, rather than the focal actor's view of him or herself. For instance, there may, or may not be, a difference between a high school freshman's perception of her own opinion leadership and susceptibility to social influence, and her peer's perception of her influence and susceptibility. Our two measurements allow us to examine influence from the actor's perspective and from others' perspectives. Along with asking each member about their degree of friendships with others, we asked them to rate every other member on a 7-point Likert type scale (1 – Never; 4 – Sometimes; 7 – Always) on the extent to which they would be persuaded by that particular member to participate in club XYZ's events and activities, and the extent to which they persuade that particular member to participate in club XYZ's events and activities. This way, we were able to track how much the focal actor was perceived by others to be susceptible to influence by each and every other member in the network and also assess the degree to which the focal actor was perceived by others to be influential in the network.

By transposing the two matrices such that columns become rows, and vice versa, we were able to assess the influence of the focal actor on others, and the influence of others on the focal actor, as perceived by the members of the network. Therefore, this measurement is not self-reported, but compiles the ratings of others in the network. We then created an index score for each member's susceptibility to influence (CSII-b, consumer susceptibility to interpersonal influence alternative) and his/her ability to influence (OL-b, opinion leadership alternative). CSII-b and OL-b were created by taking the average scores of every member's rating of the focal actor. It is reasonable that these index scores skew negatively, because not everyone in the network will know each other (when two people do not know each other, this was necessarily coded as a 0). Because our alternative variables were designed to measure the member's CSII-b and OL-b in relation to their immediate network, it was necessary to include all scores despite the large numbers of 0s in the matrix. These alternative measurements were designed to provide a more conservative test of our theory. We were concerned that the self-reported data on opinion leadership and susceptibility to interpersonal influence could be correlated due to similar social desirability biases or the need for consistency. Our alternative measures eliminate this concern.

Control Variables. Studies have shown that the extent to which people derive benefits from their structural positions in a social network may differ based on demographic differences (Mehra, Kilduff, & Brass, 1998). Hence, we controlled for age and gender in our study.

Data Analyses

The data was analyzed using both ordinary least squares (OLS) and multiple regression quadratic assignment procedure (MRQAP). Past researchers have noted the limitation of using OLS regression in network analyses, as network data do not fulfill the assumptions of independence of observation (Gibbons & Olk, 2003). MRQAP is a non-parametric alternative that allows us to test network data without violating the parametric assumptions associated with OLS regression (Krackhardt, 1993). However, for degree centrality, we can use OLS regression, as the number of ties a member is connected to do not depend on the entire structure of the network and can be assumed an individual, independent measure. However, for our other centrality measures, such as betweenness centrality, the centrality score is dependent on the structure of the entire network. Therefore, MRQAP analysis was necessary to run regressions involving betweenness centrality.

MRQAP accepts data in an actor-by-actor matrix form only. To use single column vector variables such as gender, age, opinion leadership, and consumer susceptibility to interpersonal influence, similarity, or difference matrices need to be created. For example, for vector attributes with binary (0,1) values (e.g., gender), a similarity matrix was created. If participant "X" matched the gender of participant "Y", the corresponding row and column received a score of 1. If there was no match in gender between actor X and actor Y, then the corresponding row and column received a score of 0. For each continuous variable, difference matrices were created. The difference matrix was calculated by taking the score of actor "X" and subtracting it from the scores of all of the other members. Then we take the next actor and subtract his/her score from all of the other members. The similarity and difference matrices are used in MRQAP regression (see Krackhardt, 1993 for further review).

Results

Means, standard deviations, and Spearman correlations are reported in Table 1. We used Spearman correlations, as these are non-parametric tests that do not assume independence of observations. In the sample of 75 respondents, there were 40 males and 35 females that participated in the study. The participants' ages ranged from 18-28, with an average age of 20.5. Average tenure of membership was 2.0 years, and all participants were the same race. Also, both the average of each respondent's out-degree score and the average in-degree score was 3.9, meaning that the number of close friends a person perceived themselves to have was equal to the number of people that nominated that person as a close friend.

Table 1 (Student's Network)

Overall Means, Standard Deviations, and Spearman Correlations

	M (SD)	1	2	3	4	5	6	7	8	9	10
1. In-Deg. Centrality	3.39 (2.32)	1									
2. Out-Deg. Centrality	3.39 (3.79)	.04	1								
3. Between. Centrality	.020 (.030)	$.53^{***}$	$.72^{***}$	1							
4. Opinion Leadership	4.23 (1.61)	-.19	$.33^{**}$	.12	1						
5. OL-b	1.34 (.228)	$.53^{**}$	.18	$.41^{***}$	-.13	1					
6. Norm. Influence	3.76 (1.27)	-.14	$.32^{**}$	$.26^{*}$	$.35^{**}$	-.06	1				
7. Inform. Influence	4.77 (1.06)	-.04	$.34^{**}$	$.32^{**}$	.22	-.03	$.47^{***}$	1			
8. CSII-b	1.35 (.315)	-.12	$.50^{***}$	$.34^{**}$	.22	.07	$.33^{**}$	$.24^{*}$	1		
9. Gender	n/a (n/a)	-.10	-.05	-.05	-.07	-.05	-.05	-.06	$-.24^{*}$	1	
10. Age	20.45 (1.86)	.11	.12	.14	-.10	.11	.10	$-.23^{*}$	.04	-.02	1

Significance levels: $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$.

Opinion Leadership

The data demonstrate a positive relationship between centrality and opinion leadership. For analyses involving degree centrality we used OLS regression, but for analyses involving betweenness centrality, we used MRQAP regression to test the significance of the relationship. As described above, we devised two distinct ways to measure and analyze opinion leadership. In analysis A, we used a self-reported scale to determine how each member evaluates their own degree of opinion leadership (OL-a) in the network. In analysis B, we assessed opinion leadership (OL-b) by taking the average score of the degree to which every other member in the network perceived the focal person to be influential regarding the club's events and activities.

In analysis A, out-degree centrality was positively associated with opinion leadership (OL-a) ($\beta = .18$), $t(74) = 3.84$, $p < .001$, and it explained a significant portion of the variance in the opinion leadership measurement ($R^2 = .20$), $F(4, 74) = 4.43$, $p < .01$. In-degree centrality was not a significant predictor of opinion leadership ($p > .05$). Betweenness centrality was positively related to OL-a ($\beta = 13.30$, $p < .01$). Please see Table 2 for the detailed analysis. In analysis B, we used MRQAP regression for all centrality measures, as we cannot assume independence of observations; MRQAP regression also overcomes the skewness of the distribution ($M = 1.34$), as the test does not assume a normal distribution.

In analysis B, degree centrality and betweenness centrality were both positively related to opinion leadership. More specifically, we found in-degree centrality is positively associated with OL-b ($\beta = .01$, $p < .05$). However unlike in analysis A, it was in-degree, not out-degree centrality, which significantly related to OL-b. When opinion leadership was self-reported (OL-a), it was out-degree that positively correlated with opinion leadership, whereas when opinion leadership is reported by other members in the network (OL-b), it is in-degree that positively correlates with opinion leadership.

Nevertheless, we found support for a positive relationship between degree centrality and opinion leadership. In addition, betweenness centrality was positively related to OL-b ($\beta = 1.41$, $p < .05$). Consistent with analysis A, this result supports the notion that betweenness centrality positively relates to opinion leadership (see Table 2).

Consumer Susceptibility to Interpersonal Influence (CSII)

Similar to opinion leadership, we devised two ways to measure and analyze consumer susceptibility to interpersonal influence. In analysis A, we used a self-reported scale to determine how each member rated their general susceptibility to interpersonal influence. In analysis B, we assessed CSII by taking the average score of how each member rated everyone else as being influential to them regarding the club's events and activities.

In analysis A we found that out-degree centrality is positively related to both the normative ($\beta = .12$), $t(74) = 3.21$, $p < .01$, and the informational ($\beta = .11$), $t(74) = 3.39$, $p < .01$, dimensions of influence. Out-degree centrality also explained a significant portion of the variance of the two dimensions: ($R^2_{\text{normative}} = .18$), $F(4, 74) = 3.86$, $p < .01$ and ($R^2_{\text{informational}} = .16$), $F(4, 74) = 3.44$, $p < .05$. There were no significant results for in-degree centrality ($p > .05$). Further examination revealed that betweenness centrality was positively related to both the normative ($\beta = 10.7$, $p < .05$) and informational ($\beta = 10.6$, $p < .01$) dimensions of CSII-a. In analysis B, we once again used MRQAP regression for all of our centrality measures for CSII-b. The results from analysis B are consistent with analysis A. Specifically, we found that out-degree centrality is positively correlated with

CSII-b (β = .02, $p < .01$), and betweenness centrality is positively correlated with CSII-b (β = 3.26, $p < .05$). Table 2 details these findings.

Table 2 (Student's Network)

Results of OLS and MRQAP Regression for Network Centrality → OL & CSII

	OL-a β	OL-b β	CSII-a β **(Inform.)**	CSII-a β **(Norm.)**	CSII-b β
	OLS	**MRQAP**	**OLS**	**OLS**	**MRQAP**
In-Degree / Out-Degree Centrality					
Gender	.01 (n.s.)	.00 (n.s.)	.06 (n.s.)	.02 (n.s.)	<.001 (n.s.)
Age	-.12 (n.s.)	.01 (n.s.)	-.11 (n.s.)	.10 (n.s.)	.01 (n.s.)
In-Degree Centrality	-.12 (n.s.)	.01 *(.015)*	-.03 (n.s.)	-.12 (n.s.)	-.002 (n.s.)
Out-Degree Centrality	.17 *(.000)*	.00 (n.s.)	*.11* *(.001)*	*.12* *(.002)*	*.02* *(.000)*
R^2	.20	.09	.16	.18	.39
Betweenness Centrality					
Gender	.00 (n.s.)	.00 (n.s.)	< .001 (n.s.)	< .001 (n.s.)	< .001 (n.s.)
Age	-.03 (n.s.)	.01 (n.s.)	-.11 (n.s.)	.091 (n.s.)	.01 (n.s.)
Betweenness Centrality	*13.3* *(.002)*	*1.41* *(.045)*	*10.6* *(.004)*	*10.7* *(.011)*	*3.26* *(.010)*
R^2	.09	.04	.15	.09	.10

Note: Unstandardized regression coefficients are shown. The significance levels are shown in parentheses (Inform. – Informational Influence; Norm. – Normative Influence).

Discussion

Overall, the results support our idea that social network centrality is positively correlated with both opinion leadership and consumer susceptibility to interpersonal influence. For opinion leadership, we found, perhaps not surprisingly, differential effects between out-degree and in-degree centrality on self-reported scale measures (versus a network measure) on our two dependent variables. Our results show that people think of themselves as opinion leaders if they perceive that they are popular (central) in the network. However, those looked to as opinion leaders are only those who are viewed by others as central. Additionally, the results show that network centrality and susceptibility to others' influences positively co-vary, and we found that those who perceive themselves as central (out-degree) are those who are most susceptible to interpersonal influence. We suspect this is because as central consumers are exposed to a greater variety of information from different interest groups, they must somehow absorb this information in order to maintain ties, and thus maintain their central position. There are differences between out-degree and in-degree centrality, and individuals who are betweenness central were more influential *over others*, but were also likely to be influenced *by others*.

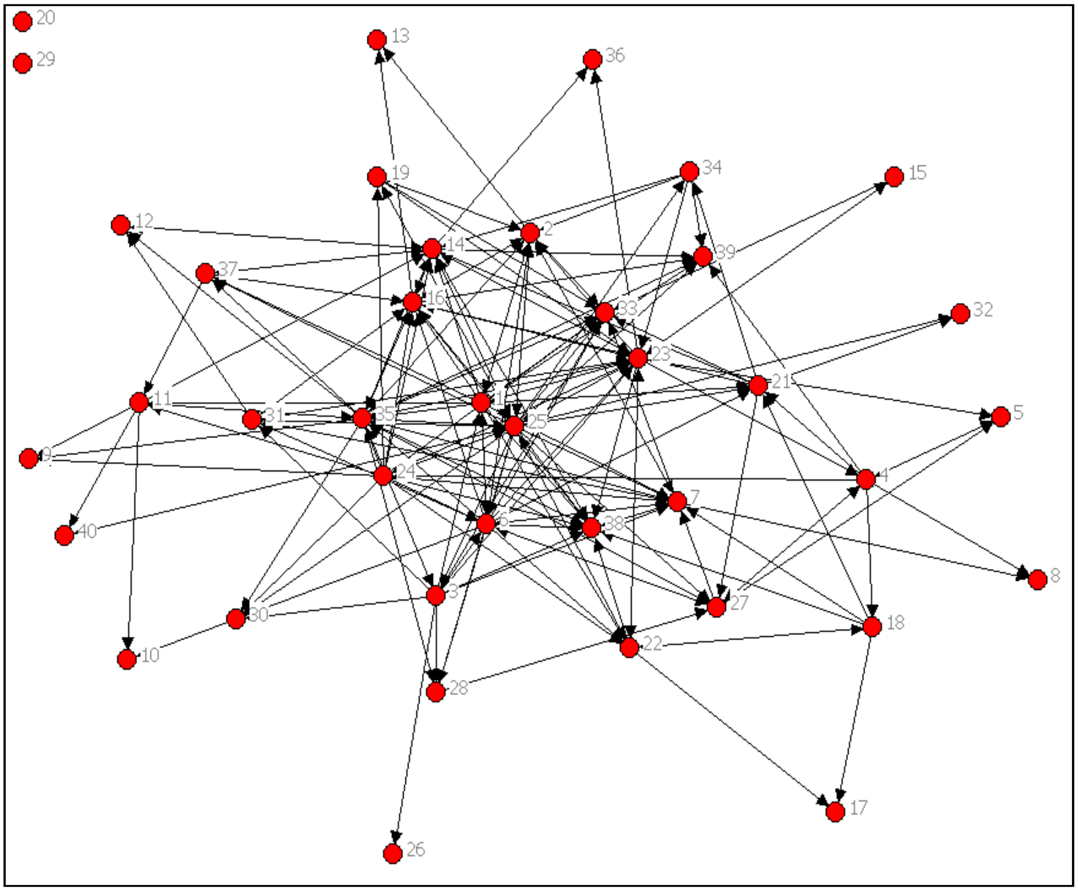
Our alternative measures of OL and CSII are novel, and we recognize the limitation of conducting a study of influence within one racial/national group (all members of the social club were from the same Asian country). In addition, as our response rate was 60%, we felt that our measures of network centrality were inevitably affected by non-response. We conducted a second network study to further validate our alternative measures of OL and CSII, increase response rate, and increase external validity using a different type of social network.

Study 2

We collected data from a group of 40 members from a Seniors activity club (SAC) located in a city in central Canada. This club provides senior citizens with opportunities to socially connect with other seniors in the local neighborhood area (a diagram of the network is presented in figure 1). In this club, seniors are required to pay a membership fee at the beginning of each calendar year to have access to the services and activities offered by the club. Some of the services offered by the club include shopping trips, bingo nights, coffee socials, and holiday season parties. This replicates the type of social events and activities we assessed in study 1.

Figure 2

Seniors Activity Club Network Diagram



Note:
Participants 20 and 29 indicated that they had no close friends in the network. The directions of the arrows indicate the direction of the nomination. For example, 18 considers 17 to be a close friend, however 17 does not consider 18 to be a close friend. For double arrows (e.g. 16 ← → 23), this indicates that both members nominated each other as a close friend.

We collected our data using a paper-and-pen questionnaire that was prepared for all 40 members of SAC. To encourage participation, we provided cash incentives to both the club and the participants ($5 to the participant and $7 to the club for every survey returned). In total, 30 of the 40 seniors completed and returned the questionnaire (a response rate of 75%), which is quite reasonable for examining social network structure (Burt & Minor, 1983). Our research design and procedures remained similar to those we outlined in study 1. Particularly, we were interested in replicating the results for our alternative measurements of our key dependent variables (OL-b & CSII-b). We added additional control variables to our study, including years of club membership and expertise (Flynn & Goldsmith, 1999; $\alpha = .91$), age, and gender.

Results

Means, standard deviations, and Spearman correlations of the relevant variables are reported in table 3. In the sample of 30 respondents (24 female), the average age was 75.7 and the average tenure of club membership was 6.5 years. The average of each respondent's out-degree score was 6.1, while the average in-degree score was 6.1.

Table 3 (Seniors Network)

Overall Means, Standard Deviations, and Spearman Correlations

	M (SD)	1	2	3	4	5	6	7	8
1. In-Deg. Centrality	6.13 (3.41)	1							
2. Out-Deg. Centrality	6.13 (5.66)	$.51^{**}$	1						
3. Between. Centrality	0.26 (0.33)	$.65^{**}$	$.90^{**}$	1					
4. OL-b	1.78 (.51)	$.84^{**}$	$.57^{**}$	$.61^{**}$	1				
5. CSII-b	1.99 (.71)	.19	$.67^{**}$	$.62^{**}$	.32	1			
6. Gender	n/a (n/a)	-.01	-.10	-.03	.11	-.13	1		
7. Age	75.7 (7.99)	-.08	-.33	-.19	-.14	-.32	.20	1	
8. Member	6.50 (4.59)	$.46^{*}$	$.42^{*}$	$.36^{*}$	$.41^{*}$	.10	-.05	-.09	1

Significance levels: $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$

We found similar results for the influence of the social network on consumers, offering encouraging evidence of a more generalizable finding across the two studies. Despite research which suggests older consumers may have unique decision making processes (Yoon, Cole, & Lee, 2009), we find converging results between the student group and the elder group. Replicating study 1, in-degree centrality was positively related to OL-b (opinion leadership) ($\beta = .11$, $p < .001$) and out-degree centrality was positively related to CSII-b (susceptibility to interpersonal influence) ($\beta = .12$, $p < .001$). Betweenness centrality was again positively related to both opinion leadership ($\beta = 7.02$, $p < .01$) and susceptibility to interpersonal influence ($\beta = 10.98$, $p < .01$). Overall, we found consistent results using the same alternative operationalization of opinion leadership and consumer susceptibility as we did in study 1. This provides further evidence for our proposed relationships. Results of study 2 are shown in table 4.

Table 4 (Seniors Network)

Results of MRQAP Regression for Network Centrality → OL-b & CSII-b

	OL-b β	CSII-b β
	MRQAP	**MRQAP**
In-Degree / Out-Degree		
Gender	.00 (n.s.)	.00 (n.s.)
Age	.00 (n.s.)	-.01 (n.s.)
Years of Membership	.00 (n.s.)	-.02 (n.s.)
Expertise	.10 *(.039)*	-.04 (n.s.)
In-Degree Centrality	.11 *(.000)*	-.01 (n.s.)
Out-Degree Centrality	.01 (n.s.)	.12 *(.000)*
R^2	.72	.69
Betweenness		
Gender	.00 (n.s.)	.00 (n.s.)
Age	-.01 (n.s.)	-.03 (n.s.)
Years of Membership	.11 (n.s.)	-.01 (n.s.)
Expertise	.02 (n.s.)	.00 (n.s.)
Betweenness Centrality	7.02 *(.003)*	10.98 *(.002)*
R^2	.42	.33

Note: Unstandardized regression coefficients are shown. The significance levels are shown in parentheses.

General Discussion

This research is among the first studies in consumer behavior to examine the effects of centrality on social influence variables from a social network perspective. Our study differs from, and provides a contribution to, the extant literature by recognizing that there are unique opportunities and advantages from occupying certain structural positions in a social network. Overall, the results of our research generally support the notion that occupying a central position in a network is related to the degree to which individuals are opinion leaders and are susceptible to influence. That is, while these individual differences are important, network structure also influences them. The context of the social situation helps create them.

With regards to opinion leadership, our finding that betweenness centrality is positively related to opinion leadership confirms our prediction that brokers of the network, who are structurally located advantageously to span across unconnected individuals or subgroups, are those who will be most influential in the network, as they hold a unique position which allows them to reach others with optimal efficiency. Therefore, we highlight the importance of occupying a structurally advantageous position for influence in the social network.

Regarding degree centrality, we found out-degree (but not in-degree) centrality to be positively related to opinion leadership, but only when opinion leadership was self-reported. We also found in-degree (but not out-degree) centrality was associated with opinion leadership when opinion leadership judgments were taken from the other people in the network. We replicated these findings in both of our network studies. This discrepancy in our findings can be explained using a social constructivist argument. Numerous studies in social psychology have purported that social perceptions create social realities (Jussim, 1991). Individuals tend to create beliefs, stereotypes, and expectations about reality largely based on their own perceptions about reality. We feel that the differences in our results are explained by the contrasting methods we deployed to measure opinion leadership. When opinion leadership was measured by a self evaluation of one’s degree of influence in the network, we found only out-degree centrality to be positively significant. We believe that the degree to which individuals perceive themselves to be popular among their friends (the number of close friends people perceive they have within the network) is a reflection of how much influence they believe they have on the network. In other words, the extent to which people feel that they are influential is largely based on their perception of their own popularity within the network. Therefore, it is reasonable to believe that people will rate themselves higher as an opinion leader if they perceive that they have more friends over whom they can exert their influence.

On the other hand, when opinion leadership was measured using the network data, we found only in-degree centrality to be positively significant. Social psychologists have also acknowledged that people’s errors and mistaken beliefs may also create what appears to be a social reality even though these perceptions may not accurately reflect reality (Jussim, 1991). In other words, perceptions may not always reflect reality, which explains why we did not find consistent results between the two methods. What we can conclude is that the opinion leaders (as rated by others), who actually hold the power of influence over others, are those who were most frequently nominated as close friends by their peers in the network. But when individuals believe that they are opinion leaders, it is largely because they perceive themselves to be popular (they believe they have many close friends). However, those that were voted often by others as close friends were people who were considered to be most influential by others in the network, that is, who were most likely to influence consumer behavior.

While the overall concept of studying the relationship between centrality and opinion leadership may not be novel (e.g., Burt, 1999), one important contribution from our studies is that the extent to which people perceive themselves as opinion leaders, or are considered by others to be opinion leaders, is dependent on whether they perceive themselves to be popular (out-degree centrality) or are rated by others as popular (high in-degree centrality) in the network. Beyond its theoretical interest, this has practical implications for how we measure opinion leadership.

Turning now to consumer susceptibility to interpersonal influence, we again found converging results between the two operationalizations. Overall, we found that out-degree centrality and betweenness centrality were positively related to susceptibility to influence. When consumers self-reported their susceptibility to influence, we found out-degree and betweenness centrality to positively predict both dimensions (informational and normative) of CSII. We also found similar results for our alternative measure of CSII, as both out-degree and betweenness centrality were positively and significantly related to the extent which individuals were influenced by others. Our results suggest that those who perceived themselves as having many close friends, as well as those who actually hold brokering positions in the network, were those that were most susceptible to influence.

This susceptibility to influence result has very interesting implications. Previous research has posited the idea that those generally in the periphery of the network are those that look for support from others to gain acceptance and to enhance their social reputation (Burt, 1999). As these periphery actors do not have much leverage in the network, it seems intuitive that these individuals would be more willing to adopt the behaviors of others or comply with the expectations of others. However, the results of our study reveal that people who hold central positions, not peripheral positions, are those that were most susceptible to influence. Individuals in central positions are motivated to maintain their structural status, as this provides them with many benefits such as popularity, power, prominence, and influence (Bonacich, 1987). Because individuals in these central positions have a vested interest in protecting their structural position, it is reasonable that they need to be open to influence. When individuals in peripheral positions do not succumb to interpersonal pressures or influence, the consequences to their structural status in the network is relatively minor. For individuals in highly central positions, the social consequences can be more severe. For example, someone with high centrality, who bridges and appeals to different individuals/subgroups within the network, must be open to the influential pressures of these individuals/subgroups to maintain ties and structural position. A resistance towards such influence could possibly weaken or harm relationships.

Because relationships with unproductive contacts tend to expire over time (Burt, 2000), it is necessary for individuals to actively keep interpersonal relationships with others in the social network. This may require individuals, particularly those in highly central positions, to become more open to influence as they have the responsibility of balancing their flow of influence from different parts of the network. Therefore, contrary to what is expected from the prior literature, we demonstrate that even the most popular individuals are susceptible to influence.

Limitations and Directions for Future Research

Our research has several limitations. The main one is inherent in the correlational data we collected with our survey methodology. We did not argue herein, nor could we establish, the causal direction between network position and influence. Future research could explore the very interesting question of whether network position itself causes the degree of influence we saw here, or whether having a higher degree of influence causes one's position in the social network. This is a difficult issue to address, but could yield intriguing process-level understanding.

Second, as with other network studies in consumer behaviour, our study is limited within the context of the artificial boundary of the social networks. The extent to which people influence or become influenced can obviously be dependent on factors external to these networks. Although we acknowledge the limitations of network analysis, we believe that the benefits of understanding the structural element of networks overcome the problems of the artificial boundary. Third, we acknowledge that people have different definitions of who they consider others as a close friend versus a friend or an acquaintance. Therefore, our network may have been affected by differences in individuals' interpretation. Finally, we acknowledge the limitation of obtaining self-reported data of opinion leadership (OL-a) and consumer susceptibility to interpersonal influence (CSII-a) with regards to common methods bias. However, we believe we overcame these limitations by designing alternative opertationalizations (OL-b and CSII-b) and demonstrating their effectiveness in two disparate networks.

Despite these limitations, in addition to our theoretical contributions, we provide a contribution to the marketing literature from a methodological standpoint. Specifically, we demonstrate how social network analysis can identify the quantitative structural properties of networks that cannot be realized from the study of individuals' characteristics or from traditional dyadic analysis. Other marketing studies that have attempted to capture relational data using traditional sample survey methodology and the use of retrospective data suffer from inaccurately describing properties of networks and connections between individuals (Reingen & Kernan, 1986). Some marketing studies attempting to study networks have simply gathered information on the characteristics of networks such as size, frequency of interaction, or relationship type from the perspective of the focal actor (Webster & Morrison, 2004). One of the strengths of this study is that this is one of the first studies in consumer behavior to examine the structural properties of networks. Because interpersonal influence is a social phenomenon, the structural properties of individuals' networks are an important part of understanding the parameters of social influence.

Past network studies have shown that networks are especially important for referrals on small market services such as piano tuners and teachers, where objective information is difficult to acquire from media channels (Brown and Reingen 1987; Reingen and Kernan 1986). While their focus was on the strength of ties between people, we extend these previous works by suggesting that one's structural position plays a key role in whether information and influence is transmitted across the network. In other words, an actor's position in a network has a differential effect above and beyond the strength of dyadic relationships. Therefore, the next step in this research domain is to integrate the relational perspective (strength of ties) and the structural perspective (actor's position) to study network phenomena in consumer behavior.

Future studies should be devoted to extending our research by examining a different sample or group to improve the generalizability of the results. One of the fascinating ways in which researchers could extend this study is by examining online social network communities (Kozinets, 2002). Currently, the literature on online communities has largely ignored the interplay of social networks and interactions with these communities (Van Den Bulte & Wuyts, 2007). As peer-to-peer consumer virtual networks (e.g. Facebook) and computer mediated communication continues to grow (Schlosser, 2009), this issue of understanding the flow of influence in a virtual context is gaining in importance and relevance for both consumers and marketers. Therefore, it would be fruitful to examine how centrality plays a role in these online communities not only to improve the generalizability of the results, but also to explain the phenomena behind network structures and an individual's involvement in off and online communities.

Recent research has also shown that in group settings, the degree of WOM behavior in which one engages depends on the strength of ties that members have with each other (Ryu & Han, 2009). Future research could also extend this framework longitudinally to capture the development of networks, and how a change in the composition of ties and structures over time affects WOM behavior, as well as other social and marketing variables. The use of a social network methodology can assist marketers in identifying the key figures they could convey their ideas to, and in turn, reap the benefits of positive WOM as they diffuse those ideas to the rest of the network.

Additionally, the results from our study could also be extended to lend further insights into issues beyond the consumer behavior discipline. Our findings, which include highlighting important features about centrality and showing the differential effects of the individual's perception versus others' perceptions, could have ramifications in the political realm, business organizations, and even in academic communities. While our focus was strictly on consumers, future research can devote to exploring these relationships in other research domains.

Concluding, we extend the field's knowledge by demonstrating how network centrality plays a role in the consumer's degree of influence on other consumers, and others' influence on a consumer. We find that being central in a network is one of the ways in which people can diffuse information into the network. Understanding that centrality is also associated with susceptibility to influence (that is, that the group influences the central actor too), researchers and marketers can utilize this information to predict adoption behaviors of individuals in the network.

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Essay 1 provided a framework for understanding the association between network centrality and the flow of consumer influence. Having demonstrated this relationship, the next essay investigates *how* information is gathered and *what types* of information are gathered by those who occupy these central positions (either degree or betweenness). Information-seeking behavior is critical to consumer decision-making, and thus, it has always been a key interest to marketers (Beatty & Smith, 1987). Essay 2 provides insights into the relationship between network centrality and consumers' information-seeking behavior.

Essay 2

Asking About You and Asking About Me: Information-Seeking in Networks

Consumers seek information from other consumers on a daily basis. Within a consumer's social network, information about products is constantly being shared, in turn affecting subsequent purchase behaviors (Flynn, Goldsmith, & Eastman, 1996; Kiel & Layton, 1981). Consumers often search for and ask others for information in order to reduce uncertainties in their decision-making process (Cox, 1967; Hansen, 1972). The importance of social communication in explaining consumer behavior has been highlighted across a wide variety of research streams (e.g., Childers, 1986; Price & Feick, 1984). From prior research, we know that consumers tend to rely on their interpersonal networks (like a social network of friends) as resources for product information, evaluations, and recommendations to make better purchase decisions (Brown & Reingen, 1987; Gershoff, Broniarczyk, & West, 2001). However, the literature is less clear when it comes to explaining how individuals' social network positions may influence their information-seeking behavior (a use of their social capital) in these networks. The goal of this research is to examine this phenomenon.

Consumers rely on their social networks because they believe their friends can provide suggestions that are in line with collective attitudes and preferences (Brown & Reingen, 1987; Gershoff & Johar 2006). For example, a worried consumer gains comfort by seeking information from someone they know and trust (Beatty & Smith, 1987). Research has also shown that consumers seek information from others because there are select individuals (e.g., opinion leaders and market mavens) who have exclusive knowledge and/or access to unique information (Childers, 1986; Feick & Price, 1987).

Given the seeming importance of social networks in a consumer's information search process, it is surprising that research in this area has failed to consider the possible effect of the consumer's network position on information-seeking behavior. Unfortunately, most of the previous network studies in consumer behavior have focused on consumer-to-consumer dyadic relationships, largely ignoring the structural dimensions of the network (and thus the social capital) that encompass these relationships. In other words, it is not simply a consumer's membership in a social network but that consumer's *location* within the network that affects information-seeking behavior. In this area of study, certain questions remain unanswered: Will a unique network position increase or decrease a consumer's information-seeking behavior? Will the information-seeking behavior of consumers, and the type of information they seek, be any different because of their social network position? These research questions suggest that, as a discipline, we do not have a thorough understanding of how social network positions influence the information-seeking behavior of consumers.

This research contributes to the extant literature in multiple ways. First, field studies of multiple social networks reveal that consumers in central network positions (versus peripheral network positions) exhibit greater information-seeking behavior. Moreover, the latter study demonstrates that consumers differ in the *type* of information they seek, based on their unique network positions (degree or betweenness). In particular, certain network positions appear to be more related to seeking information about one's own behavior, while other positions are more related to seeking information about the consumer behavior of others. Importantly, this essay advances the marketing field's comprehension of the information-seeking behaviors of consumers and further contributes to marketers' understanding of the burgeoning domain of consumer networks.

Information-Seeking in Networks

Network theories have been applied to a wide range of marketing issues, including diffusion and adoption of products and services (Brown & Reingen, 1987), word-of-mouth communication (Duhan et al., 1997), and information search and acquisition (Granovetter, 1973). Brown and Reingen (1987) and Reingen and Kernan (1986) found that networks are especially important for small market services, such as piano tuners and teachers, where objective information is difficult to acquire from media channels. These studies support the general notion that people rely on interpersonal contacts as a way to inquire about services and acquire information (Beatty & Smith, 1987).

Research in consumer behavior has begun to appreciate the importance of studying consumers' positions in social networks and the unique benefits associated with occupying advantageous positions (Kratzer & Lettl, 2009; Lee, Cotte, & Noseworthy, 2010; Van den Bulte & Wuyts, 2007). An individual's structural position affects their attractiveness as network members, the amount of access and the frequency of contact they have with other members in the network, and the power they have over others, all of which should influence the degree of interaction and information-sharing that occurs within a network (Blau, 1964; Ibarra, 1993; Marsden, 1990). In other words, because individuals are motivated to maximize the benefits of social relationships, occupying an advantageous network position will help consumers to accomplish these goals (Molm & Cook, 1995).

As mentioned, networks facilitate access to information, resources, and opportunities (Burt, 1992). Social structure can augment or restrict who has access to what information, subsequently affecting individual behavior and variation in sharing (Carley, 1986; Sirsi, Ward, & Reingen, 1996). Within a consumer's social network, there are network positions that provide individuals with privileged access to important social capital resources (Kratzer & Lettl, 2009). One of the ways consumers can achieve privileged access to these resources is to become *central* (either degree or betweenness) in a social network (Freeman, 1979; Lee, Cotte, & Noseworthy, 2010, refer to the introductory chapter for a comprehensive review on network centrality).

Theoretical Development

There are reasons to believe that individuals occupying high degree central positions and betweenness central positions will exhibit higher information-seeking behavior. *Degree* central consumers have a larger *quantity* of network connections by definition, which allows them to become a social hub for acquiring greater amounts of information (Goldenberg et al., 2009). These individuals tend to have more access to other network members, and thus, they possess the advantages of acquiring information and resources (Mehra et al., 2006). Further, researchers have shown that individuals in high degree central positions have the ability to facilitate the transfer of complex knowledge, as well as having greater willingness and motivation to invest time and effort in sharing knowledge with close others (Reagans & McEvily, 2003). Finally, these individuals are better positioned to identify other network members who will be useful to them (e.g., experts) and whose information is likely to be reliable (Borgatti & Cross, 2003).

Betweenness central individuals are also in an advantageous position to seek information from others within their networks. As connecting brokers of the network, individuals in high betweenness central positions have shorter paths (better access) to many diverse others in the network (Mehra et al., 2001). That is, these individuals are in a better position to seek diverse information from different, often far-flung, parts of the social network. Consequently, they may benefit from seeking non-redundant information from unconnected parts of their network, which they can, in turn, use to create advantage for themselves (Burt, 1992; Granovetter, 1973). Given this enhanced opportunity to interact with the diverse social sub-groups that are contained within the network, individuals in high betweenness central positions can take advantage of this information and resources. Therefore, it is predicted that individuals in these advantageous network positions will exhibit higher information-seeking behavior. Study 3 is designed to test this prediction.

Study 3

Data were collected using social network analysis (Scott, 2000). There are several advantages of using network analysis to examine patterns of information-seeking behavior. First, because the data is based on collecting information about "who is connected to whom" and "who asks information from whom," this method allows researchers to identify sociometric information and the degree to which people ask for or receive information regarding a specific topic domain (Valente & Rogers, 1995). Reingen and Kernan (1986) suggest that when network data is used, researchers are able to explicate and include interpersonal relationship components in the analysis, one of the shortcomings of traditional sample survey methodology. Another advantage of this method stems from its ability to identify key actors (e.g., centrality) in the network (Borgatti, 2006). Hence, network analysis is ideal for locating and identifying the key actors and the information-sharing that occur in social networks.

Data were collected from 36 members of a seniors' club in a medium-sized North American city. Members of this club must be over the age of 55 and must pay a membership fee at the beginning of each calendar year in order to have access to the services and activities offered, including bingo/euchre nights, gardening seminars, arts and crafts nights, potlucks, etc. This club was designed to provide seniors who live in a specific apartment complex with the opportunity to socially connect and interact with other seniors in the complex. Prior to the data collection, the primary researcher met with the club's executive to identify the names of those who were considered to be regular participants. This identification process ensured that the data collected were from those who were active in the network (omitting those who were official members but who did not take part in any of the club's activities). All 36 of the identified members did complete the survey.

Data were collected using a paper-and-pen questionnaire. To encourage participation, cash incentives ($10) were provided. All registered and active members completed the survey, yielding a 100% response rate from the entire active social network.

Measures

Network data were collected using the roster method, a technique that is widely used in social network research (Wasserman & Faust, 1994). Participants were provided with an alphabetical listing of the names of all club members. Then, each person was asked to rate their relationship strength (1 – do not know/barely know; 2 – acquaintance; 3 – friend; 4- close friend) with every other member in the club (Lee et al., 2010). Providing a roster of participants to respondents helped overcome potential recall bias and is considered to be a more reliable method of network data collection, compared to asking respondents to come up with names on their own (Wasserman & Faust, 1994). This method is consistent with previous network studies in marketing, and it is useful in identifying the overall structure of the network and the extent of a member's network centrality (Lee et al., 2010).

Network Centrality. Network data was arranged in an N×N binary matrix (Wasserman & Faust, 1994). Each cell X_{ij} in this matrix corresponds to i's relation to j as reported by i. Thus, based on the network data, a 36×36 network matrix was created to calculate the network centrality scores of each participant in the network. Symmetric data for the matrix was then created such that a friendship was coded as a 1 when both individuals identified each other as a friend (rating of 3 or more). For all other responses, the relationship between the dyad was coded as 0. A cut-off point of 3 was specifically chosen to achieve the analysis of strong-tie networks (Sirsi et al., 1996).

Degree centrality was calculated by totaling the number of links each member had with other members in the network. While it is true that relationships can be outgoing (the extent to which the focal actor identified the other 35 members as a friend) or incoming (the extent to which the focal actor is identified by the other 35 members as a friend), the data were made symmetric in order to examine only those friendship relationships that were reciprocated. In addition, a separate analysis involving outgoing ties and incoming ties revealed a correlation of .76 ($p < .001$), suggesting that most of the relationship ties in this network were indeed reciprocated.

For betweenness centrality, the 36×36 relationship matrix was entered into a network software program called UCINET (Borgatti, Everett, & Freeman, 2007). As a first step, differences in the betweenness centrality scores were obtained for each of the participants and were compared to every other member in the matrix. The creation of these centrality-difference scores was necessary in order to analyze the data using multiple regression quadratic assignment procedure, (MRQAP) (see Krackhardt, 1993 for a review). Details are elaborated further in the data analyses section.

Information-Seeking (IS-a). For our dependent variable, an overall trait measure of information-seeking behavior was measured using a 6-item, opinion-seeking scale developed by Flynn et al. (1996). The scale was recorded on a 7-point, Likert-type scale ranging from 1 to 7, with descriptive anchors “Strongly Disagree” and “Strongly Agree.” Although the original scale items included reverse-coded items, research has shown that reverse-coded items are subject to unexpected factor structures (Netemeyer, Bearden, & Sharma, 2003). Thus, all negatively worded questions were converted into positively worded questions in order to better achieve a unidimensional factor. Confirmatory factor analysis revealed that the remaining 4 items all loaded .78 and higher with adequate fit (CMIN/DF = 1.04, NNFI = .89, CFI = .99, RMSEA = .011), thereby indicating unidimensionality. Please see Table 5 for all of the scale items associated with Essay 2.

Table 5

All Relevant Scale Items for Essay 2

Scale Items (Study 3)	EFA	CFA
Opinion Seeking Scale (IS-a, Flynn et al., 1996)		
Cronbach's Alpha (α = .94)		
1. When I consider participating in the events and activities of the seniors' club, I ask other people for advice.	.87	.88
2. I like to talk to others before I participate in the events and activities of the seniors' club.	.90	.92
3. I always ask other people about events and activities of the seniors' club.	.87	.91
4. I like to get others' opinions before I participate in the events and activities of the seniors' club.	.88	.89
5. I feel more comfortable participating in the events and activities of the seniors' club when I have gotten other people's opinion on it.	.86	.86
6. When choosing what events and activities of the seniors' club to participate, other people's opinions are important to me.	.85	.87
Subjective Knowledge (covariate, Flynn & Goldsmith, 1999)		
Cronbach's Alpha (α = .83)		
1. I know a lot about events and activities of the seniors' club.	.88	.93
2. I feel very knowledgeable about events and activities of the seniors' club.	.92	.98
3. Among my circle of friends, I know more about events and activities of the seniors' club.	.84	.79
4. Compared to most other people, I know more about the events and activities of the seniors' club.	.90	.89
5. When it comes to events and activities of the seniors' club, I really know a lot.	.88	.94

Table 5 (Continued…)

All Relevant Scale Items for Essay 2

Scale Items (Study 4)	EFA	CFA
Opinion Seeking Scale (IS-a, Flynn et al., 1996)		
Cronbach’s Alpha (α = .88)		
1. When I consider cooking recipes, I ask other people for advice.	.76	.79
2. I like to talk to others about recipes before I cook.	.81	.83
3. I always ask other people about cooking recipes.	.76	.80
4. I like to get others’ opinions on cooking recipes.	.83	.88
5. I feel more comfortable cooking recipes when I have gotten other people’s opinion on it.	.80	.86
6. When choosing cooking recipes, other people’s opinions are important to me.	.76	.70
Subjective Knowledge (covariate, Flynn & Goldsmith, 1999)		
Cronbach’s Alpha (α = .89)		
1. I know a lot about cooking recipes.	.91	.88
2. I feel very knowledgeable about cooking recipes.	.70	.68
3. Among my circle of friends, I know more about cooking recipes.	.85	.86
4. Compared to most other people, I know more about cooking recipes.	.87	.81
5. When it comes to cooking recipes, I really know a lot.	.86	.84

Information-Seeking (IS-b). Going beyond the trait measure, an alternative method of operationalizing the information-seeking construct was created using the network data itself (see Lee et al., 2010). In addition to asking each member about the status of their friendship with other members, each participant also rated every other member on a 7-point Likert scale (1-never, 4-sometimes, 7-always) concerning the frequency with which they seek information from that particular member about events and activities of the seniors club. This rating provides a direct measure of information-seeking behavior using the network data, and even though it is a single-item measure, research suggests that one-item network measures are largely reliable when the roster method is used to aid an individual's recall (Marsden, 1990). Then, the average score of what the individual rated for every other member was calculated to create an index score to represent the frequency with which that individual seeks opinions from their network.

Information-Seeking (IS-c). A shortcoming of the aforementioned measures is that both scales are susceptible to common methods bias and social desirability bias. Thus, a third measure was developed to collect other people's views of the person's information-seeking behavior. In collecting this measure, each individual was asked to rate every other member on a 7-point Likert scale (1 – never, 4 – once a week, 7 – every day) concerning the frequency with which they are approached for information (events and activities) by that particular member. Then, an information-seeking index score was created by transposing the matrix, such that columns became rows and vice versa (Lee et al., 2010, see Essay 1). This method provides a score that is based on others' rating of that person. Thus, this measure is not self-reported, since it is a compilation of the information-seeking ratings of the focal person by every other member in the network.

Analyses

The data were analyzed using ordinary least squares regression (OLS) and multiple regression quadratic assignment procedure (MRQAP). For any regressions involving betweenness centrality, MRQAP was used to analyze the data. Since betweenness measures depend on the structure of the network (not just on the number of ties), the data are therefore not independent of each other. MRQAP is a non-parametric technique that allows researchers to analyze network data without the standard independence assumptions associated with OLS regressions (Dekker, Franses, & Krackhardt, 2003), and its use is consistent with previous research on betweenness centrality. For degree centrality, a standard OLS regression was used, as the number of ties that a member has does not depend on the structure of the network itself. Further, research has shown that varying levels of consumer knowledge may have an effect on an individual's motivation to seek out information from others (Selnes & Troye, 1989). Thus, for each of the analyses, the subjective knowledge of the seniors' club (Flynn & Goldsmith, 1999) was included as a covariate.

Results

Of the 36 members, 12 were male and 24 were female. The participants' ages ranged from 55 to 93, with a mean age of 75.6 (SD = 9.9) years. The average tenure of club membership was 6.2 years (SD = 4.6). The average number of network ties for each participant was 11.5 (SD = 7.4). Means, standard deviations, Cronbach's alpha, and Spearman correlations of the variables of interest are reported in Table 6.

Table 6 (Seniors Club)

Overall Means, SD, and Correlations

	M (SD)	1	2	3	4	5	6
1. Degree Centrality	11.47 (7.45)	1					
2. Betweenness Centrality	0.12 (0.02)	$.85^{**}$	1				
3. IS-a	3.41 (1.73)	$.46^{**}$	$.46^{**}$	1			
4. IS-b	2.22 (1.10)	$.57^{**}$	$.57^{**}$	$.54^{**}$	1		
5. IS-c	1.51 (0.27)	$.68^{**}$	$.73^{**}$	.20	.27	1	
6. Knowledge	3.51 (1.64)	-.02	.01	.14	.08	-.13	1

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Overall, there was a positive relationship between network centrality and all three measures of information-seeking behavior. *Degree centrality* was positively associated with information-seeking behavior ($\beta_{\text{IS-a}} = .37$, SE=.04), $t = 2.29$, $p < .05$, ($\beta_{\text{IS-b}} = .52$, SE=.02), $t = 3.59$, $p < .01$ and IS-c ($\beta_{\text{IS-c}} = .82$, SE=.01), $t = 8.17$, $p < .001$. Degree centrality also explained a significant portion of the variance of the three OS measures, ($R^2_{\text{IS-a}} = .17$), $F(1,35) = 3.35$, $p < .05$; ($R^2_{\text{IS-b}} = .30$), $F(1,35) = 6.93$, $p < .01$; and ($R^2_{\text{IS-c}} = .57$), $F(1,35) = 21.95$, $p < .001$. *Betweenness centrality* was also positively associated with information-seeking behavior ($\beta_{\text{IS-a}} = .32$, $p < .05$, $R^2 = .13$), IS-b ($\beta_{\text{IS-b}} = .47$, $p < .01$, $R^2 = .27$), and IS-c ($\beta_{\text{IS-c}} = .51$, $p < .01$, $R^2 = .29$). Detailed results of these findings are reported in Table 7.

Table 7 (Seniors Club)

OLS/MRQAP Regression Results

	IS-a	IS-b	IS-c
(OLS)			
Knowledge	.21	.19†	.00
Degree Centrality	.08*	.07**	.03**
R^2	.17	.30	.57
(MRQAP)			
Knowledge	.13	.11	-.02
Betweenness Centrality	24.30*	22.28**	5.88**
R^2	.13	.27	.31

Unstandardized regression coefficients are shown. The significance levels are shown in parentheses.
*Significance levels: *** p < .001, ** p < .01, * p < .05*

Discussion

In this study, the data reveal a positive relationship between network centrality (degree and betweenness) and each of the three information-seeking behavior measures. Importantly, this study shows that unique opportunities and advantages arise from occupying a central position in a social network, and the results from this study of a seniors' network support the notion that occupying a central position is related to a consumer's propensity to seek information from others in the network. Since information is a part of social capital, these results once again demonstrate that network position has a relationship to the building and sharing of social capital.

Moreover, individuals in these unique central positions may differ in the *type* of information they seek from other network members. While Study 3 revealed the positive relationship between centrality and one's propensity to information-seek, the next study is designed to explore the type of information that degree central and betweenness central individuals seek from other network members. This information is crucial for marketers, as they try to get a sense of what type of product information and recommendations flow within consumer networks.

When looking for feedback from others, individuals can seek information about their *own* consumption behavior (e.g., asking for opinions on a product they have purchased), or they can seek information about *others'* consumption behavior (e.g., asking for opinions about a product purchased by a friend). While both forms of information-seeking may create social capital, it is expected that a certain type of network position (degree or betweenness) may predispose consumers in those positions to seek one type of information more so than the other. Study 4 is designed to test this phenomenon.

Consumers seek information about their own behavior because it can be useful in making better product decisions in the future (Vroom, 1964). Feedback is information about the effects of one's action or efforts on some criterion of interest (Ilgen, Fisher, & Taylor, 1979). This type of information is important to consumers because it can serve as a quality rating for a product they have purchased, and it can also confer a higher degree of confidence in their decisions (Schubert & Ginsburg, 2000). Consumers seek feedback information to minimize the discrepancy between the feedback they receive versus their own standards (Ilgen et al., 1979). When feedback from others is negative (i.e., consumers receiving unfavorable information about their purchase behavior), consumers will attempt to reduce the negativity by changing their own behavior (Klein, 1989). Therefore, information about their own behavior is important for providing consumers with evidence to assess the efficacy of their past purchase decisions and for identifying areas where they could have done better.

This type of information is effective only if the consumer feels that such feedback is accurate and credible (Pavlou & Gefen, 2002). If a consumer does not trust the source of the feedback, he/she likely to ignore or disregard the information received. Literature has shown that consumers with higher degree centrality (versus low) have quicker access to higher quality information (Brass & Burkhardt, 1992). This position helps individuals to locate certain members within their network who may provide them with credible feedback (e.g., experts). Further, consumers with many close connections are able to generate social capital advantages by developing shared meanings and trust within the immediate network, thereby increasing the reliable knowledge that is shared between them (Coleman, 1988; Reagans & McEvily, 2003). Individuals can leverage their social capital to efficiently locate people whose feedback they can trust. It is likely that individuals in high degree central positions have significant advantages in seeking quality feedback from their peers. Thus, these individuals are better able to assess the efficacy of their own behavior and gather information to aid in future decisions. In other words, degree centrality is likely to be associated with consumers seeking information about their *own* consumption behavior.

Besides accumulating information about their own behavior, consumers also seek information about the behavior of others in order to build their consumer knowledge and social capital. Social information processing theory suggests that people develop attitudes as a result of the information they accumulate through their social network, in turn using this information to gain social advantages (Brass & Burkhardt, 1992; Salancik & Pfeffer, 1978). There are reasons to believe that individuals occupying high betweenness positions may be in a prime position to seek information about the behavior of others. Research has shown that betweenness central individuals tend to be lead users (Kratzer & Lettl 2009); these individuals occupy an advantageous network position that helps them stay up-to-date with the newest trends in the market. Because betweenness central individuals have the ability to span across multiple sub-groups in a social network (i.e., the ability to access both direct and indirect ties), they possess more options for selecting information. Accordingly, it is expected that betweenness central people have the unique advantage of detecting and exploiting their network structure to gain information about the consumption behavior of others in their network. Thus, their ability to span across a diverse set of individuals and cliques helps them acquire a broad base of information to assist with their future consumption decisions. In other words, betweenness centrality is likely to be associated with seeking information about the consumption behavior of *others*.

Study 4

Data were collected from 55 members from a food and culinary club (FCC). In order to become a member of this club, individuals were required to pay a membership fee, which gave them access to the club's services and activities, including cooking seminars, recipe-swap nights (sharing), wine-tasting events, workshops on dining etiquette, and holiday dinners (e.g., a Thanksgiving social). Social networks like this club that encourage and facilitate the sharing of consumption behaviors provide an ideal testing ground for the predictions of this study. The FCC club was chosen because of its mandate to facilitate information-seeking and information-sharing between its members by providing a forum for individuals to share innovative recipes and various tips on shopping for ingredients and kitchenware.

Network data were collected using a traditional pen-and-paper questionnaire. To encourage participation, the club offered discounts to those who completed the survey in time for the FCC's annual party. In total, 55 of the 66 members responded to the survey for a response rate of 83.3%. Of the 55 remaining members, 89% of the ties were reciprocated by other members. The remaining 11% of non-reciprocated ties were dropped and considered as non-active ties.

Measures

The same two centrality measures – a trait measure of information-seeking behavior (IS-a) and a control variable (subjective knowledge) – were collected in the same way as in Study 3 (see Table 5 for the list of the items). Additionally, on a 7-point, Likert-type scale (1-never; 4-sometimes; 7-always), participants rated the extent to which they would seek information (or opinions) from that particular member regarding the *rater's own* recipes (IS_{SELF}) and the extent to which they would seek information (or opinions) from that particular member regarding *another member's* recipes (IS_{OTHER}). Information about recipes was chosen as the dependent measure for this study because this club emphasized the sharing of recipes and ideas (e.g., what ingredients to buy and where to buy them) with other members. Consistent with the procedures followed in

Study 3, the average score of what the individual had rated for every other member was calculated to create an index score to represent that individual's propensity to seek opinions from their network. Thus, a dependent measure was provided of individuals' rate of information-seeking on their *own* recipes, as well as their information-seeking with respect to the recipes of *others*.

Results

The 55 network participants (10 males and 45 females) ranged in age from 18 to 36, with an average age of 23.3 years (SD = 3.30). The average number of ties for each participant was 5.64 (SD = 3.41). Means, SD, and Spearman correlations of the key variables are reported in Table 8.

Table 8 (FCC)

Overall Means, SD, and Correlations

	M (SD)	1	2	3	4	5	6
1. Degree Centrality	5.64 (3.41)	1					
2. Betweenness Centrality	0.03 (0.04)	.69**	1				
3. IS-a	3.78 (1.15)	.42**	.27*	1			
4. IS-Self	3.07 (0.82)	.30*	.19	-.06	1		
5. IS-Other	4.01 (1.06)	.22	.28*	-.15	.12	1	
6. Knowledge	4.36 (1.66)	.37**	.31*	.02	.08	.07	1

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Parallel to the findings in Study 3, there was once again a positive association between network centrality and information-seeking behavior (IS-a). But more importantly, the results indicated that certain positions within social networks are positively associated with seeking information about their own behavior or seeking information about the behavior of others. Consistent with Study 3, there was a positive relationship between degree centrality and IS-a ($\beta_{\text{IS-a}} = .48$, SE=.05), $t = 3.63$, $p < .05$; ($R^2_{\text{IS-a}} = .20$), $F(1,54) = 6.59$, $p < .01$. Betweenness centrality was also positively related to IS-a ($\beta_{\text{IS-a}} = .29$, $p < .05$, $R^2 = .08$). Moreover, the data revealed differences between the two central positions with regards to the type of information they seek from other members. Interestingly, degree centrality was positively related to seeking information about the self but was not related to seeking information about others, $IS_{\text{Self}} = .32$, SE=.03, $t = 2.27$, $p < .05$; ($R^2 = .10$), $F(1,54) = 2.76$, $p < .05$. In contrast, betweenness centrality was positively related to IS_{Other} ($\beta = .29$, $p < .05$, $R^2 = .08$), but was not related to OS_{self}. Please refer to Table 9.

Discussion

Study 4 replicates – and hence provides further evidence of – the positive relationship between network centrality and information-seeking behavior. More importantly, this study reveals the tendency of people who occupy high degree central positions to seek information about their own consumer behavior, whereas people who occupy high betweenness positions tend to seek information about other people's consumer behavior. This observable difference is important because it demonstrates that centrality is not only linked to the rate of information-seeking but also to the *type* of information sought from other members. This finding also demonstrates the fact that individuals use their social capital to gain certain types of information benefits.

Table 9 (FCC)

OLS/MRQAP Regression Results

	IS-a	IS_{SELF}	IS_{OTHER}
	FCC	**FCC**	**FCC**
(OLS)			
Knowledge	-.11	-.04	-.01
Degree Centrality	.16**	.08*	.07
R^2	.20	.10	.05
(MRQAP)			
Knowledge	-.05	.01	-.01
Betweenness Centrality	8.39*	3.72	7.74*
R^2	.08	.04	.08

Unstandardized regression coefficients are shown. The significance levels are shown in parentheses.
*Significance levels: *** p < .001, ** p < .01, * p < .05,* † *p* < .10

General Discussion

This research extends the extant network literature in consumer behavior by recognizing that there are unique opportunities and advantages of occupying a central position in a social network. Granovetter (1985) argued that economic transactions are embedded in the *structure* of a social network. That is, social structure determines our choice of economic trading partners and how we interact with them. Social structure also constrains who has access to what information, affecting the flow of information and influence in a social network (Kratzer & Lettl, 2009). In that light, the current study has two main objectives: The first is to identify *where* the prominent opinion-seekers are located within a network, and the second is to investigate whether there are differences in the types of opinions pursued by these prominent opinion-seekers.

The results of the studies in Essay 2 firmly demonstrated the importance of both the *number* of social ties and the *position* of those ties in the flow of opinions through a social network. First, Study 3 revealed a positive relationship between network centrality (degree and betweenness) and consumer's information-seeking behavior. In Study 4, differences between degree central individuals and betweenness central individuals emerged with regards to the *type* of information they seek from other members in the network (information about one's own consumption behavior versus information about the consumption behaviour of others). The latter finding is important to marketers because it suggests that social network positions open up opportunities to seek certain types of information. Individuals in degree central positions tended to seek information about their own behavior, perhaps because this type of feedback can be useful in maintaining their identity and position within their social network. Individuals in betweenness central positions were inclined to seek information about the behaviour of others, perhaps because they have a desire to accumulate knowledge and resources to gain an advantage over others in their network. Further, these findings are important for understanding the role of social capital and its movement in consumer social networks. Specifically, the findings reveal that certain types of information are reserved for consumers who occupy these unique network positions.

This research has several limitations. In the two network studies, the networks were limited within the confines of the artificial boundary of the social network. It is very plausible that the extent to which people seek and receive information can be dependent on factors external to this network (e.g., a person who is involved in another similar club). Second, the fact that people differ in their designation (i.e., what constitutes a friendship) stands as a limitation in most network research. This limitation was, however, somewhat circumvented by the practice of assessing only the shared ties that existed among the members (reciprocated ties). Further, the number of people in the networks investigated in this essay, as well as in Essay 1, is small, thus the variance in degree centrality is small. It is possible that the results from these networks may only be generalizable to small-scale networks. Finally, one of the caveats in network analysis is that the results are correlational, and thus, causality cannot be inferred from the network data. Therefore, it is difficult to discern whether social network centrality leads to information-seeking behavior or whether information-seeking behavior leads to network centrality. More broadly, it is unclear at this point whether network centrality positions lead to increased social capital or whether high social capital individuals are more likely to become central in a social network. However, since the focus of this research was on understanding the role of consumers' positions in social networks, conducting sociometric network studies was necessary and appropriate to test the theoretical framework. Admittedly, the results from these studies are descriptive, and the data fall short of developing a rich understanding of the reasons why consumers seek information from their networks. Despite these limitations, the findings from the two network studies provide fruitful insights on information-seeking behavior and open doors to fundamentally new modes of future enquiry in understanding consumer networks.

Although there may be many potentially fruitful extensions of our work, one interesting direction for future research would be to examine the differences between the treatments of publicly consumed versus privately consumed goods in consumer networks. Studies have confirmed that individuals adhere more strictly to social norms when their behavior or choices are exposed as opposed to when they are anonymous (Diener, 1979; Ratner & Kahn, 2002). Social comparison theory (Festinger, 1954) implies that people tend to base their decisions on social cues, such as what others in the network have to say about the decision (Burt, 1987). For example, image-conscious people tend to seek out a greater variety of information when they are aware that observers will be judging their choices (Ratner & Kahn, 2002). This finding would imply that consumers' expectations of how others will evaluate their behaviors may affect individuals' opinion-seeking behaviors. Thus, future research should consider extending the generalizability of the findings by comparing publicly versus privately consumed goods.

In view of the complexity in the field of information search and acquisition, it is important for researchers to continue exploring the dynamic of *how* information is being shared among the members of consumer networks. Given the burgeoning interest in networks as a marketing tool, future research could also productively explore these effects on online social networks and communities. As the growth in peer-to-peer technologies continues to fuel a corresponding growth in virtual social networks and social commerce (e.g., Stephen & Toubia, 2010), the time is ripe for an investigation into the information-seeking and information-sharing practices and tendencies that exist within those communities.

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In the previous two essays, I focused primarily on the outcomes and perceived outcomes of social capital and network centrality. In the following essay, I shift my focus to investigate a possible antecedent to network centrality – namely, materialism. Specifically, I investigate the role of materialism on the development of individuals' actual and perceived network centrality in an emerging social network. By using the latest method of analyzing longitudinal data, the goal of Essay 3 is to track the role of materialism in the unique patterns of social network development as it unfolds over time.

Essay 3

The Instrumental and Detrimental Role of Materialism in the Development of Social Networks: Drivers of Perceptual Network Fallacy

Materialism reflects the importance that a consumer attaches to worldly possessions and acquisitions (Belk, 1984; Richins & Dawson, 1992). Early research in this field described materialism as a trait (Belk, 1984), but recent research suggests that materialism should be seen as a value (Richins, 1994; Richins & Dawson, 1992). While there are systematic differences between the two conceptualizations, they do share a common platform in that consumption of objects is central to materialistic behavior (Ahuvia & Wong, 2002; Belk, 1985; Csikszentimihalyi & Rochberg-Halton, 1981), and individuals acquire and utilize possessions as a way to reach desired end-states (e.g., happiness) (Chaplin & John, 2007; Richins & Dawson, 1992). Thus, materialism is herein referred to as the dispositional view towards consumption of objects and possessions as an important part of achieving higher goals, such as self-definition and self-enhancement (Chaplin & John, 2007). For example, Richins & Dawson (1992, p. 304) state that "it is the pursuit of happiness through acquisition rather than through other means (such as personal relationships, experiences, or achievements) that distinguishes materialism." In other words, materialism is the importance that people place on consumption relative to other values, such as relationships, as a means by which to achieve certain goals (Richins & Dawson, 1992).

Research has shown that there are positive and negative consequences of materialism (Banerjee & Dittmar, 2008; Burroughs & Rindfleisch, 2002; Chaplin & John, 2007; Christopher & Schlenker, 2004; Cohen & Cohen, 1996; Csikszentimihalyi & Rochberg, 1981; Dittmar, Long, & Bond, 2007; Fitzmaurice, 2008; Fitzmaurice & Comegys, 2006; Hirschman, 1991; Holt, 1995; Kasser, 2002; Kasser & Ahuvia, 2002; Kasser & Ryan, 1983, 2001; Solomon, 1983; Richins, 1987, 1994; Richins & Rudmin, 1994; Van Boven, Campbell, & Gilovich, 2010; Van Boven & Gilovich, 2003). Csikszentimihalyi and Rochberg-Halton (1981) were among the first to provide a conceptual distinction between the negative impacts of terminal materialism (consumption for the sake of consumption) and the positive impacts of instrumental materialism (consumption as a means of furthering non-materialistic goals). Materialism can be detrimental to consumers because it can lead to impulsive and less careful shopping (Richins, 1994); it can also lead to self-detrimental behaviors, such as addiction to shopping, that have a negative impact on an individual's well-being (Christopher & Schlenker, 2004). Overall, research in marketing, for the most part, has depicted materialism as a destructive trait; Hirschman (1991) refers to materialism as one of the "dark sides" of consumer behavior. If materialism is, in fact, negative and destructive, why are we witnessing rising levels of materialism among consumers (Goldberg et al., 2003; Chaplin & John, 2010)?

Perhaps there is a brighter side to materialism. Research has shown that materialistic consumption provides greater utilitarian and status benefits (Richins, 1994) as well as memories and values that remind consumers of their past accomplishments and experiences (Csikszentimihalyi and Rochberg-Halton, 1981). Materialism is also known to be associated with greater perceived control over the consumer's self and others (Burrough & Rindfleisch, 2002) and having amiable abilities (Dittmar & Pepper, 1994). Together, there is evidence to suggest that materialism can provide positive benefits to consumers.

As most of these findings suggest, much of the research in this domain has explored the negative and positive consequences to the *self*, such as psychological and physical well-being (Belk, 1984; Cohen & Cohen, 1996; Richins & Dawson, 1992; Kasser & Ahuvia, 2002; Kasser & Ryan 1993), self-esteem (Chaplin & John, 2007; Deci & Ryan, 1985), compulsive behavior (Dittmar et al., 2007), shopping behavior (Fitzmaurice & Comegys, 2006), ecological behavior (Kasser, 2002), and many others. Thus, research in this field has primarily been conducted at the individual level, possibly downplaying the important role that materialism has in social networks. In light of this shortcoming, the objective of the current research is not only to delineate the positive/negative paradox but also to examine this paradox from a more macro-level view of how materialism affects individuals' *social network development*.

If consumers use material objects as a way to achieve certain personal goals, then materialism should play an integral role in the development of their social networks and the creation of individuals' social capital. The challenge, however, is to uncover what role materialism has, if any, on social network development. Past researchers have shown that materialistic behavior is associated with positive personal outcomes, such as attaining a higher standard living (Richins & Rudmin, 1994) and attaining desirable characteristics (e.g., cultured, sophisticated) (Christopher & Schlenker, 2004). In contrast, materialism has been associated with negative personal outcomes, such as social ineptitude (Richins, 1987) and narcissistic behavior (Cohen & Cohen, 1996), which can hinder an individual's motivation and ability to effectively form social relationships and networks. This debate about the nature of materialism leads to my main research question: Is materialism *instrumental* or *detrimental* to an individual's social network development?

The final essay contributes to the extant literature in multiple ways. Findings from a longitudinal field study from an emerging social network (Study 5) reveal that materialism is instrumental to an individual's social network development (i.e., more materialistic people made more social connections over time). However, a caveat is that this benefit is perceptual, not actual. That is, there appears to be a discrepancy between consumers' perceptual social network versus their actual social network, a phenomenon I call the *perceptual network fallacy*. Materialistic individuals overestimated the number of friends they had in their social network in two separate time-periods (early and later stages of network development). A follow-up experimental study (Study 6) shows that talking about materialistic consumption (as opposed to talking about vocations) caused individuals to overestimate their *friendship desirability* (the extent to which they are desired as a friend). Together, these two studies make conceptual advances to the field and offer marketing implications and suggestions for understanding the role of materialism in emerging social networks. In the following section, I further elaborate on the paradoxical role of materialism, given these competing rationales.

Theoretical Framework

Materialism is Instrumental to Network Development

Consumers have always used objects to express their self-concept and identity to others (Belk, 1988). People use objects to convey their connection to others and to help articulate who they are to others (McCracken, 1988). For instance, having the right type of material objects is known to be integral in developing and maintaining interpersonal relationships (Banerjee & Dittmar, 2008; Solomon, 1983). Thus, materialistic consumption plays a vital function in building and strengthening social relationships (Holt, 1995).

There are many reasons to believe that materialism will play an instrumental role in social network development by widening one's social network base over time. First, materialistic individuals use objects as a way to further their own social goals (Holt, 1995). Such behavior influences the way materialistic individuals develop social relationships, since these individuals define themselves to others by using possessions as a way to convey status and prestige (Richins, 1994). They achieve this feat by splurging on purchases that are publicly consumed, especially on items that enhance their owner's appearance (Fitzmaurice, 2008). Materialistic individuals use public displays as a tool to increase their attractiveness as social partners and to provide themselves with opportunities to display a particular lifestyle that they expect will seem desirable to others (Christopher & Schlenker, 2004).

Second, materialistic people are motivated to avoid looking helpless or weak in front of others (Christopher, Lasane, Troisi, & Park, 2007). This need drives them to seek a prominent network position where they can better promote their individual identity and social status. In consequence, materialistic people are motivated to obtain friendships so they can use their network channels to convey a particular image to those around them (Bagwell & Bernheim, 1996). Since materialism is known to be associated with a need to impress others (e.g., Belk, 1988), social ties become a necessary component in promoting one’s social status; hence, friendships are “collected” in order to create a desired position within the network (e.g., a central position).

Third, as networks mature, materialistic behavior may be beneficial to maintaining social relationships. Previous research has documented a positive correlation between materialism and conformity to normative influence (Schroeder & Dugal, 1995). Materialism evokes higher status consciousness and greater self-monitoring behavior (Browne & Kaldenberg, 1997); materialistic consumers are sensitive to the social acceptability and communicative abilities of their possessions (Fitzmaurice & Comegys, 2006). In other words, over time, materialistic individuals will become more sensitive to and have a greater awareness of their social surroundings. For example, adolescents continuously manage their impressions by acquiring certain brands and products (e.g., clothing, music, cigarettes, etc.) as props to gain acceptance from their peers (Solomon, 1983). They use consumption as a symbol to maintain and strengthen their interpersonal relationships (Holt, 1995). Thus, materialistic individuals may alter their consumption behavior in response to the changing social environment in order to increase their chances of becoming more connected and more integrated into their social network. Therefore, when coupled with the motivation to use possessions as a way to gain social status (Richins & Dawson, 1992), materialism provides individuals with social opportunities to become a prominent (i.e., central) figure in their social network. In sum, it is expected that materialistic individuals will develop a larger social network over time.

Materialism is Detrimental to Network Development

In the extant literature, it has been well argued that materialism has a negative impact on social relationships. First, there are reasons to believe that materialistic individuals are *selective* in their choice of friends, thus constraining their network development in terms of who they pursue as a friend. Materialistic people evaluate themselves and others by their acquisition of money, wealth, and possessions (Kasser, 2002). As networks develop and relationships mature, materialistic people will have more opportunities to gain insights about the people within the network. According to social identity theory, individuals determine their social identity by categorizing themselves and others based on shared characteristics. People categorize those who are unlike themselves as an out-group, while categorizing those who are similar as an in-group (Chatman & Spataro, 2005); relationships are formed only with members of the in-group. Further, because material possessions are known to play a symbolic role in maintaining interpersonal ties, those who possess a similar affinity for objects are more likely to form stronger bonds and relationships over time (Belk, 1988; Richins, 1994). Since materialistic people are motivated to seek out validations from others (e.g., Belk, 1985), their selection of friends becomes limited as they desire to pursue an exclusive group of individuals who share their common materialistic identity.

Next, there is ample evidence to suggest that consumers use objects to suppress their need for social interaction, thus hindering their social network development (Kasser & Ryan, 2001; Kasser, 2002; Richins, 1987). Research has shown that material objects demotivate people from pursuing intrinsic rewards, such as social relationships (Kasser, 2002). Over time, materialistic individuals devalue the importance of interpersonal relationships; they prefer instead to glean comfort and psychological support from their materialistic possessions (Kasser & Ryan, 1993). Thus, materialism may cause individuals to become socially lethargic, as material objects become central to their personal lifestyle (Kasser & Ryan, 2001). In consequence, materialistic people may become increasingly less interested in their communities, they may become less socially productive, and they may exhibit greater numbers of antisocial behaviors (Burroughs & Rindfleisch, 2002; Cohen & Cohen, 1996; Kasser & Ryan, 1993), thus contributing to their inability to develop their social networks.

In addition to suppressing the need for relationships, materialistic individuals may also find it difficult to forge relationships with others. Researchers have shown that people tend to have an unfavorable impression of consumers who exhibit materialistic behavior (Van Boven, Campbell, & Gilovich, 2010). In Van Boven et al.’s (2010) study, consumers who made extrinsically motivated purchases (e.g., taking up skiing to gain “bragging rights”) were rated less favorably than those who made intrinsically motivated purchases (e.g., buying a new watch because of its enduring value). Further, Van Boven and Gilovich (2003) found that participants liked their partner more and enjoyed their time more in conservations with those fellow consumers who discussed experiential purchases, relative to those who discussed material purchases (e.g., a holiday abroad versus a new car). Finally, research has shown that materialism is related to narcissistic behavior (Cohen & Cohen, 1996). Together, these findings suggest that materialistic individuals may have a difficult time fostering and maintaining social relationships in their networks, thus restricting their capacity to widen their social network. In sum, it is expected that materialistic individuals will develop a smaller social network. To test these competing rationales, Study 5 is designed to investigate this paradox by investigating the development of individuals' social networks over time.

Study 5

Method & Procedures

The data were collected from a social network comprised of undergraduate students from a college dormitory (one floor). The data were collected longitudinally at two separate points in time. In both time-periods, a paper-and-pen questionnaire was prepared for the responding students. Time 1 data was collected approximately five to six weeks after the start of the academic school year (early October) to allow participants enough time to have some perception of their social network. Time 2 data was collected when the participants were approximately five to six weeks into their second semester (early February). In Time 1, 76 of 83 students (response rate of 92%) in the network provided usable data for analysis. In Time 2, 71 of 83 students (response rate of 86%) provided usable data for analysis. To ensure parallel comparison between the two time periods, only those who responded in both waves were kept for the final analyses (N=71).

Network data were collected using the roster method, a technique that is widely used in network research (Scott, 2000; Wasserman & Faust, 1994). This method is consistent with previous network studies in marketing and is useful in identifying individuals' network positions (Kratzer & Lettl, 2009; Lee, Cotte, & Noseworthy, 2010). Using the roster method, participants were provided with an alphabetical listing of the names of all the students on their floor. Then, students rated their relationship strength (1 – do not know or barely know; 2 – acquaintance; 3 – friend; 4 – close friend) with every other student on the floor (Lee et al., 2010). For every direct link (a rating of 3 or above), the focal actor received a score of 1; all other responses were given a rating of 0. A rating of 3 or above was chosen to reflect the individual's strong-tie networks (Sirsi, Ward, and Reingen, 1996).

Then, two different types of social ties were assessed (out-degree centrality and in-degree centrality; see Freeman, 1979 and introductory chapter for a review). Out-degree is the student's *own* view of the number of social ties he/she perceives to have in his/her social network (out-degree centrality). In-degree is the number of social ties others rated to have with the focal person (in-degree centrality). Hence, out-degree is the extent to which the focal actor identified the other 70 students as a friend. In-degree is the extent to which the focal actor was identified by the other 70 students as a friend.

In addition, the students were asked to rate every other member on the roster "to what extent do you find this person materialistic?" A brief description of materialism was provided using the scale items adapted from Richins and Dawson (1992). *A materialistic person is someone who puts emphasis on physical things, on buying things to impress others, and on having brand-name items*. Then, by transposing these results (Lee et al., 2010), a materialism score for each member (as rated by others) was calculated. This measurement was not self-reported; it was a compilation of the ratings by the members' friends. That is, if person X had a network of 10 friends, then only the ratings provided from those 10 friends (omitting the ratings of all others) were considered when compiling the materialism score for person X. This method was preferred over a self-report measure (a scale measure) because it reduced the concerns of common methods bias and social desirability bias.

Afterwards, several sets of regression analyses were performed using the network dataset. First, the effects of materialism on the difference between out-degree and in-degree were observed for both time-periods (difference was calculated through $T_{\text{out-deg}} - T_{\text{in-deg}}$). Then, additional analyses were conducted to uncover whether materialism was indeed instrumental or detrimental to an individual's social network development. In addition, the analyses tested whether these benefits (or costs) were perceptual (out-degree) or actual (in-degree). All analyses included gender and age as covariates.

Results

Means, standard deviations, and zero-order correlations among variables at T1 and T2 are reported in Table 10. In this network, the combined sample of 71 students included 34 males and 37 females. The average age of the participants was 18.22 (measured at T1). In T1, the average out-degree and in-degree centrality was 6.73. In T2, the average out-degree and in-degree centrality was 16.82. That is, the average out-degree score and the average in-degree score was the same, meaning that the number of friends a person perceived themselves to have was equal to the number of people who nominated that person as a friend. Figure 3 presents graphical representations of the network development from T1 to T2.

Table 10 (Dormitory Network)

Overall Means, Standard Deviations, and Zero-order Correlations

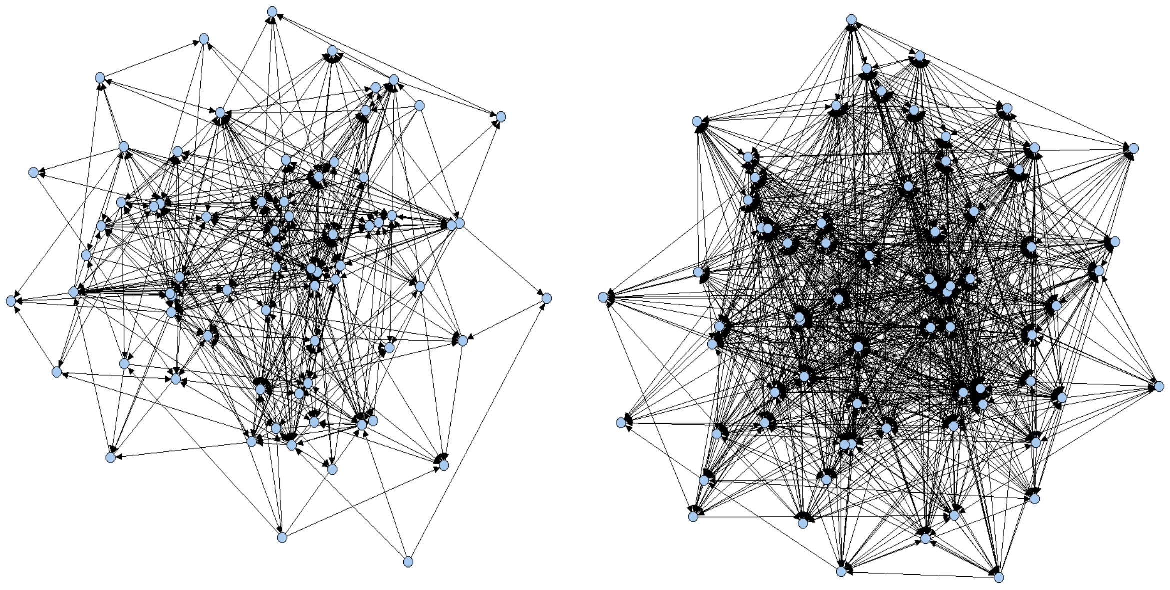
	M (SD)	1	2	3	4	5	6
1. Materialism (T1)	3.53 (1.10)	1					
2. Materialism (T2)	3.14 (1.27)	$.49^{**}$	1				
3. Out-degree (T1)	6.73 (5.19)	$.26^{*}$	.21	1			
4. In-degree (T1)	6.73 (4.61)	-.01	-.09	$.45^{**}$	1		
5. Out-degree (T2)	16.82 (9.86)	$.42^{**}$	$.33^{**}$	$.53^{**}$	.12	1	
6. In-degree (T2)	16.82 (5.70)	-.04	$-.25^{*}$	$.30^{*}$	$.52^{**}$	$.24^{*}$	1

Significance levels: $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$

Results from the analyses suggest that materialism is positively associated with the difference between the two types of social ties (out-degree and in-degree). In general, materialistic individuals perceived that they had more friends (outgoing ties) than they actually had (incoming ties). In T1, materialism was positively associated with the difference between out-degree and in-degree ($\beta = .25$, $t = 2.18$, $p < .05$, $f^2 = .07$). Additional analyses revealed that materialism was positively associated with out-degree ($\beta = .23$, $t = 2.07$, $p < .05$, $f^2 = .06$), but not with in-degree ($\beta = -.02$, $t = -.20$, *ns*). The latter findings suggest that this difference was primarily attributable to materialistic individuals overestimating the number of friends in their network rather than to that individual receiving fewer incoming friendships.

Figure 3 (Dormitory Network)

Diagrams of Network Change over Time: College Dormitory Network



Time 1

Time 2

In T2, materialism was also positively associated with the difference between out-degree and in-degree ($\beta = .48$, $t = 4.44$, $p <.001$, $f^2 = .29$). Additional analyses revealed that materialism was once again positively associated with out-degree ($\beta = .34$, $t = 2.98$, $p <.01$, $f^2 = .13$). Interestingly, materialism was also negatively associated with in-degree ($\beta = -.26$, $t = -2.16$, $p <.05$, $f^2 = .07$). Unlike in T1, these findings suggest the gap between perceptual and actual number of friendships was due to materialistic individuals overestimating their number of friends, as well as to receiving fewer incoming friendships.

Furthermore, materialism was associated with the rate of growth in social ties over time (rate of growth was calculated by Δ out(in)-degree / T2 out(in)-degree). In particular, materialism was positively related to the rate of growth in outgoing ties over time ($\beta = .27$, $t = 2.38$, $p <.05$, $f^2 = .08$). However, these results did not hold for incoming ties ($\beta = -.01$, $t = -.04$, *ns*). These results suggest that, over time, the tendency for materialistic individuals to overestimate their number of friendships grew. For all analyses, no other effects (e.g., gender, age) were significant.

Discussion

The results from the field network study reveal several interesting insights. First, it appears that in both time periods (early and later stages in network development), materialism was positively associated with having a higher incidence of out-degree ties relative to in-degree ties (self perception versus others' perception). The very idea that individuals higher in materialism were unable to accurately perceive their network implies that these people were susceptible to *perceptual network fallacy*, that is, the extent to which people's perception of their social network differs from their actual social network (as viewed by others); the larger the gap between perceptual versus actual, the larger the magnitude of the fallacy.

People differ in their ability to accurately perceive the patterns of interpersonal relationships in their social networks (Casciaro, 1998; Krackhardt, 1990). This study reveals that materialism is associated with having these inaccurate perceptions. In particular, materialistic individuals overestimated the number of friends they had in their network. Interestingly, this finding is counterintuitive. Casciaro found that a need for affiliation and a need for achievement are positively related to the accuracy in one's perception of his/her friendship network. Given that past research has shown that materialistic behavior is associated with a need for affiliation and a need for achievement (Banerjee & Dittmar, 2008; Srivastava, Locke, & Bartol, 2001; Richins, 1994), logic would dictate that materialistic individuals should have a more accurate perception of their social network. However, the findings from Study 5 indicate otherwise.

Moreover, there are additional reasons to explain why materialistic individuals would be susceptible to perceptual network fallacy. As mentioned before, materialism drives individuals to widen their social network so they can use these social connections to express their self-concept and identity to others (Belk, 1988). Thus, materialism could be vital in building social relationships (Holt, 1995). However, the data shows that these instrumental elements of materialism are primarily perceptual; materialistic individuals perceive that their behavior will help them gain more friends and higher status within their social network. Unfortunately, such efforts proved to be futile, as materialistic individuals were unable to accrue an equal amount of incoming ties for every outgoing tie.

Furthermore, as the network matured, this gap between out-degree and in-degree ties became larger, and it did so for two reasons. First, the rate of outgoing ties over time was positively associated with materialism. The results indicate that materialistic individuals (compared to non-materialistic individuals) believed they had made more friends over time. However, what is really driving this gap is the fact that materialism was negatively associated with in-degree ties in Time 2. That is, materialistic individuals were desired less often as a friend, even though they perceived they had gained more friends. Together, these results suggest that materialism can be both instrumental and detrimental to an individual’s social network development. Materialism can be instrumental because it helps individuals perceive that they have a larger social network base, potentially fulfilling their self-achievement motivation, as well as their desire to be a prominent member in the network. It appears, however, that materialism can also be detrimental, since these same individuals are likely to receive fewer incoming ties (Time 2) and thus to become more susceptible to perceptual network fallacy.

Despite having identified the potential drawbacks of perceptual network fallacy, there is still no clear explanation as to why materialistic individuals consistently seemed to overestimate their number of friends. One possible explanation concerns the way materialistic individuals share and converse about their product possessions. As networks mature, individuals gain more opportunities to converse and share information about their product possessions (Christopher & Schlenker, 2004). Researchers have shown that conversing about product possessions provides materialistic individuals with an opportunity to impress others (Belk, 1995; Christopher & Schlenker, 2004); materialistic individuals see this instance as a chance to create a positive strong image and self-representation (Christopher et al., 2007). In contrast, conversing about product possessions can also have negative effects. Research has shown that participants disliked those who discussed material purchases relative to experiential purchases (Van Boven & Gilovich, 2003). Thus, it is expected that when materialistic individuals talk about their product possessions, they will perceive these conversations as being helpful to their process of building friendships. However, it is expected that these conversations will in fact have a negative consequence, since overt materialism can induce certain stereotypes (e.g., narcissism, self-centeredness) that have a negative impact on friendship-building.

In sum, it is expected that materialistic individuals (versus non-materialistic) will perceive that they will be highly desired as a friend, yet, they will be rated less so by others on the *friendship desirability rating* (extent to which individuals are desired as a friend). On the other hand, when materialistic individuals are not given the opportunity to talk about their product possessions (i.e., talking about their past and current vocational experience), it is expected that they will become more accurate in their ratings. Study 6 is an experimental study designed to test this phenomenon. It is also intended to provide greater internal validity to the theoretical framework.

Study 6

In exchange for course credit, 156 undergraduate students (56% females) participated in this study. The average age of the participants was 17.9 (SD = .70) years.

The study used a 2 (materialism: high / low) × 2 (conversation: product-focused versus vocation-focused) between-subjects design.

Upon entering the lab, participants were asked to complete a collage task similar to that of Chaplin and John's (2007; 2010). Consistent with their method, materialism was measured by instructing participants to construct a collage that answered the question "What makes me happy?" To create their collage, participants were first presented with a set of 75 labels and pictures with five different themes (15 labels per theme). For example, "fishing" and "Sudoku" were two of the 15 labels that were included as part of the *hobbies theme*, "getting a good job" or "being on the Dean's list" was included as part of the *achievements theme*, "family" and "roommate" were included as part of *people theme*, "basketball" and "hockey" as part of *sports theme*, and "new shoes" and "nice car" were included as part of *materials theme*. Despite the similarities in the procedures, there were two deviations from the original method. First, Chaplin and John utilized the collage method primarily on adolescents. Thus, some of the labels that had previously been used (e.g., getting into a good college) were not relevant to the subjects in this study (since they were already in college). Thus, modifications to the original labels were necessary to ensure that the current items were specifically relevant to undergraduate students. Second, unlike Chaplin and John's method of using poster boards, this study was performed on the computer. To avoid "cluttering" of labels, this study used 15 labels per theme instead of 20.

Participants had opportunities to view all 75 labels on a computer screen. These labels were divided according to their respective themes and were presented on five different slides. (For a screen sheet of this experimental stimuli, please see Figure 4.) To eliminate order effects, the slides were counterbalanced. Then we asked each participant to create their own collage of items by selecting the items that answered the question "What makes me happy?" Participants were free to include as many items as they wished to create their collage. After they had completed the task, the participants were instructed once again to think carefully about their choices (i.e., they were then given a second opportunity to add/delete/modify their personal list). This action was necessary in order to encourage the participants to think carefully about the items they had chosen. At this point, a materialism index score was created for each participant by counting the number "materials-themed" labels in their personal collage. Choosing material goods, such as "money" and "brand name products" over non-materialistic items (e.g., sports, friends) indicated higher levels of materialism (Chaplin & John, 2007). To create the high/low groups for materialism, the index score was divided into thirds. The high group was calculated by averaging the materialism scores from the top third. The low group was calculated by averaging the materialism scores from the bottom third. The average materialism scores for the high and the low groups were 4.98 and 1.85, and the mean scores were significantly different from each other ($F(1,100) = 820.72$, $p < .001$, $\omega^2 = .89$).

Figure 4

Experimental Stimuli for Study 6

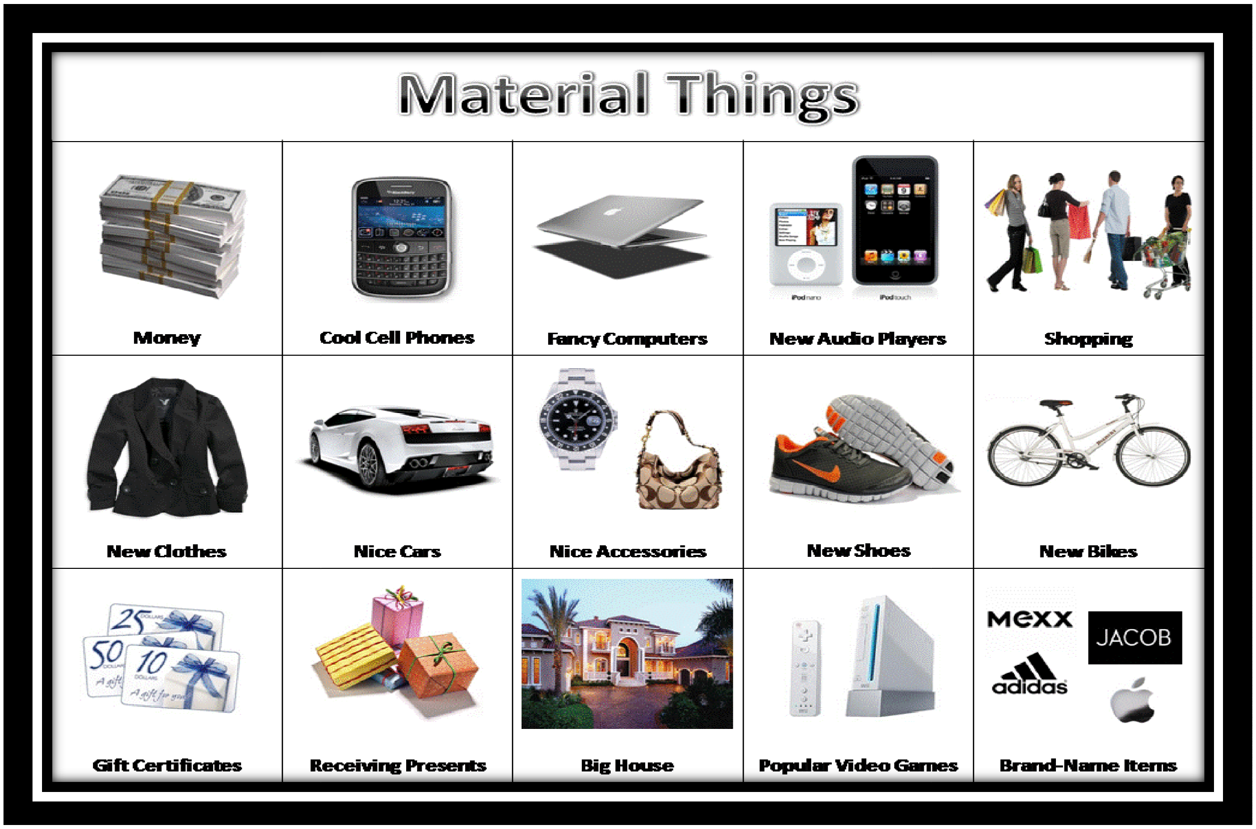

Material Things
Money
Cool Cell Phones
Fancy Computers
New Audio Players
Shopping
New Clothes
Nice Cars
Nice Accessories
New Shoes
New Bikes
Gift Certificates
Receiving Presents
Big House
Popular Video Games
Brand-Name Items

Figure 4 (Continued…)

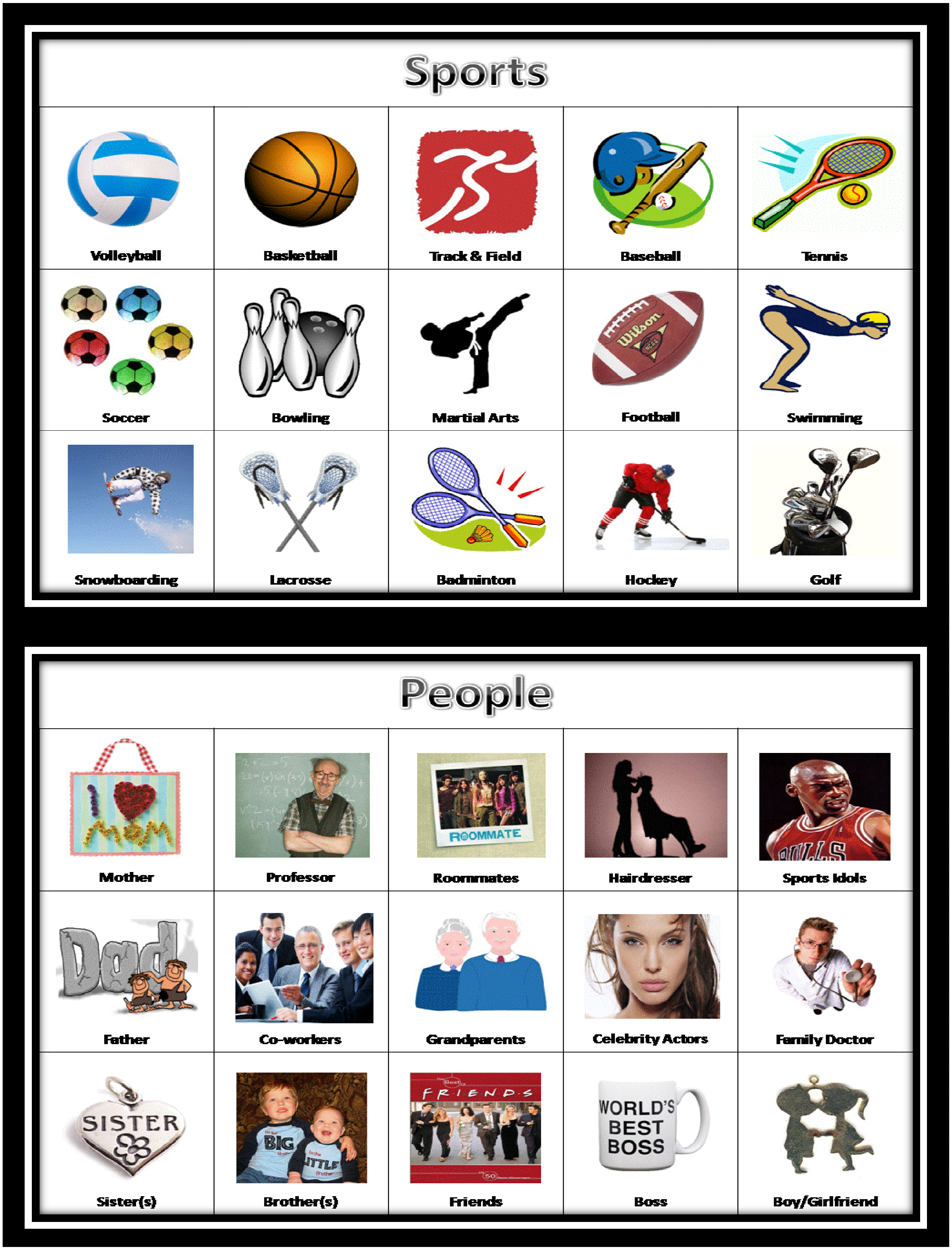
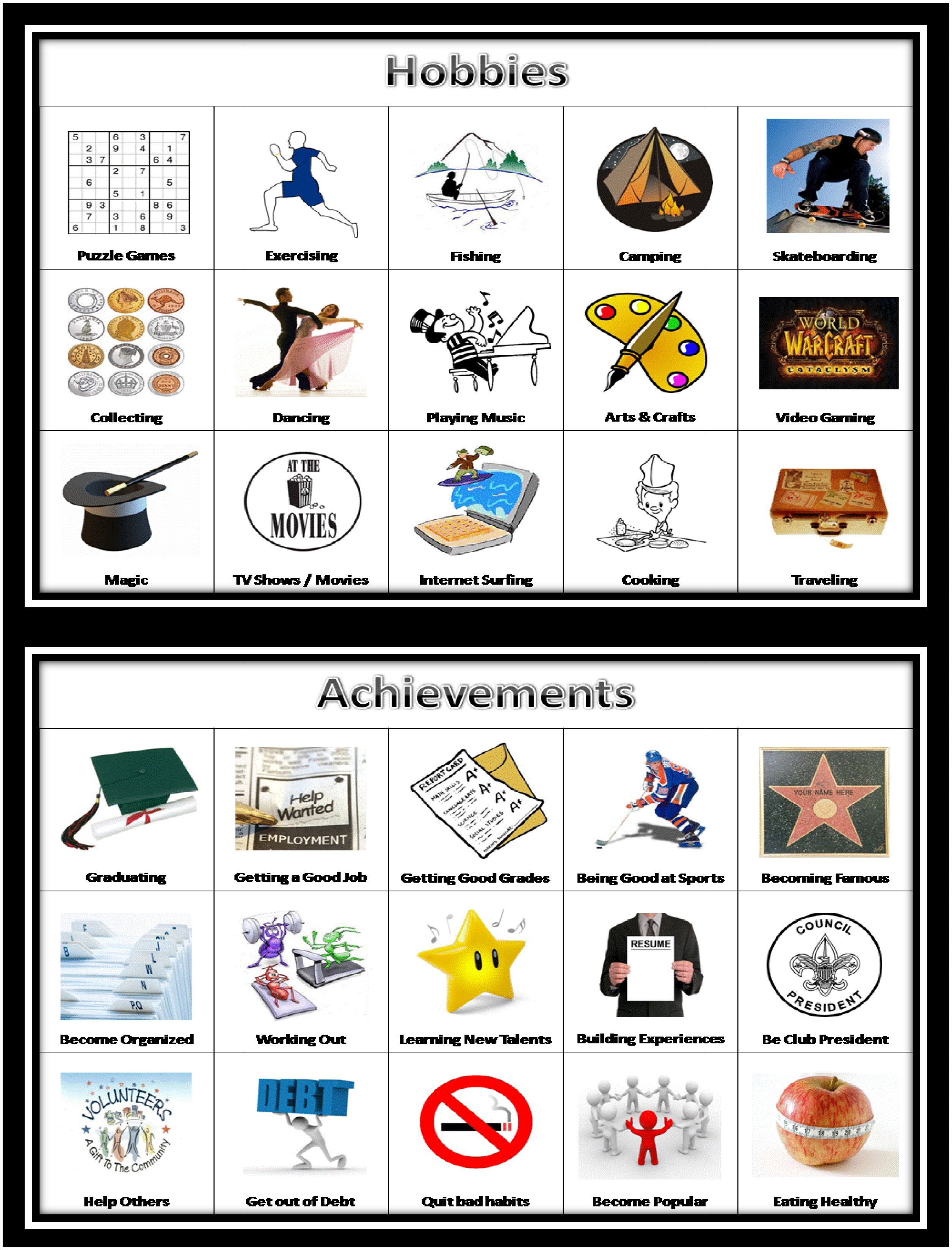

Sports
Volleyball
Basketball
Track & Field
Baseball
Tennis
Soccer
Bowling
Martial Arts
Football
Swimming
Snowboarding
Lacrosse
Badminton
Hockey
Golf
People
Mother
Professor
Roommates
Hairdresser
Sports Idols
Father
Co-workers
Grandparents
Celebrity Actors
Family Doctor
Sister(s)
Brother(s)
Friends
Boss
Boy/Girlfriend

Figure 4 (Continued…)


Hobbies
Puzzle Games
Exercising
Fishing
Camping
Skateboarding
Collecting
Dancing
Playing Music
Arts & Crafts
Video Gaming
Magic
TV Shows / Movies
Internet Surfing
Cooking
Traveling
Achievements
Graduating
Getting a Good Job
Getting Good Grades
Being Good at Sports
Becoming Famous
Become Organized
Working Out
Learning New Talents
Building Experiences
Be Club President
Help Others
Get out of Debt
Quit bad habits
Become Popular
Eating Healthy

Afterwards, participants were randomly paired with another student for a conversation task. Prior to the conversation, the experimenter asked each individual to identify whether they had met the person previously. If the participants indicated “yes,” then a new partner was assigned to them. If they indicated “no,” then they proceeded with the exercise. The pair was randomly assigned into one of two conditions. In the first condition, the pair was instructed to focus their conversation on their product possessions, including products they currently owned or had owned in the past. In the second condition, the pair was instructed to focus their conversation on their vocational experiences, (employment, volunteer, and/or extra-curricular experiences), including their current vocations and vocations they had occupied in the past. Afterwards, the participants were asked to rate their partner (on a 0-100 sliding scale) on *friendship desirability* measures, using the following four items ($\alpha = .89$): “I want to become friends with this person,” “I would be a good companion to this person,” “I want to develop a relationship (social) with this person,” and “I want to become a pal to this person.” Further, the participants were also asked to rate themselves on four similar items: “My partner would want to become friends with me,” “My partner would find me to be a good companion,” “My partner would want to develop a relationship (social) with me,” and “My partner would want to be pals with me” ($\alpha = .85$). These measures (friendship desirability) provided a self-report rating for each participant in addition to rating from their partners.

Finally, the length of the conversation was randomized such that half of the groups were instructed to converse for eight minutes, while the other half was instructed to converse for 15 minutes. A post-analysis revealed no significant difference in the final results between the two time lengths ($F < 1$). Additionally, variables such as gender, age, sociability, and extraversion were collected as covariates, but there was no indication that these variables had any significant influence on the final results (Fs < 1).

Results

ANOVAs were conducted on a 2 (materialism) × 2 (conversation topic) between-subjects factorial design. The analyses revealed an interaction effect between materialism and the type of conversation (product or vocation) on the individual's perception (self-rating) of their friendship desirability ($F(1,100) = 6.59, p < .05, \omega^2 = .04$). As expected, simple effects revealed materialistic individuals (versus low) rated themselves significantly higher on friendship desirability after a product-focused conversation ($M_{high} = 83.80$ *vs.* $M_{low} = 75.03$; $F(1,100) = 8.47, p < .01, \omega^2 = .06$), but not after a vocation-focused conversation ($M_{high} = 73.86$ *vs.* $M_{low} = 76.03$; $F(1,100) = .52$, *ns*). Interestingly, a reverse pattern of results occurred for the partner's rating (other's rating). This analyses also revealed an interaction effect ($F(1,100) = 5.01, p < .05, \omega^2 = .03$). More importantly, simple effects tests revealed materialistic individuals (versus low) were rated significantly lower on friendship desirability after a product-focused conversation ($M_{high} =69.94$ *vs.* $M_{low} = 78.63$; $F(1,100) = 8.96, p < .05, \omega^2 = .07$), but not after a vocation-focused conversation ($M_{high} =76.70$ *vs.* $M_{low} = 76.19$; $F(1,100) = .03$, *ns*). Overall, the results indicate that materialistic individuals perceived that they would be desired more as a friend after talking about their material purchases. However, these same individuals were desired less as a friend by their conversation partners.

Moreover, it is worth noting that there was a significant difference between the self-ratings and the partner rating for only one of the conditions. As expected, materialistic individuals in the product-focused condition overestimated their friendship desirability (M_{self} =83.80 *vs.* M_{others} = 69.94; $F(1,100) = 17.72$, $p < .001$, $\omega^2 = .23$). For all other conditions, there were no significant differences between the self-ratings and the partners' ratings. To confirm all of these findings, separate regression analyses were performed using all subjects, and these sets yielded parallel results. Table 11 shows the means and standard deviations of all treatment groups. Figures 5 and 6 provide a graphical display of the interactions.

Table 11

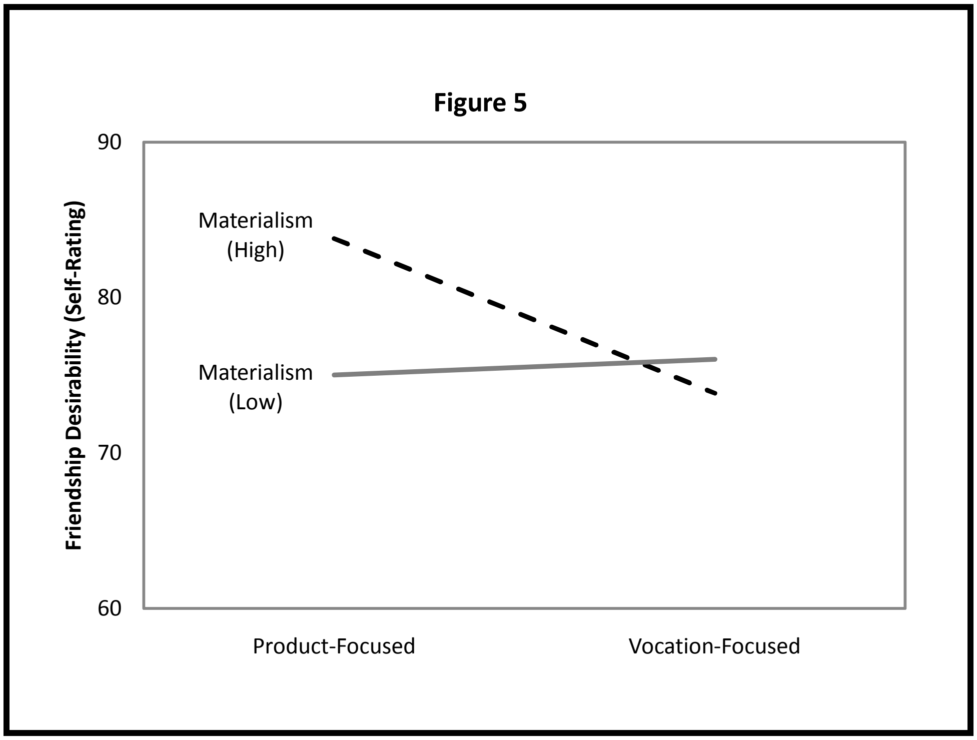
Treatment Means and Standard Deviations

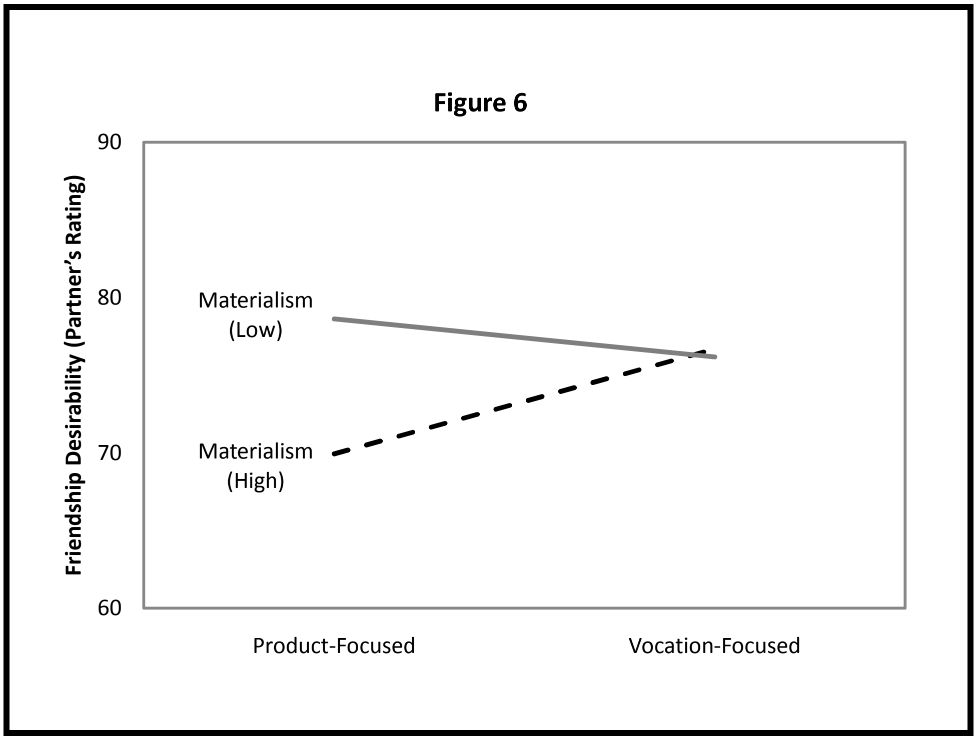
	Product		Vocation	
	Mat-High	Mat-Low	Mat-High	Mat-Low
Friendship Desirability (Self-Rating)	83.80 (11.52)	75.03 (9.42)	73.86 (12.56)	76.03 (9.66)
Friendship Desirability (Partner's Rating)	69.94 (12.21)	78.63 (9.36)	76.69 (11.07)	76.19 (8.84)

Note: Standard deviations are reported in parentheses

Figures 5 and 6

Graphical Display of Results from Study 6





Discussion

Study 6 reveals two noteworthy findings. First, past research has shown that the stigmatization of materialism led people to be liked less and to be less enjoyable partners in a conversation setting (Van Boven et al., 2010; Van Boven & Gilovich, 2003). Similarly, these results show that participants who discussed material purchases were desired less (as friends) by their conversation partners. However, different from the previous study, this reaction occurred only for those who were highly materialistic. This finding is important because it suggests that materialistic individuals behave differently from non-materialistic individuals, and this behavior is reflected in the conversations they have with others. Furthermore, this behavior became apparent only when materialistic individuals were given the opportunity to talk about their product possessions. Negative perceptions are likely derived from the fact that materialistic individuals flaunt their product possessions or display undesirable mannerisms (e.g., showing off, lack of care for others) when given the opportunity to talk about objects and possessions. When participants were asked to talk about topics unrelated to product possessions (e.g., vocational experience), there was no discernible difference between the high and low materialism groups.

Second, despite the fact that they were being rated lower by others on the friendship desirability measure (of which they were unaware), materialistic individuals erroneously perceived that they would be desired more as a friend after they were given the opportunity to talk about their product possessions. Conversing about product possession gave materialistic individuals the opportunity to display their social status and success to others (Richins, 1994), in turn triggering these individuals to (mistakenly) believe that they would be highly desired as friendship partners. This pattern of misperception replicates the pattern from the previous network study and suggests that materialistic individuals have a distorted view of their own appeal as a friend. Further, the pattern explains why a gap exists between the materialistic individuals' self-ratings (perceived self-rating) versus the ratings offered by their partners. This finding is important because it sheds light on why materialistic individuals are susceptible to perceptual network fallacy. Their misperception is related to their view of – and hence their conversation about – their own materialistic consumption.

General Discussion

Is materialism instrumental or detrimental to individuals' social network development? Given the rich history on the topic of materialism, a variety of perspectives would suggest that materialism can have positive and negative impacts on individuals' network growth. However, results from a field study and an experimental study suggest that the instrumental benefits of materialism are merely perceptual, while the detrimental costs are definite. Hence, this research provides several advances to the field. First, social scientists have long been interested in the accuracy of an individual's interpersonal judgments. Researchers have explored people's accuracy in reporting communication patterns (Bernard et al., 1982), accuracy in specific social events (Freeman & Romney, 1987), and accuracy in people's social network structure (Casciaro, 1998; Krackhardt, 1990). This research follows in the latter tradition.

Results from a longitudinal field study (Study 5) show that materialistic individuals perceive their network inaccurately, as compared to their actual network (as rated by others), a term coined here as *perceptual network fallacy*. That is, materialism is associated with overestimating the number of friends in the network. This finding is important to consumers because materialistic individuals are accustomed to acquiring material goods in response to their belief that possessions will enhance their social standing (i.e., they will become more popular/central in a network). However, the findings of this research suggest that this belief is merely perceptual.

Moreover, in support of this theory, the findings from Study 6 reveal that conversing about product possessions is what primes materialistic individuals to overestimate their friendship desirability. While previous research has noted the negative impact of discussing possessions with others (Van Boven et al., 2010), the current research goes one step further to show that this effect is even stronger for materialistic individuals. In support, the data show that materialistic individuals were rated less desirable by others when they were first given the opportunity to converse about product possessions. Interestingly, the data also show that materialistic individuals rated themselves higher on friendship desirability. Thus, materialistic individuals perceive that conversing about product possessions enhances their self-value, although this was clearly not the case. Materialistic individuals continue to purchase and talk about products that elevate their social image because they mistakenly perceive that doing so will benefit them socially (Bagwell & Bernheim, 1996). Unfortunately, they are oblivious to the detrimental effects, a condition that explains why the magnitude of perceptual network fallacy grows over time. As networks mature, materialistic individuals gain more opportunities to talk about their product possessions with others. As a result, such conversations continue to contribute to the growing gap between these individuals' out-degree and in-degree ties over time, thus magnifying their erroneous perception of their position within the network.

In addition to its theoretical contributions, the research in this essay has distinct marketing implications for practitioners, consumers, and academics. First, for years, marketers have promulgated the idea that material objects are important and that desirable qualities, such as beauty, success, and happiness, can be obtained only through material possessions (Pollay, 1986). To add to the list, this research shows that materialism is important to an individual's social network development. Thus, marketers should specifically devise messages (e.g., ads, commercials) that highlight the social benefits of product possessions, especially if they are targeting those who have high affinity for material objects. However, caution is advised when constructing these messages, since the link between materialism and network development is merely perceptual.

More importantly, this research provides another lesson to consumers regarding the dangers of materialistic consumption. Growing levels of materialism among teenagers have raised concerns among parents and educators alike (Chaplin & John, 2010; Goldberg et al., 2003). Adolescents purchase certain objects (e.g., cell phones, MP3 players, brand-name clothing) because they perceive that material possessions will help them gain a desirable status (e.g., popularity) in their social network. However, it must be recognized that these are erroneous perceptions. Indeed, materialistic individuals do not gain more friends over time. They only believe that they will. Therefore, consumers could be warned that their efforts to use material consumption in order to gain favorable network positions may not be successful.

Caution should be noted in interpreting these results. First, the network study is limited within the artificial boundary of the social network since the data contains only those friendships that were developed between students on one floor of a residence. Although these floor friends represent an important part of an individual's social environment, it is possible that the results may be confounded by the social relationships that were formed outside of this network (e.g., campus clubs, religious organizations, etc.). Furthermore, the relationships studied in this network were dichotomous network ties (0 for absence, 1 for presence), and thus, the network data fail to capture the role of materialism on the strength of relationship ties. Second, regarding the experimental study, it is difficult to determine what really caused materialistic individuals to overestimate their friendship desirability. While the results show that talking about product possessions caused materialistic individuals to overestimate their number of friends, it is unclear what facet of their behavior (e.g., mannerisms, talking about specific sets of products, etc.) caused this error. Thus, additional research is encouraged to further delineate the true cause of this overestimation. It is plausible that certain individual traits related to materialism (e.g., narcissism, egocentrism) may be the root cause of perceptual network fallacy. Thus, future research should investigate these constructs as possible mediators. Finally, the sample from the two studies was primarily composed of first-year undergraduate students. The purpose of choosing this group was to ensure that there was adequate representation of materialistic individuals in a given social network. However, prior research has shown that levels of materialism differ based on different age groups

(Chaplin & John, 2007; Goldberg et al., 2003). Thus, more research is clearly needed to increase the external validity of this research.

Despite these shortcomings, this study offers important advantages. Logistically, the impact of potential antecedents to network development is best observed in a group of individuals brought together into the same setting at the same time. In the past, materialism has primarily been studied at the individual level. This research contributes by providing a more macro-level view of the influence that materialism has on individuals' social networks. Further, this study is among the first longitudinal studies in consumer behavior to track the developmental patterns of a social network. Aside from its theoretical advances, the present study provides a methodological contribution to the marketing field by being one of the first studies to observe the growth and development of networks. The use of network analysis provides significant advantages over other traditional methods as it is a useful statistical technique for modeling dependencies beyond dyadic relationships.

Future research should also explore the concept of perceptual network fallacy at a deeper level. While this research shows that materialistic individuals overestimate their number of friends, it would be interesting to explore the variables that influence individuals to underestimate the size of their social network. One fruitful extension of this work is to assess the effects of consumers' need for uniqueness on the development of social networks (Tian, Bearden, & Hunter, 2001). Individuals with a high need for uniqueness define their unique identity by avoiding similar others (Berger & Heath, 2007; Ruvio, Shoham, & Brencic, 2008). That is, these individuals would rather avoid others in order to reduce the chances of having their identity copied (Tian et al., 2001).

Given this motivation, it is plausible that these individuals will want to reduce their number of friendships in order to maximize their unique appeal, as well as to protect their identity from becoming mainstream. On the other hand, research has shown that unique individuals make creative choices, which are socially applauded by others (Tian et al., 2001). There are elements of unique behavior that allow individuals to freely express their unique identity while maintaining their social utility (i.e., capacity to socially acclimatize with their peers) (Brewer, 1991). Thus, it is reasonable to believe that individuals with a high need for uniqueness may *perceive* that they have a smaller network (to feel more unique), yet they actually have a larger network (as rated by others) because they may possess a unique characteristic that is desirable. In sum, individuals with a high need for uniqueness are likely to underestimate their number of friends – an alternate form of perceptual network fallacy.

In closing, more research is clearly needed to identify other individual characteristics or traits that may influence the development of individuals' social networks. Additionally, more research in the area of materialism is also encouraged to further uncover its impact on individuals' network outcomes. Since the study of networks is beginning to gain momentum in the consumer-behavior discipline (Van den Bulte & Wuyts, 2007), this is an apt time for researchers to further explore the impact of marketing variables within the context of various social networks.

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Final Thoughts and Directions for Future Research

Social networks are revolutionizing the way marketers view the world of consumerism. Consumers are connecting, businesses are transforming, and the marketing playground is continuously changing to reflect the growing importance of networks in consumer behavior. In 2006, the Marketing Science Institute put out a call for more research on the “connected customer” to explicate the role of networks on consumers. With the decline in the effectiveness of traditional marketing tactics, marketers should recognize the importance of exploring the effects of social capital and networks on social behavior, and in particular, on consumer outcomes.

In the past, sociologists and consumer researchers have explored the topic of social norms, social persuasion, social values, social presence, and social contexts to study the changes in attitude and behavior of consumers (Brown & Reingen 1987, Dahl, Manchanda, & Argo, 2001; Deutsch & Gerrard, 1955; Fishbein & Ajzen, 1975; Gladwell, 2000; Keller & Berry, 2003; Watts & Dodds, 2007). Unfortunately, the literature has overlooked the importance of social networks, specifically, the influence of the structural elements of networks on consumer decisions. Thus, the primary motivation of this dissertation was to provide additional insights on the role of network positions (and the social capital that is borne from it) and to show how the patterns of those positions influence consumer behavior.

Essay 1 provided a framework for understanding the association between network centrality and the flow of consumer influence. Essay 2 provided insights into the relationship between the network centrality and information-seeking behavior of consumers. Essay 3 investigated the role of materialism in the development of network centrality (perceived and actual) within social networks. Together, these essays provide two distinct contributions to the marketing literature. First, using social capital theory as the theoretical base, I show that *where* a consumer is located within a network (network centrality) affects that individual's ability to influence others *and* affects how they are influenced by others in the network (Essay 1). Moreover, network positions also influence the type of information that is sought from others (either information about self or information about others, Essay 2). These results are important because they allow researchers and marketers to better predict the consumer behavior of individuals in the network.

Second, I show that a discrepancy between individuals' perception of their network position versus their true network position (as rated by others) can yield different personal outcomes. In Essay 1, I demonstrate that when individuals believe they are opinion leaders, it is largely because they perceive themselves to be central to their network. However, those who were voted as truly central within a given network were people who were considered (by others) to be highly influential in the network, that is, who were most likely to be influential members in the group. In Essay 3, I demonstrate that materialistic individuals were more likely to be susceptible to perceptual network fallacy; these individuals over-estimated the number of friends they had in their social network. This difference is important because it shows that a person's perception of their social capital may not coincide with their actual store of social capital. Overall, the findings of this research contribute to our understanding of consumer networks and further emphasize the relevance and importance of social network positions and social capital.

There are several limitations to my research. First, degree centrality results for all five network studies are skewed to the lower end of the distribution (see Appendix A for degree centrality histograms). However, this is expected as these measures were intended to measure strong-tie relationships (friend or close friend). Further, using non-parametric statistical analysis (e.g., MRQAP) in essays 1 and 2 helped mitigate this bias. Second, because members have entered the network at different times (with the exception of study 5), the development of friendship ties may be affected by history or tenure effects. Thus, it is possible that how long one has been with the organization may be a moderator to how influential or influenced one can be when occupying a central position. Third, the network studies are limited to the confines of the artificial boundary of the network, as the data contains only the friendships that were developed within the same network. Although the current network of friends represent an important part of one's social environment, it is possible that the results may be confounded by the friendships that were formed outside of this network (as people are often involved in multiple networks). Furthermore, these studies may also contain biased parameters, as people who live closer together (geographical proximity) or who are alike (homophily, e.g., gender) may have a higher likelihood of forming friendships, thus, subsequently affecting individual's information-seeking behavior, opinion leadership, and susceptibility to interpersonal influence. Finally, caution should be noted when interpreting the results showing low R-squared values, as there are other factors that contribute to the variance in the dependent variable. To overcome such limitations, additional studies are encouraged to replicate and extend the generalizability of the findings.

More importantly, as the focus of this dissertation was an understanding of the role of a consumer's position in a social network, sociometric network studies were necessary to test the theoretical framework. However, one of the shortcomings of network methodology and analysis is that the results are correlational, and thus, causality cannot be inferred from the data. Therefore, it is difficult to discern whether centrality led to information-seeking behaviour, opinion leadership, and susceptibility to interpersonal influence or vice versa. To make causal inferences, experimental studies are necessary. Researchers can create artificial networks with varying network structures in a simulated environment to compliment the field data when investigating how network structure affects consumer behavior.

With regards to future research, it would be fruitful to investigate the benefits and costs of occupying a hybrid position (a person high in both degree and betweenness centrality). Occupying a hybrid position has the potential to provide an individual with the greatest amount of social capital, as degree centrality provides trust and collaboration with one's immediate network, while betweenness centrality provides non-redundant information from subgroups of the network. In lieu of this, it may be important to investigate how occupying a hybrid position can provide individuals with maximum benefits (influence, greater access to information) to generate social advantages.

Much of what has been explored in the three essays has been limited to understanding the *structural* aspects of networks; thus, there remains immense potential for future work in this field. One fruitful avenue for future research is to study the importance of social ties that encompass these social network relationships. Social ties represent *how* individuals are connected to each other (Wasserman & Faust 1994); they reflect individuals' bond and intimacy with others in the network (Granovetter, 1973). In marketing, the study of social ties has revealed prolific insights. Brown and Reingen (1987) report that people looking for referrals were more likely to seek out strong ties than weak ties for help on their decision (influence), but they used weak ties over strong ties for their knowledge (information). Further, research on social ties has offered some important insights on word-of-mouth behavior. Rogers (1995) concludes that while there was greater information flow between strong-ties, weak ties clearly played a crucial role in the spread of word of mouth, as they were conduits for spreading information across different sectors of the network.

Unfortunately, exactly how consumers' structural positions and the strength of their social ties interact to influence consumer decision-making still stands as an unexplored factor in the literature. It is plausible that individuals in central positions may rely on their strong ties and weak ties in ways that are different from the practices of those located in peripheral positions. Since central individuals have greater stores of social capital, they may be better able to leverage their position to maximize the benefits they can accrue from their strong ties and weak ties. Further, central individuals may develop a higher incidence of "multiplex ties" (ties that one may share with another person, e.g., friendships, work, family, etc., see Ward and Reingen, 1990), which may provide greater opportunities to increase and utilize their social capital. Thus, integrating social ties with structural elements of networks may provide rewarding insights on how individuals build and maintain their storage of social capital.

Second, while it has been established in the literature that social capital can occur at varying levels of a social structure (Paxton, 1999; Putnam, Leonardi, & Nanetti, 1993), I focus only on the micro (i.e., individual) level of social capital. Thus, this research is limited to understanding the social capital benefits accrued from relationship ties within the network as opposed to the macro (inter-network) level of analysis. Unfortunately, this approach ignores the much larger impact of the macro-level view of networks on consumer behavior. As such, future research should explore the integration of micro- and macro-level variables in understanding the effects of networks and social capital on consumer outcomes.

There is a variety of ways to study macro-level variables. First, researchers can examine the *density* of networks. Network density, by definition, is the number of social ties divided by the number of all possible ties (Scott, 2000). Individuals in dense networks share cognitive cohesion, shared language, and a similar frame of reference (Morrison, 2002). Second, researchers can examine the *size* of the network. The characteristics of a small network are bound to differ from those of a large network (Wasserman & Faust, 1994). Goldenberg, Libai, and Muller (2001) found that the smaller the network size, the more its members tend to be homophilous and have similar attitudes (e.g., brand congruence). These are two of the many macro-level network variables that can be studied, both of which have the potential to influence the development of an individual's social capital. Thus, it may be worthwhile to integrate both a micro-level and a macro-level view of analysis to further advance our understanding of structural positions in consumer networks.

Finally, all the studies conducted here involved the exploration of off-line social networks. Given the emergence of the Internet and social media tools such as Facebook, MySpace, and Twitter, marketers are paying increasingly more attention to finding ways to develop productive relationships (and, as a consequence, build social capital) in these networks. In particular, marketers are eying the emergence of E-Networks (e.g., online brand communities; Kozinets, 2002). These communities are of great interest to marketers because brands, culture, and social communication uniquely interact to play a role in how consumers influence and share information with one another.

In recent years, companies have devised creative ways to become "connected" to consumers in online environments. For example, many companies are appearing on Twitter, while marketers on Facebook are providing coupons to those who have become "friends." These are just a couple of examples that illustrate how marketers are not only attempting to create an online presence, but are also discovering innovative ways to become a *part* of an individual's social network. *How* such status (or structure) in online networks can provide advantages and benefits for consumers remains relatively unknown. Marketers have always attempted to identify select individuals, otherwise known as "influentials," who can be approached in order to facilitate the diffusion of company information (Gladwell, 2000; Keller & Berry, 2003). The field of marketing might benefit from knowledge of centrality, since centrality provides companies with opportunities to build their own social capital and tap into the strength of these influential figures, particularly in online settings. Therefore, it may be fruitful to consider the structural properties of E-networks in order to derive some key insights for marketers who are interested in developing social capital in these online networks.

In sum, the study of consumer networks provides a novel way to look at key marketing concepts, and it also creates potential for exploring new concepts to advance our understanding of consumers. For instance, much of the past research on social relationships has been dyadic, limited in scope, and has not truly captured how information travels from one person to another in community networks. Fortunately, the exploration into social networks and social capital that is borne from those networks provides opportunities to research some of the limitations that have restricted academics in the past. By using network theories and analysis, this dissertation advances the comprehension of social capital, opinion leadership, susceptibility to influence, information-seeking behavior, and materialism, while further contributing to marketers' understanding of the promising domain of consumer networks.

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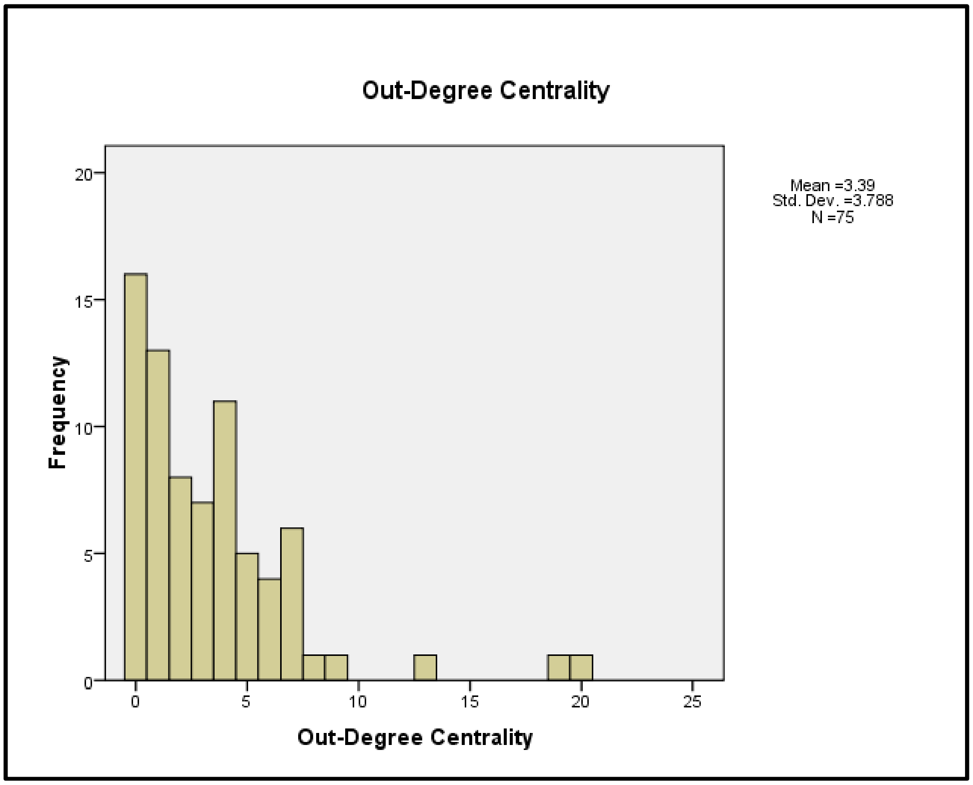
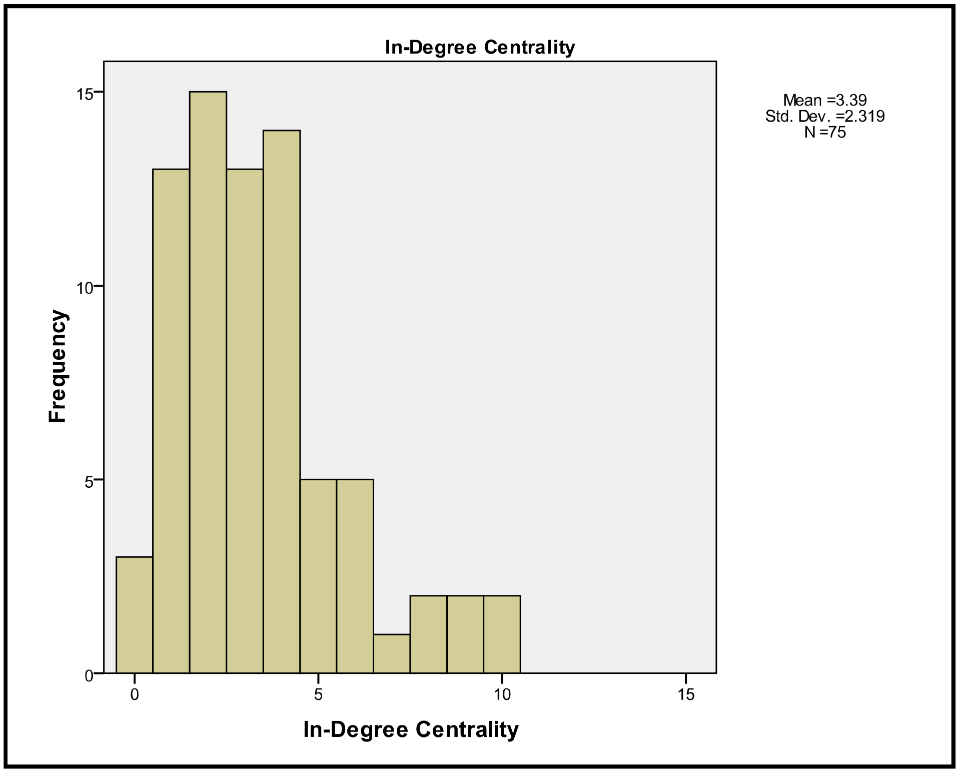
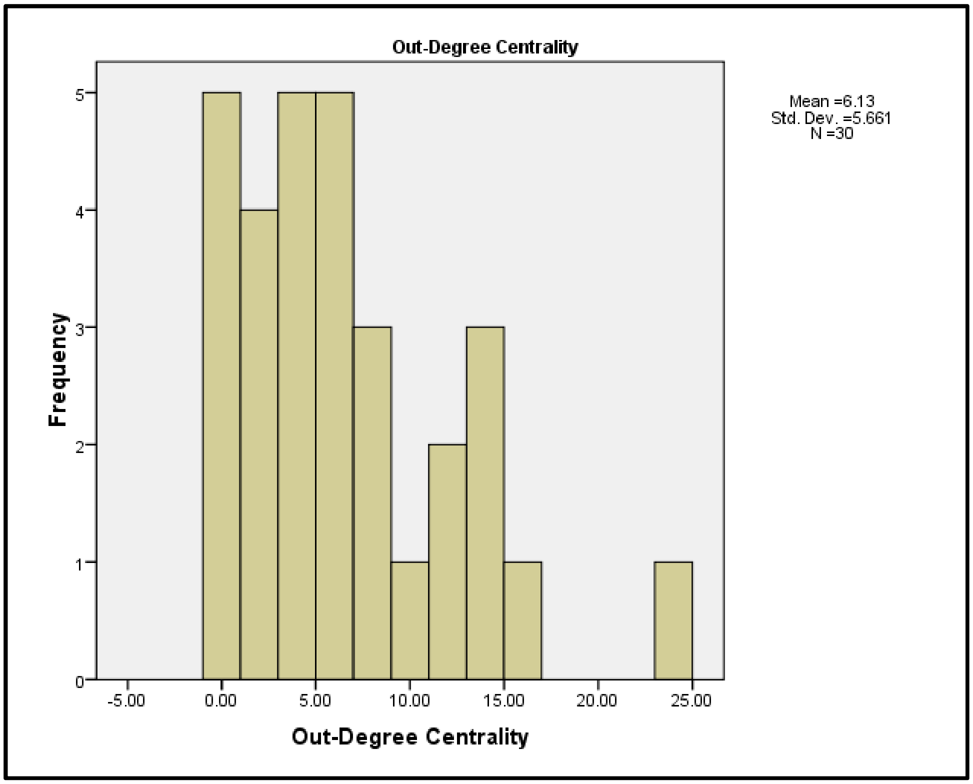
Appendix A: Degree Centrality Histograms

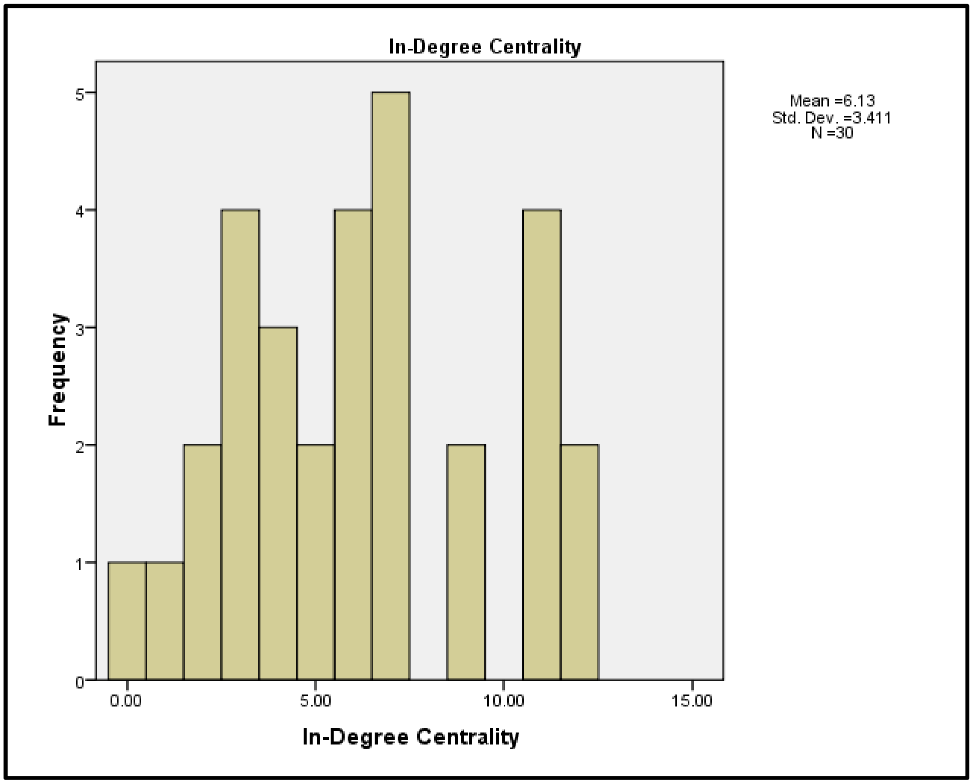
Study 1



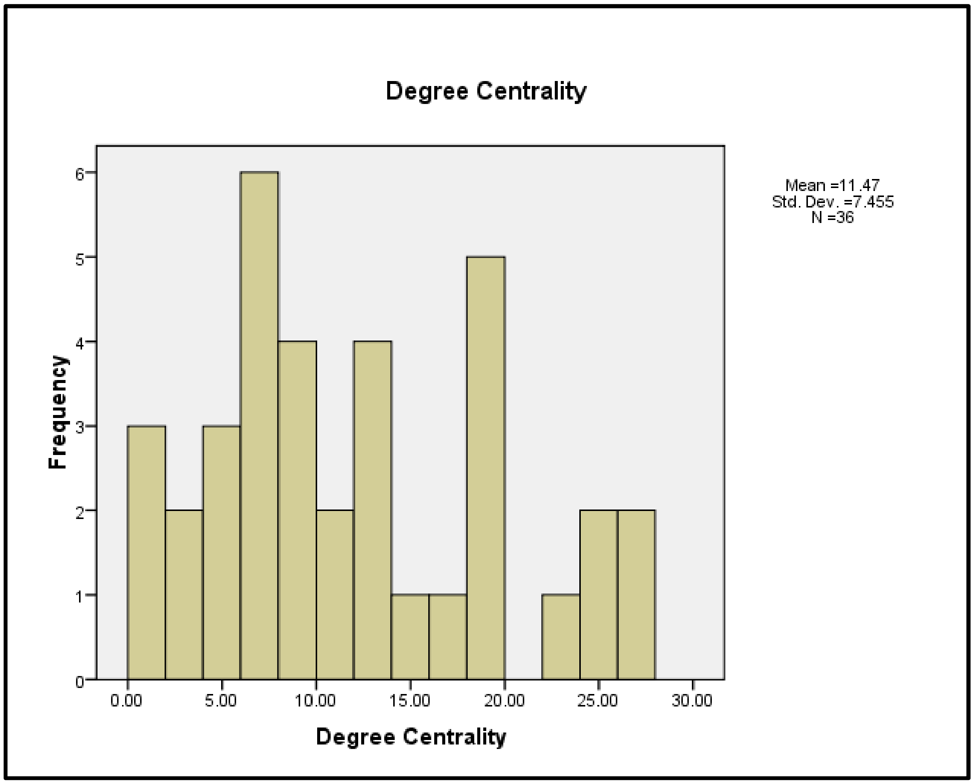


Study 2

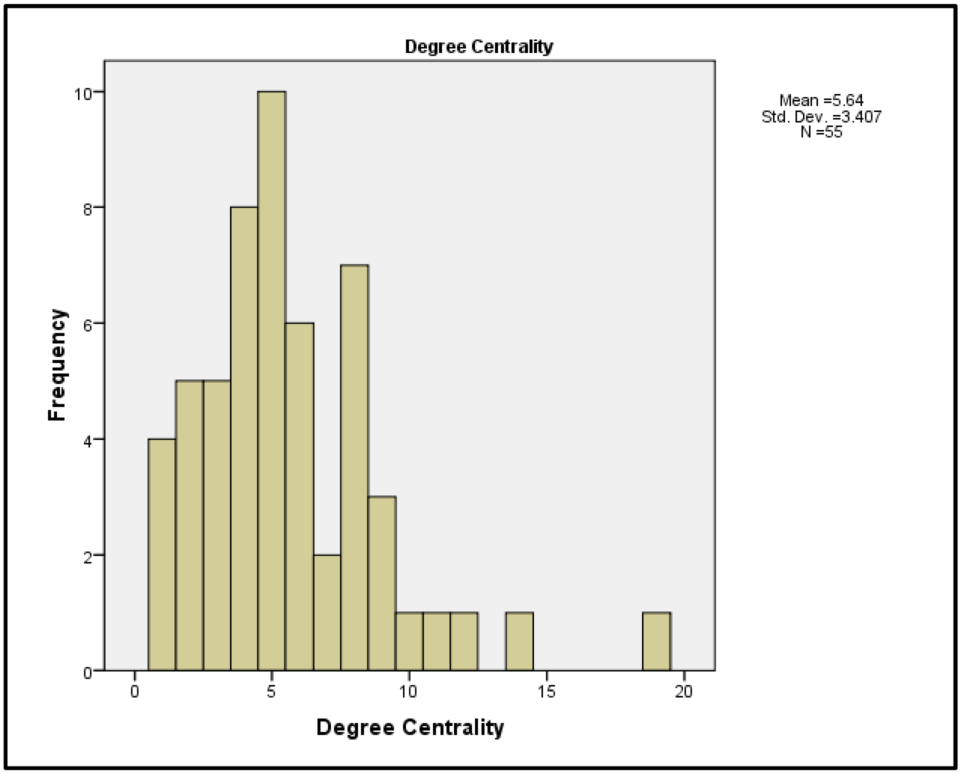

Out-Degree Centrality
Mean =6.13
Std. Dev. =5.661
N =30
Frequency
0
1
2
3
4
5
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
Out-Degree Centrality


In-Degree Centrality
Mean =6.13
Std. Dev. =3.411
N =30
Frequency
0
1
2
3
4
5
0.00
5.00
10.00
15.00
In-Degree Centrality

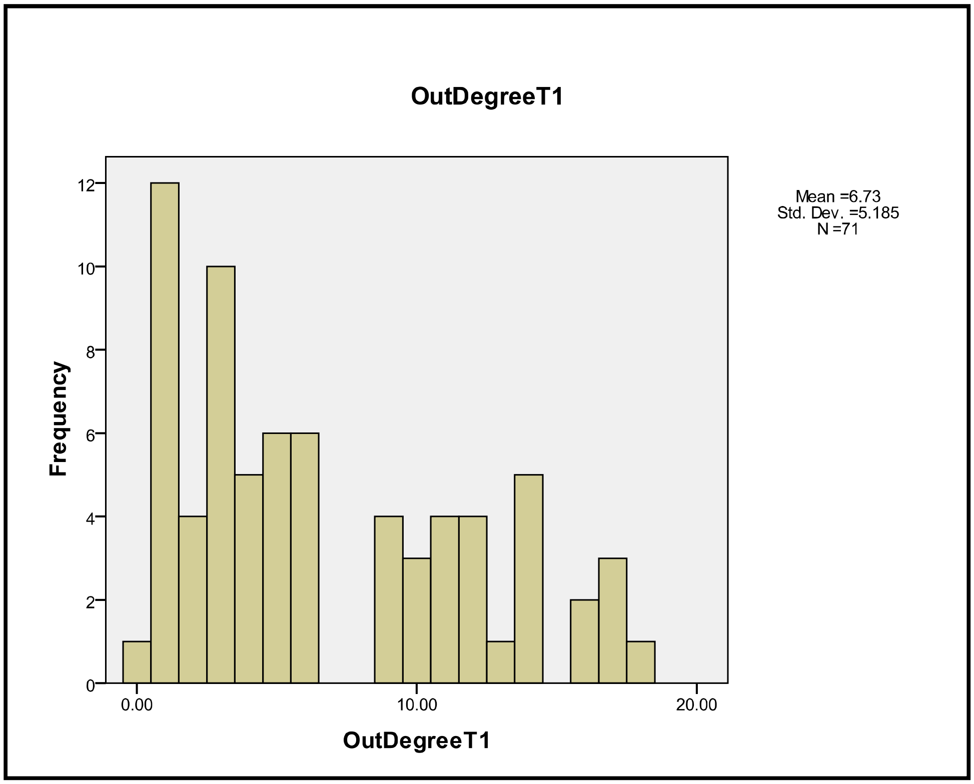
Study 3

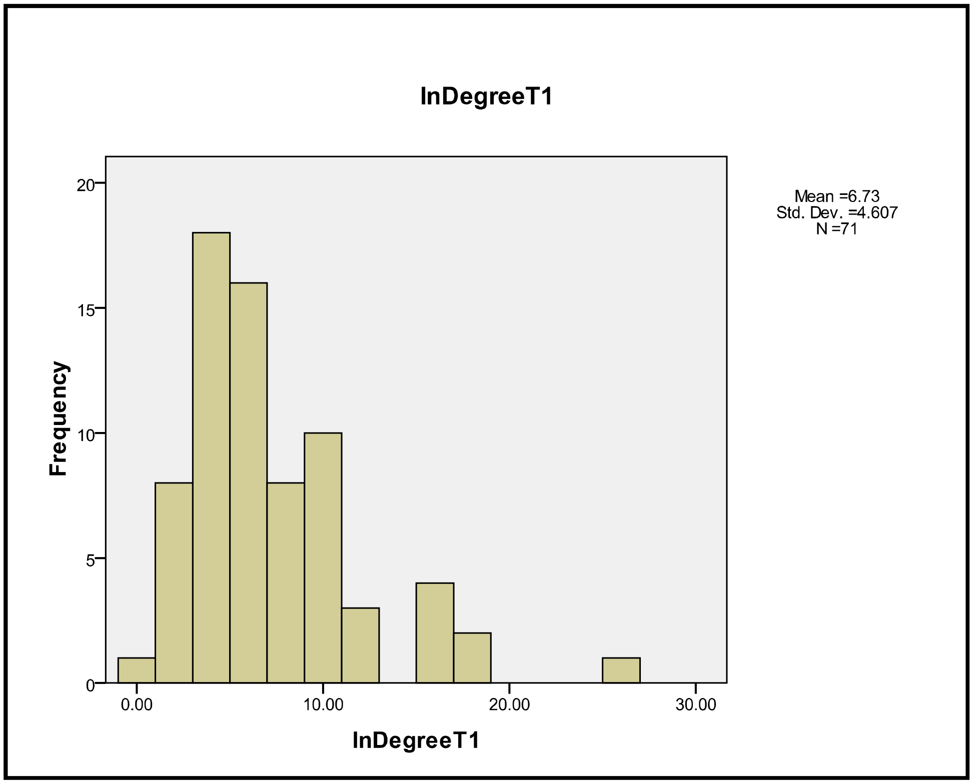


Study 4

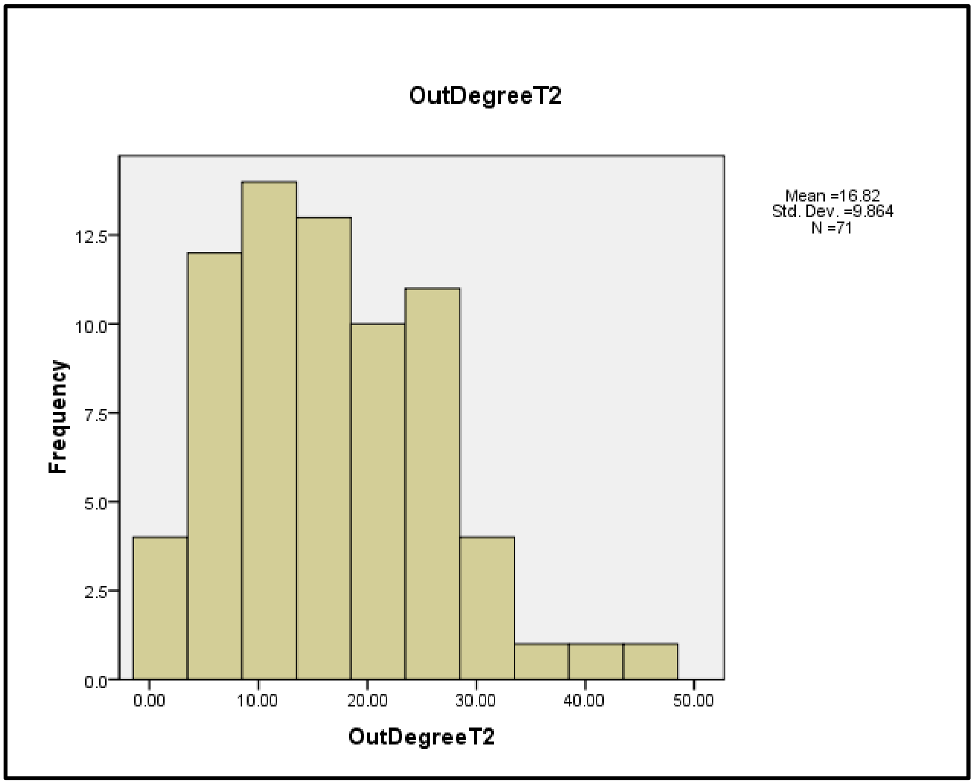


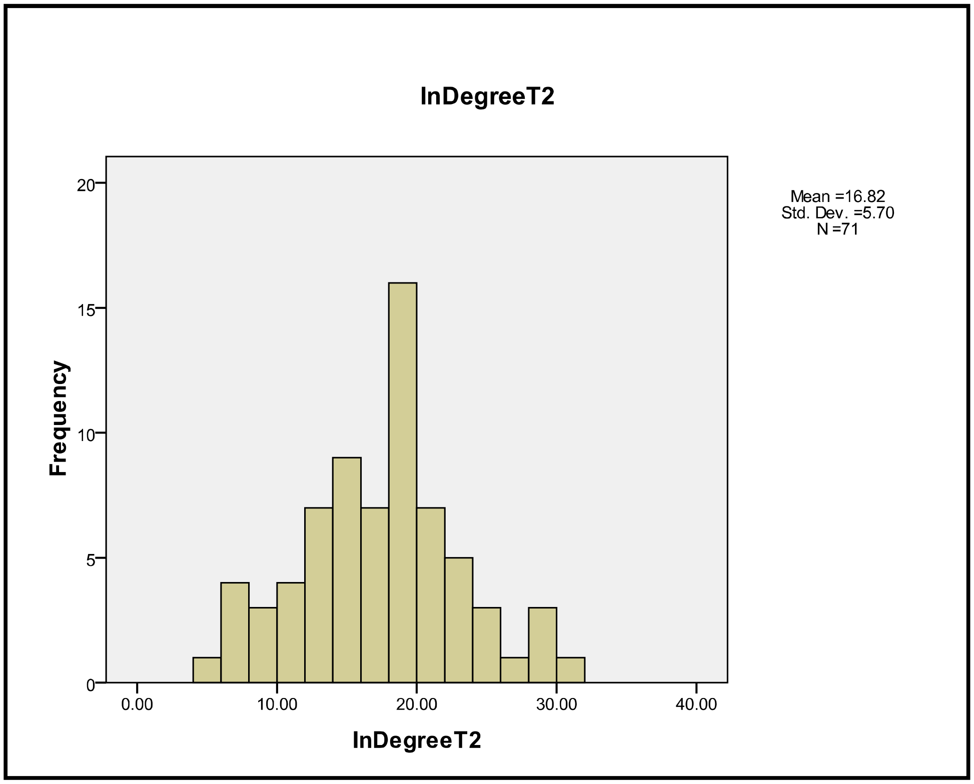
Study 5 (Time 1)





Study 5 (Time 2)





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