Networked Information Behavior in Life Transition

by
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Abstract

FREDERIC D. STUTZMAN: Networked Information Behavior in Life Transition.
(Under the direction of Gary Marchionini.)

This study explores the supportive and informational uses of social network sites that facilitate adaptation to transition. Adaptation to transition is a complex process contingent upon the management of stress associated with transition and general integration into the transitional environment. This study focuses on the transition to college, a major life event requiring integration into new settings, the negotiation of informational challenges, and the mastery of new roles and identities.

Social network sites represent a connective infrastructure within personal networks. Because social network sites are inherently connective, they afford a location for provision and receipt of social support during transition, and a site for the acquisition of information necessary for integration into the transitional environment. Drawing on data collected directly from a social network site that describes the networked activity of a freshman class over the course of their first semester at college, from a sample survey of freshmen with 1,198 respondents, and from 15 semi-structured interviews, this research has two primary components.

In the first component of analysis, I explore the structure and dynamics of socio-technical networks during transition. Using exponential random graph modeling, I identify the role and magnitude of preference, socio-demographic, and configuration factors in structuring socio-technical networks during transition. I then use an econometric framework to demonstrate that certain types of information sharing and profile change are associated with socio-technical network growth.

In the second component of analysis, I explore uses of social network sites that facilitate adaptation to transition. Using multiple regression and structural equation modeling, I demonstrate that supportive and social-informational uses of social network sites in transition exert a direct and mediated positive effect on overall adaptation. I then draw on interviews to explore supportive and informational uses of the social network site during transition, finding that social network sites are useful in pre-transition preparation, for social adaptation, and for academic support throughout the transition. Upon evaluation, I demonstrate that a social network site is a useful place to turn for the social and informational support that facilitates adaptation to transition.

To Chelcy, Freddie, and the player to be named later.

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Chapter 1

Introduction

Throughout the life course, an individual engages in a series of transitions that shape him or her personally and in the eye of society (Elder, 1994, 1998). Transition can be conceptualized as a period in which an individual's schema, or sense of understanding of the world, is interrupted. The basic challenge of transition is to master the world anew (Mandler, 1990). In this study, I show that social network sites play a useful role facilitating adaptation to transition.

1.1 Research Question

When an individual is in transition, the primary challenge is to adapt to the transition (Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989). Adaptation is a complex process requiring the management of stresses associated with transition, as well as general integration into the transitional environment. Success in adaptation to transition exerts a strong, positive influence on the individual's life trajectory (Hogan and Astone, 1986; Schlossberg, 1981).

During transition, an individual must manage the stress of transition. Stress is a construction referring to "any environmental, social, or internal demand which requires

the individual to readjust his/her usual behavior pattern" (Thoits, 1995, p. 54). Reaction to transition can be quantified through measurement of stress associated with the transitional period. Individuals with higher levels of stress generally report depressive mood, poor health outcomes, and reduced social well being when compared to individuals with lower levels of stress.

An individual in transition must also integrate into the transitional environment (Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989). There is agreement on three primary factors of integration. As transitions are normative, governed by structural rules and expectations, successful integration first involves learning to play the role acquired through transition. Transitions pose many informational challenges; individuals must learn to navigate the transitional lifeworld that they occupy. Finally, transitions require the development of a supportive network before, during, and after the transition. The individual in transition can then call on this network for support.

Over the last thirty-five years, researchers across a range of disciplines have focused on the relationship between social support and stress. The work of Cobb (1976) and Cassel (1976) established the first major hypothesis regarding social support: that social support was valuable as buffer against stress. Individuals with higher levels of social support reported lower stress levels, a finding that has been robust across outcome, situation, and empirical method. Therefore, the development of a supportive network during transition stands to mitigate the stress of transition and increase overall adaptation.

Social network sites are a connective infrastructure within personal networks, and are well suited to address the needs of individuals in transition. Because social network sites are inherently connective, they afford a location for the provision and receipt of social support during transition. Furthermore, social network sites represent a powerful

collaborative information ground, to which individuals can turn for information about the transitional environment. Social network sites afford novel solutions to the two primary challenges of transition, which makes the study of social network site use during transition worthwhile.

1.2 Structure of the Analysis

This study explores the structure and processes of social network site use during the transition to college. The transition to college is a major life event requiring adaptation to new settings, informational challenges, and role identities (Terenzini et al., 1994). The transitional period is one of significant stress, with positive social support associated with successful adaptation (Pratt et al., 2000). The social network site is a place where the student can address the informational challenges of transition, and draw support from a group of alters[1].

Adaptation to transition is a function of an individual's supportive network and their ability to integrate to the transitional environment. In this study I examine two questions regarding the use of social network sites during transition. First, I explore the structure and dynamics of networks articulated in a social network site during transition. Second, I identify how the social network site is used for integration into the transitional environment. Using a range of methods, the goal of this analysis is to address these two essential questions.

In this dissertation, I draw on three analytics components across two coherent data sets. With these components, I explore the structural dynamics, uses, and outcomes of social network site participation during a life transition. Separately, these components make a substantial individual contribution to understanding social network site use

[1]In the analysis of personal networks, the term *alter* is used to describe other individuals, and the term *ego* is used to describe the self.

during transition. Together, the components represent a comparative methodology, one that I plan to extend in future studies of transition. The components of the study are described:

- **Component One**: Identification of factors of association in a social network site during transition, and longitudinal modeling of socio-technical support network during early-phase transition. This component draws on the Facebook profiles data set.

- **Component Two**: Modeling of relationship between social network site social-informational behaviors and adaptation/support outcomes. This component draws on the survey component of the spring 2010 data collection.

- **Component Three**: Qualitative analysis of social network site information behavior during transition to college. This component draws on semi-structured interviews completed during the spring 2010 data collection.

A secondary goal of this study is the exploration of a comparative methodology for studying transition in socio-technical systems. I am interested in how the analysis of large-scale observational data can be used to inform qualitative work, such as surveys or interviews. Following Russell's conception of sensemaking (Russell et al., 1993), I explore how the analysis of macro-social structure as articulated in network data sets can contribute to an understanding of the transitional process. Within Chapters 4 and 5 the reader will note that, in some cases, variable or question choice is influenced by the structural analysis of component one.

Because the data sets I employ are from two different populations, they are not directly comparable. When indirectly compared, however, a picture emerges that is fairly consistent between data sets and analyses. During a life transition, I observe

that a social network site is a useful place to turn for the social and informational support, which in turn facilitates adaptation.

1.3 Significance of the Proposed Research

In conducting this research, I have four goals:

1. Substantively explore how supportive and informational uses of social network sites facilitate adaptation to transition. Within this goal I have two primary sub-goals:

   (a) Understand the dynamics of socio-technical networks (e.g. networks within a social network site) during transition.

   (b) Identify outcomes and uses of social network sites that facilitate adaptation to transition.

2. Demonstrate a mixed-methods approach to the study of transition that combines the analysis of large scale observational data, survey research, and qualitative interviews. Explore how the components of the methodology may inform each other.

3. Contribute valuable findings to a growing body of interdisciplinary work that explores the outcomes of information and communication technology (ICT) use, in transitional settings and otherwise.

4. Produce a set of policy and design guidelines that identify valuable technical affordances and social practices in social network sites that facilitate adaptation to transition, and explore how these guidelines may apply to a range of transitions.

Interdisciplinarity in ICT research

Like many studies within the fields of information science and human-computer interaction, this study is interdisciplinary by necessity. In particular, this study draws on the fields of sociology, psychology, communications, health behaviors, and the information and computer sciences. A primary challenge of interdisciplinary research is scope; while this study spans multiple disciplines, the research question and analyses remain focused on two primary questions: understanding the dynamics of socio-technical networks during transition, and identifying outcomes and uses of social network sites that facilitate adaptation to transition.

This venture into interdisciplinary research was aided by two primary factors. First, the study of information and communication technology use during transition has a substantial interdisciplinary lineage (e.g. Chen and Katz, 2009; Cummings, Lee, and Kraut, 2006; Grinter, Palen, and Eldridge, 2006; Handel, 2007; Quan-Haase, 2007; Shklovski, Kraut, and Cummings, 2006), which I was able to draw on while structuring this research. Second, the processes I study — transition, support, and adaptation — are extensively theorized across discipline. Furthermore, scholars of transition have been working across discipline for several decades, which is not surprising considering the practical importance of the topic.

1.4 Structure of the Dissertation

This dissertation is arranged in six chapters. In Chapter 1, *Introduction*, I present the dissertation, the research questions and methods, and discuss the significance of the research.

In Chapter 2, *Literature Review*, I present literature relevant to the research questions and analysis. The goals of the literature review are: First, to provide an overview

of social network sites, exploring factors affecting disclosure in social network sites, and identifying the role of social technology during transition. Second, to provide both practical and theoretical overview of transitions. Third, to explore factors associated with adaptation to transition, exploring how social network site use may facilitate transition. Finally, to provide background for the motivations of this study using relevant theories of information needs, uses, and behaviors.

In Chapter 3, *Research Design*, I present the study's research framework. Particularly, I describe the primary research questions, describe data collection, and provide an overview of the analytic strategies. It is in this chapter that I present the formal models employed in the quantitative analyses conducted in the study.

In Chapter 4, *Network Dynamics During Life Change*, I describe the analysis of a data set of Facebook profiles collected in 2005. Collected over the course of the fall semester, 2005, this data set captures the profiles and networks of a transitional cohort over their first semester at college. In the first component of the analysis, I identify factors associated with the establishment of connections in the networks data set. In the second component of the analysis, I use statistical analysis to test hypotheses regarding factors associated with the growth of networks in the social network site during transition. Coupled, this analysis provides an in-depth picture of the structure and dynamics of supportive socio-technical networks during transition.

In Chapter 5, *Supportive Properties of Social Network Sites*, I describe the analysis of survey and interview data collected during the spring of 2010. Drawing on the survey data, I employ quantitative analysis to explore the relationship between the use of social network sites for support and integration during transition and overall adaptation to transition. Next, I analyze the interview data, exploring supportive and informational uses of social network sites during the transition to college. This analysis provides insight into processes of support in social network sites during transition, and

information behaviors supporting adaptation to transition.

In Chapter 6, *Discussion and Conclusions*, I first provide a general summary of findings, identifying how my analysis answers the two core research questions. Next, I identify limitations of the data collection and analysis. I then describe the study's comparative methodology and cross-cutting findings, focusing on how the components of this mixed-methods analysis of transition speak to one another. Based on these findings, I discuss implications for policy and design. I conclude with the discussion of a research agenda to extend this analysis.

1.5 Summary

In this research, I identify how supportive and informational uses of social network sites facilitate adaptation to transition. Drawing on data collected directly from Facebook, from a sample survey, and from semi-structured interviews, I have two primary goals for this research. The first goal of the research is to understand the dynamics of socio-technical networks (e.g. networks within a social network site) during transition. The second goal of the research is to identify uses of social network sites that facilitate adaptation to transition.

Chapter 2

Literature Review

Modern life is characterized by transition. Completing education, moving between jobs and residential relocation are examples of the transitions that challenge us, enable personal growth, and facilitate the construction of our life stories. Common transitions include developmental transitions, situational transitions, and health-related transitions. Other forms of transition, including role transitions, social and legal transitions, and individualistic transitions can be comprised of a series of transitions or life events (Arnett, 1997, 2001; George, 1993; Liddle, Carlson, and McKenna, 2004). In general, a transition can be theorized as an interruption, in which one's schema, or sense of understanding of the world, is interrupted and new discrepancies are revealed (Mandler, 1990). The individual in transition seeks resources which help them address transition-related discrepancies and construct a new schema. Though the process of transition is commonplace, reaction and adaptation to transition exert a strong influence on an individual's life trajectory (Hogan and Astone, 1986; Schlossberg, 1981).

Studies of transition cover a wide range of events spanning the life course. The transition to adulthood, relocation, career change and the death of a loved one are exemplar transitions. Many studies of transition, particularly those with disciplinary roots in psychology or sociology, examine the relationship between transition, stress,

and *social support* (Bardi and Ryff, 2007; Brissette, Scheier, and Carver, 2002; George, 1993; Wheaton, 1990). Social support is a construct that measures the beneficial aspects of relationships. The general components of social support are instrumental aid, emotional aid, and informational aid (Cohen and Gottlieb, 2000; House, Umberson, and Landis, 1988). Researchers have identified two ways in which social support mitigates stress; these two mechanisms are known as buffering and main effect hypotheses (Cohen and Wills, 1985). The buffering hypothesis, rooted in the analysis of Emile Durkheim (e.g. 1951), explores the relationship between stress-related health outcomes and the support provided by social groups. The main effect hypothesis, on the other hand, examines the direct relationship between one's social connections and one's stress-related outcomes.

The location of resources, the establishment of friendships, and maintenance of ties to supportive family and friends are social-informational processes that are commonly enacted within and between virtual and physical spaces. This is especially so on the college campus. Just as the dormitory is a physical space for interaction, the social network site is a key virtual space for communication and transmission of information and support (Bumgarner, 2007; Ellison, Steinfield, and Lampe, 2007; Joinson, 2008; Lampe, Ellison, and Steinfield, 2007, 2008). This study explores how supportive and informational uses of social network sites facilitate adaptation to transition.

Social network sites, such as Facebook and MySpace, are ICT's that support the enumeration of one's social networks (boyd and Ellison, 2007). These sites provide a mediated space for communication, discovery of social information, and socialization into larger cultures and social identities. The core component of a social network site is a profile. The profile is a place to share pictures and personal information, host applications, and enumerate connections with friends. The profile and derivative activity shared through news feeds provide ongoing information interaction between an

individual and his or her social network. In addition to profile-centric communication, social network sites provide numerous affordances for off-profile communication, such as through chat systems or direct messaging. The social network site acts a nexus for information and communication on the college campus.

This literature review is presented in five sections; each section is of theoretical and practical relevance to the study. The sections are are: Social Network Sites, Perspectives on Transition, Stress and Transition, Models of Information Behavior, and Collaborative Information Behavior and Social Network sites. The goals of the literature review are: First, to provide an overview of social network sites, exploring factors affecting disclosure in social network sites, and identifying the role of social technology during transition. Second, to provide both practical and theoretical overview of transitions. Third, to explore factors associated with adaptation to transition, exploring how social network site use may facilitate transition. Finally, to provide background for the motivations of this study using relevant theories of information needs, uses, and behaviors. I present a brief overview and summary of each section's goals:

Social Network Sites: In this section, I first introduce social network sites, providing basic history and adoption data. I then explore factors that may affect disclosure on social network sites. Finally, I present relevant theoretical approaches to social network sites. The latter two components of the review are presented to identify contextual aspects of social network site use that may interact with the research outcome.

Perspectives on Transition: This section provides a range of perspectives on the concept of transition. Primarily, it focuses on cognitive perspectives on transition (e.g. Transition as Interruption), as well as theories of transition and adaptation to transition. The goal of this section is to understand the process of transition, and to elaborate the factors that contribute to successful transition to college.

Stress and Transition: This review presents major theories associated with life transitions, drawing primarily from sociology, organizational behavior, health behaviors, and psychology. The goal of this review is to provide a theoretical and instrumental approach to the quantitative analysis of social network sites during the transition to college. To this extent, I have specified general models, as well as variables that structure the analytic approach to evaluating transition.

Models of Information Behavior: In this review, I cover basic models of information needs, uses, seeking and behavior. This review provides the Information and Library Science disciplinary framework for the study. Major theoretical approaches and applications are covered, with a focus on how information behaviors are applied in social network sites.

Collaborative Information Behavior and Social Network Sites: The final review explores mid-range information theories that have particular relevance to the context of social network sites. This review provides the major background for the qualitative analysis of how social network sites are integrated into the information behavior of transitioning students.

This literature review provides an interdisciplinary theoretical framework for the study of socio-technical information behavior during transition. At the conclusion of the review, the reader has covered general and specific theories of transition, factors contributing to successful transition, and literature exploring how social and informational behaviors in social network sites may contribute to positive outcomes during transition.

2.1 Social Network Sites

2.1.1 Adoption and use of social network sites

Social network sites are websites such as Facebook, MySpace, LinkedIn and Twitter that facilitate the enumeration of, and communication within, an individual's social network. Used by individuals of all ages, social network sites are particularly popular among young people. In a recent Pew Internet and American Life Project survey, approximately one half (47%) of online Americans adults reported using social network sites, with adoption by 73% of those aged 12-17, and 72% of those aged 18-29, and 40% of those 30 and older (Lenhart et al., 2010). These recent numbers highlight the growth of social network sites; in 2007, by comparison, 45% of those aged 12-14, and 65% of those aged 15-17 reported use of social network sites (Lenhart et al., 2007).

On social network sites, individuals construct and enact their digital identity. To do so, they craft a profile, establish social place by listing connections, and traverse these articulated friend lists (boyd and Ellison, 2007). Individuals also engage in message-based communicative social interaction, taking part in multiple contextual discourses within the network. A number of factors draw users to social network sites. The sites provide a fun and efficient space for connecting with friends and acquaintances (Bumgarner, 2007). They provide useful tools, including directory-like functions and efficient messaging systems for enhanced communication (Joinson, 2008). Perhaps most interestingly, the sites provide a means for learning about and keeping track of large numbers of people, enabling new forms of broad-based peer-to-peer social surveillance (Lampe, Ellison, and Steinfield, 2006).

This section provides insight regarding the supportive nature of online community, particularly social network sites. First, I present theoretical and applied analyses of

social network sites. I then explore concepts of privacy and security in social technologies, and particularly social network sites. Finally, I present perspectives on the supportive nature of online communities during transition. This section identifies the processes, outcomes, and constraints regarding how social and informational support is provisioned in online communities during transition.

2.1.2 Perspectives on social network sites

Individuals have long used technology to connect, coordinate, and collaborate with others. Management and coordination of the social life through technology is documented back to early communication technologies (Fischer, 1992; Standage, 1998). With the development of the Internet, we have migrated components of our lives to the 'net. Technologies such as Internet relay chat (IRC), multi-user dungeons (MUD), instant messengers (IM), email, and weblogs demonstrate the connective and socially transformative power of the medium (e.g. Herring, 2002; Turkle, 1995). Internet technologies connect us, cross hierarchy, and foster novel forms of interpersonal communication. The popularization of social network sites represents a natural extension of the Internet's communicative affordances. Social network sites allow us to find one another, to share content, and extend our relationships.

Social network sites first appeared in the late 1990s; the site SixDegrees is cited as the first social network site (boyd and Ellison, 2007). While a novel concept, SixDegrees was not commercially viable. The first social network site to achieve mass popularity was Friendster, introduced in 2002. Originally intended to be a dating site, Friendster proved popular with a number of subcultural communities in the San Francisco area (boyd, 2006). Boosted by adoption and high market penetration in these 'net-connected, Internet-savvy populations, the site became a mainstream success and introduced social network sites to a relatively wide audience.

Following the lead of Friendster, many social network sites were launched with varying success. Notable successes include MySpace, Facebook, and the business-networking site LinkedIn. Launched in 2004 as a college-only social network site, Facebook has grown to be the most popular social network site, with 71% of online Americans thirty and under having a profile (Lenhart et al., 2010). According to self-reports, Facebook has 400 million users in 2010, up from 200 million in 2009 (Zuckerberg, 2010). In studies of social network site use on American campuses, Facebook is uniformly the most-used social network site (Acquisti and Gross, 2006; Ellison, Steinfield, and Lampe, 2007; Stutzman, 2006; Stutzman and Kramer-Duffield, 2010). In recent years, Facebook's growth has been challenged by the upstart messaging platform Twitter, though research demonstrates that Twitter is not as popular as Facebook among young people (Lenhart et al., 2010).

2.1.3 Activity and interaction

In the introduction to the *Journal of Computer Mediated Communication* special edition on social network sites, danah boyd and Nicole Ellison provide a working definition of a social network site. Social network sites "allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connection and those made by others within the system" (boyd and Ellison, 2007, p. 2). This definition helps us establish the difference between a social network site and a forum or message board, but does not limit the scope of social network site to clones of exemplar sites Friendster, MySpace or Facebook. Twitter, for example, is often called a "status-updating" service, though it generally falls in line with the definition of social network sites.

In a social network site, the profile serves as the core identity representation, and

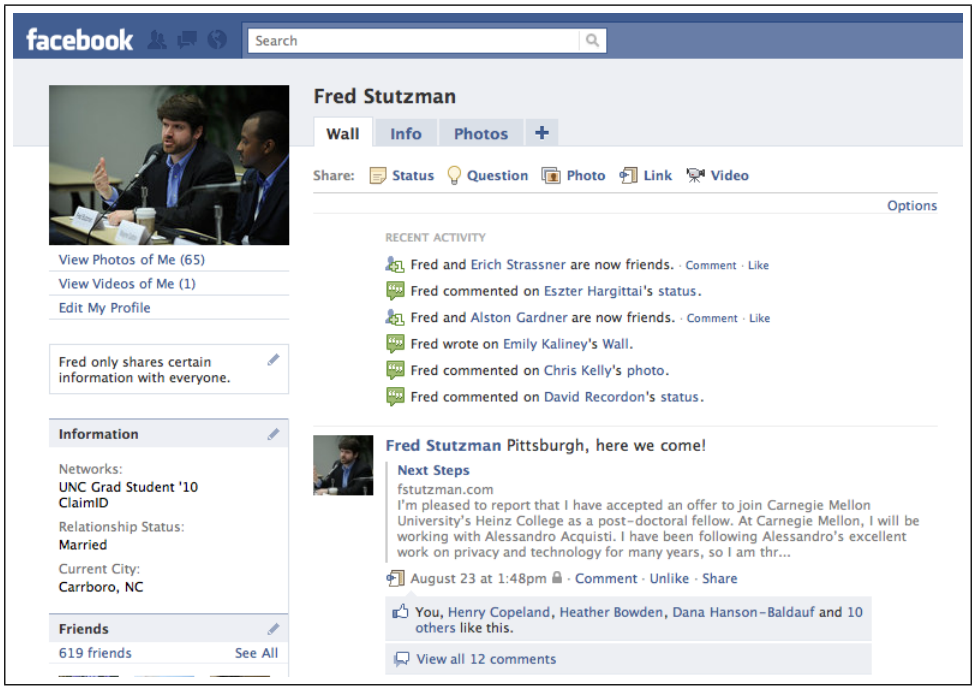


Figure 2.1: Example of a Facebook profile page, ca. 2010

as such, it acts as the individual's digital body and point of mediated interaction (boyd and Heer, 2006; Lampe, Ellison, and Steinfield, 2007). To construct a profile, one generally fills out a form, disclosing information such as one's name, birthday, hometown, interests, and favorite books and movies (e.g Liu, 2007). The individual will often upload pictures or join interest groups to complete the profile, creating a digital representation of his or her life and interests. Once the profile is constructed, the individual connects with others through the establishment of *friendships*. Friendships in social network sites generally require a reciprocal agreement; one individual will add another as a friend, and if the added friend concurs, a reciprocal dyadic bond is established. Due to the dyadic nature of ties in social network sites, there is generally structural equivalence between friends. This does not map elegantly to real-world networks, where bonds of friendship have varying strength and differing disclosure norms (Gilbert and Karahalios, 2009).

In recent years, the development of *news feed* mechanisms has affected the nature of interaction in social network sites. Initially developed by Facebook in 2006, the news feed is a mechanism that provides updates on the implicit and explicit activities of one's friend network (Hoadley et al., 2010). In a social network site, it is challenging to maintain awareness of one's activity partners; doing so would require digitally "visiting" the profiles of all friends to check for updates. The news feed solves this problem by automatically reporting a select subset of network activity. Facebook's rollout of the news feed raised privacy alarms (e.g. Hoadley et al., 2010); however, it has since proven to be a useful tool for spreading information through networks (Sun et al., 2009), and motivating content production in networks (Burke, Marlow, and Lento, 2009).

2.1.4 Motivations and contexts of use

Why do people use social network sites, and how do they perceive the sites? In the following section, I present research that identifies motivations for social network site use. Primarily, I draw on exploratory work that examines social network sites with a uses and gratifications framework. I then present boyd's concept of "networked publics." Networked publics are digital spaces where users can engage in open discourse, away from the boundaries established by parents and society (boyd, 2008, pp. 124-126). I conclude by presenting research perspectives on disclosure and privacy in social network sites.

Uses of social network sites

In the past four years, there has been an explosion of research regarding social network sites. Research by Bumgarner (2007), Joinson (2008), and Park, Kee, and Valenzuela (2009) has explored why people use social network sites, employing uses and gratifications methodology. Commonly used in media studies, uses and gratifications is an

exploratory method for assessing motivations of media use (e.g. Stafford, Stafford, and Schkade, 2004). The following studies rely on an exploratory factor analysis (EFA) of survey data.

In 2007, Bumgarner explored the motivations of Facebook use at the University of North Carolina at Chapel Hill. The primary motivations (>3.0 on a Likert scale) for Facebook use was the software's *social utility*, its *directory* functions, *voyeurism*, *group participation* (termed "herd instincts") and the *collection and connection* of friendships. Compressing these categories, Facebook is therefore a social and social-informational space. By social, I refer to digital participation in small groups, large groups, and social identities; these groups and identities are grounded in offline contexts (Lampe, Ellison, and Steinfield, 2006). The second categorization, social-informational, refers to the use of Facebook as a space rich in information about situationally relevant, ongoing social activity. By using Facebook as a directory or for voyeurism, the individual learns about the surrounding world.

Bumgarner's findings identify the social and social-informational orientation of social network sites. Bumgarner's primary identified use of Facebook, *friend functions*, correlates with the concept of digitally participating in and managing one's social world. By finding out about friends, through the collection of personal and practical information, Facebook users are able to gain a new perspective on the social world. As Bumgarner notes, "Counter to what may be intuitive, the primary way in which Facebook contributes to socializing isn't by offering a medium through which people can meet and communicate with others. Instead, it's by acting as a virtual watering hole that dispenses information about peers" (Bumgarner, 2007, "Conclusion," para. 62).

Joinson (2008) employs a similar methodology in his study of Facebook, but with a sample that is international (UK) and older ($\sim$26) than the college-age participants of Bumgarner's study. Even with these important differences, Joinson's findings are in

line with Bumgarner's work. According to Joinson, people use Facebook primarily for *social connection, shared identities, content sharing* (photographs, updates), and *social investigation* (voyeurism). By participating in Facebook, one acquires information about alters that potentially facilitates participation in groups and shared identities. This can happen functionally; one could find out about ongoing events for participation by watching the news feed (Burke, Marlow, and Lento, 2009). It can also happen strategically; one could find out about shared interests or commonalities for use as a strategic information resource (Hancock, Toma, and Fenner, 2008).

Park, Kee, and Valenzuela (2009) conducted a uses and gratifications study of social network site use at two universities in Texas, focusing on group participation. The authors found four motives for participation in Facebook groups: *socializing, entertainment, self-status seeking,* and *information seeking.* These motivations line up well with previous findings; participating in Facebook is both a social and social-informational process. For college students, whose identities are in flux, the social network site seems to serve a valuable role as an information resource and a place for experimentation with individual, group and social identities.

In addition to the work already discussed, a range of other studies have explored motivations of social network site usage. Utilizing an undergraduate sample, Ross et al. (2009) demonstrated the role of extroversion in participation in Facebook groups, as well as a desire for communication motivating Facebook use. Orr et al. (2009) explored the role shyness played in social network site use, finding that shyness was significantly correlated with positive attitudes towards social network sites, and time spent on social network sites. The work by Orr et al. highlights the potentially assistive role social network sites can play in social group integration during transition. Zywica and Danowski (2008) offer another perspective, demonstrating that both socially introverted and extroverted persons stand to benefit from social network site participation.

In conclusion, research has demonstrated that social network sites offer participants the opportunity for social participation and aggregation of social information. Social participation refers to both functional aspects of connecting and participating in a relevant social milieu, as well as experimenting with larger group and social identities. The collection and use of social information refers to discovering, using, and sharing information about fellow members of the cohort. Examples may include looking up a phone number, a functional use, or gathering taste preference information about a potential friend for purposes of voyeurism or social surveillance. Uniformly, social network sites are a vital information resource for users, particularly college students. The information gathered in a social network site is used in both offline and online contexts, with real-world outcomes. In the next section, I draw on boyd's ethnographic analysis to provide a contextual approach to use of social network sites.

Networked publics

In the previous section, I presented work exploring how and why people use social network sites. Using primarily psychological methods, researchers identified social and informational goals for using social network sites. As the use of social network sites establishes a bridge between offline and online contexts, it is important to investigate the implications of social network site use. In doing so, we can develop a rich picture of how and why people use social network sites, as well as social and structural factors affecting use.

Over the past ten years, boyd has conducted a series of ethnographic studies of youth practices in "networked publics" (boyd, 2008). To explore the relationships between youth technology use and structural forces, boyd (2008) elaborates four concepts of network publics. They are:

- *Persistence*: Acts performed in networked publics are archived.

- *Replicability*: Content made out of bits can be duplicated.
- *Scalability*: The potential visibility of content in networked publics is great.
- *Searchability*: Content in networked publics can be accessed through search. (p. 10)

In boyd's analysis, the components of the networked public — the places in which digital content is produced and shared in a social milieu — create and "reconfigure" the politics of information sharing. These elements structure practice, and should therefore be integrated into a contextual understanding of information practice in social network sites. I now elaborate the components of networked publics.

boyd's first component of networked publics, *persistence*, refer to the fact that "networked communications are recorded for posterity" (boyd, 2007, p. 126). In a social network site, implicit and explicit actions are recorded and displayed to a group of alters (with the level of disclosure varying from "general public" to a limited subgroup of connections). It is important to remember that actions in networked publics enter a database record, and are necessarily stored and represented in the infrastructure of the socio-technical system. Palen and Dourish propose the disclosure, temporal, and identity boundaries as ways to think about persistent representations in socio-technical systems (Palen and Dourish, 2003). The persistent component of networked publics both regulates content production and encourages producers to generate strategies to mitigate retrieval strategies (e.g. Stutzman and Hartzog, 2009).

The second component of networked publics, *replicability*, refers to the ease with which digital copies can be made of content. This property is unique to digital spaces, and lacks an offline analog. If one's profile, pictures, and digital identity can be easily shared, transferred, modified, and replicated, the producer must consider the ramifications of sharing. We see examples of the downside of replicability in stories of damaging

social network site photos or information disclosures (e.g. Grimmelmann, 2009; Solove, 2007). Of course, replicability is not only a "limiting" factor of use, it can also be an attractive feature of networked publics. The ability to effortlessly pass messages and replicate content is useful in many contexts, including political campaigns (Kohut, 2008) and times of emergency (e.g. Shaheen, 2008; Palen et al., 2009; Starbird et al., 2010).

The third component of networked publics, *scalability*, concerns the range of one's disclosure in mediated spaces. According to boyd, "while we can visually detect most people who can overhear our speech in unmediated spaces, it is virtually impossible to ascertain all those who might run across our expressions in networked publics" (boyd, 2007, p. 126). In interpersonal communication, we have an expectation of an audience grounded in the present context (e.g. Goffman, 1981). In a networked public, our conception of the audience is vague due to the digital mediation inherent in the communicative transaction. If one's profile is open to the "public," what proportion of the public will observe the utterance? Researchers have explored this questions, identifying differences between *intended* and *expected* audiences in networked publics (Acquisti and Gross, 2006; Stutzman and Kramer-Duffield, 2010). Furthermore, the perception of audience has been demonstrated to extend beyond technical boundary; even if one isn't "friends" with the powerful (potential employers, law enforcement), there is a perception that the powerful can view profile content (Lampe, Ellison, and Steinfield, 2008; Stutzman and Kramer-Duffield, 2010).

The final component of networked publics, *searchability*, refers to the affordances of digital spaces that enable search and retrieval of individual content. In classical social network theory, to connect to an alter in a network, one must connect "through" individuals. In this sense, networks act as brokers, limiting access to preestablished social connections. The searchable nature of networked publics transcends this brokerage in

certain ways. For example, a parent or employer may be able to find an individual's profile with search functions. This does not guarantee access to a profile, but it does demonstrate how the traditional network tie-brokering model of search was not necessary to locate the individual. Users of social network sites have pushed back on this affordance, creating mirror and secondary profiles, as well as using name obfuscation tactics to frustrate search tools. In doing so, they force alters to revert to tie-brokered models of search (e.g. boyd, 2007; Stutzman and Hartzog, 2009).

When analyzing behavior in social network sites, the networked public perspective introduces important explanatory factors influencing participation. A number of these factors are important in the understanding of disclosure behavior; the constraining or freeing role these factors play in disclosure has important implications for the support one experiences in a social network site.

2.1.5 Disclosure in social network sites

When we consider the technologically-mediated social practice of transitional populations, questions of disclosure and privacy figure prominently. In the history of social media research, a large number of studies has explored why, how, and what social media users disclose (e.g. Acquisti and Gross, 2006; Dwyer, Hiltz, and Passerini, 2007; Lampe, Ellison, and Steinfield, 2007, 2008; Lewis, Kaufman, and Christakis, 2008; Raynes-Goldie, 2010; Stutzman, 2006; Stutzman and Kramer-Duffield, 2010; Tufekci, 2008*a*,*b*). A smaller set of studies has evaluated the situated practice of disclosure-in-context (e.g. Lampinen, Tamminen, and Oulasvirta, 2009; Raynes-Goldie, 2010; Skeels and Grudin, 2009; Stutzman and Hartzog, 2009; Stutzman, Capra, and Thompson, 2011). This contextual work has documented the range of practices that have evolved within social network sites to guard disclosures, adding nuance to the primarily observational studies.

Situating disclosure

Social media is driven by the sharing of content. The pictures posted, the videos uploaded, and the status updates and "tweets" shared create perceptions of activity and vibrancy. In a social network site, disclosure is a reflection of action, in principal or derivative form, generated by the actor or the system. Based on my analysis of the literature, I have identified four meaningful disclosure boundaries within social network sites. They are the:

- *Perceptual Boundary*
- *Enacted Boundary*
- *Permeated Boundary*
- *Derivative Boundary*

The first boundary, the *perceptual boundary*, reflects the discloser's sense of the "range" of the disclosure. The perceptual boundary draws on lived experience, system-level sensemaking, knowledge of technical operations, and policies regarding to whom and where one will disclose. The second boundary, the *enacted boundary*, reflects the true range of disclosures within the social network site. The third boundary, the *permeated boundary*, reflects the range of the disclosure inside and outside of the social network site. Therefore, this boundary captures conversations that alters have about disclosures, remixed and derivative forms of the disclosure, and extra-system sharing of the disclosure. This boundary is characterized by being technically impossible to regulate, and nearly impossible to regulate socially, with normative action and privacy torts the primary recourse. The fourth boundary, the *derivative boundary*, reflects the actions taken by system owners and maintainers in storing, sharing, and monetizing disclosure. This boundary is orthogonal to the previous boundaries as it is governed by terms of service and, where applicable, data protection laws.

Disclosure practices of the study's population

A number of exploratory studies have examined psychological factors associated with disclosure in social media. Livingstone and colleagues, in particular, have authored a number of studies exploring youth disclosure practices in social network sites (Livingstone and Helsper, 2007; Livingstone, 2008; Staksrud and Livingstone, 2009). Chai et al. (2009) found positive correlations between perceived importance of privacy, external privacy importance factors, privacy self-efficacy, and privacy protection behaviors within a group of teens and pre-teens. De Souza and Dick (2009) analyzed the MySpace profiles of high school students and identified factors associated with certain types of disclosure.

The Pew Internet and American Life foundation has provided baseline statistics regarding the social network site adoption, use, and disclosure behaviors of teens and young adults in the United States (Lenhart and Madden, 2007; Lenhart et al., 2010). Considering the difficulties of access to the youth population, ethnographic work plays an important role in the analysis of youth disclosure practices. Recently, Clarke (2009) documented the use of social media by 10- to 14-year olds, highlighting the important role of disclosure in developmental processes. The ethnographic work of Clark (2005, 2009) follows a similar line, exploring the privacy practices of youth as they negotiate friend networks in social network sites.

Several themes emerge in the study of youth disclosure practices. First, there is general concern with levels and types of disclosures in social network sites. This concern is functional in nature, and posed in relation to present (e.g. cyberbullying) or future harms (e.g. not being able to get a job). Second, many of these studies are concerned with affective behavioral modification, with an end goal of reducing risky disclosures in social network sites by teens. Finally, these studies are concerned with the outcomes of disclosure, and particularly how disclosures in social network sites relate to

acculturation into groups and identities.

2.1.6 Supportive outcomes of social network site use

There is much debate over the outcomes of social network site use. Recently, research has explored the relationship between social network site use and an individual's perceived social capital and socially supportive relationships. Social capital, a multi-disciplinary and multi-theoretical construct, examines the relations between social structures and an individual's available resource pool. For example, Coleman (1988) describes social capital as a structural resource enabling the provision of human capital — resources and skills that effectuate positive outcomes. Putnam's (2001) analysis locates social capital in the community, exploring the relation between social ties and community support and vitality. In line with Wellman's conception of the personal network (e.g. Wellman and Wortley, 1990; Wellman and Frank, 2001), a key measure of social capital is an individual's network structure and size. Recent analysis of personal network size in the United States highlights a troubling trend; McPherson and colleagues' (2006) replication of Marsden's (1987) analysis found a one-third drop in core discussion network size. It is argued that certain affordances of social network sites may increase the supportive resources available to individuals.

In this section, I briefly review literature that explores the relationship between social network site use, social support, and social capital. A series of studies by Ellison, Lampe, and Steinfield (Ellison, Steinfield, and Lampe, 2007; Ellison, Lampe, and Steinfield, 2008; Steinfield, Ellison, and Lampe, 2008) explored the relationship between intensity of social network site use and perceived social capital. Employing Putnam's conception of bridging and bonding social capital, these studies found a significant and positive correlation between increased use of social network sites and both bridging and bonding perceived social capital. When comparing the variance explained in studies'

regression models, use of social network sites appears to be a stronger predictor of bridging social capital than bonding social capital. Bridging social capital represents "weak tie" social capital; by participating in Facebook, individuals develop larger networks they can draw on in times of need. Also notable is the conception of "maintained social capital," which refers benefits of articulated social ties over time.

Valenzuela, Park, and Kee (2009) explored the relationship between Facebook use and perceived social capital variables such as life satisfaction and civic participation. The authors note "the positive and significant associations between Facebook variables and social capital were small, suggesting that social network sites are not the most effective solution for youth disengagement from civic duty and democracy" (Valenzuela, Park, and Kee, 2009, p. 875). Pfeil, Arjan, and Zaphiris (2009) highlight variance in the distribution of social capital in a social network site, arguing that social capital may work differently for different age ranges on social network sites. The study raises an important question of how the experience of different cohorts in the same social network site may experience different social capital outcomes.

Social capital has multiple forms, and multiple levels of measurement (Lin, 2001; Lochner, Kawachi, and Kennedy, 1999; Stone and Hughes, 2002; Wellman and Frank, 2001). Within the concept of social capital is the notion of support, particularly social support. As Wellman and Frank (2001) note:

> When people need help, they can either buy it, trade for it, steal it, get it from governments and charities, or obtain it through their "personal community networks" — supportive ties with friends, relatives, neighbors and workmates. Such ties supply "network capital," the form of "social capital" that makes resources available through interpersonal ties. It is widely available, usually specialized, and unevenly distributed among people, ties

> and networks. Network members provide emotional aid, material aid, information, companionship, and a sense of belonging. Their "social support" is one of the main ways that households obtain resources to deal with daily life, seize opportunities, and reduce uncertainties. (p. 233)

The concept of social support refers to the supportive resources, both perceived and received, that one draws from a supportive social network. Social support has been linked to a range of beneficial outcomes, including improved health and reduced stress (Cohen and Wills, 1985). While related to social capital, social support measures a distinct concept. Many studies have explored the socially supportive outcomes of online participation (Bambina, 2007; Braithwaite, Waldron, and Finn, 1999; Cummings, Sproull, and Kiesler, 2002; Eichhorn, 2008; Morahan-Martin and Schumacher, 2003; Pfeil, Zaphiris, and Wilson, 2009)

In the context of social network sites, social support has been theorized as a potential motivator of use (Kwon and Wen, 2010; Ross et al., 2009) as well as an outcome of use (Goldner, 2008). Hampton et al. (2009) used a national probability sample to analyze the supportive outcomes of social technology use (including social network sites), finding that online participation in supportive networks translates to diverse offline social networks. Hampton et al. also found that individuals that participated in a local online forum were more likely to report supportive behaviors than the general population (Figure 2.2). In a study of adolescent technology users, Lee (2009) identified the magnifying role online participation plays for supportive networks, nothing that"adolescents who already had strong social relationships at earlier ages were more likely to use online communication, which in turn predicted more cohesive friendships and better connectedness to school" (Lee, 2009, p. 509).

In many ways, the social capital and social support hypotheses of social network

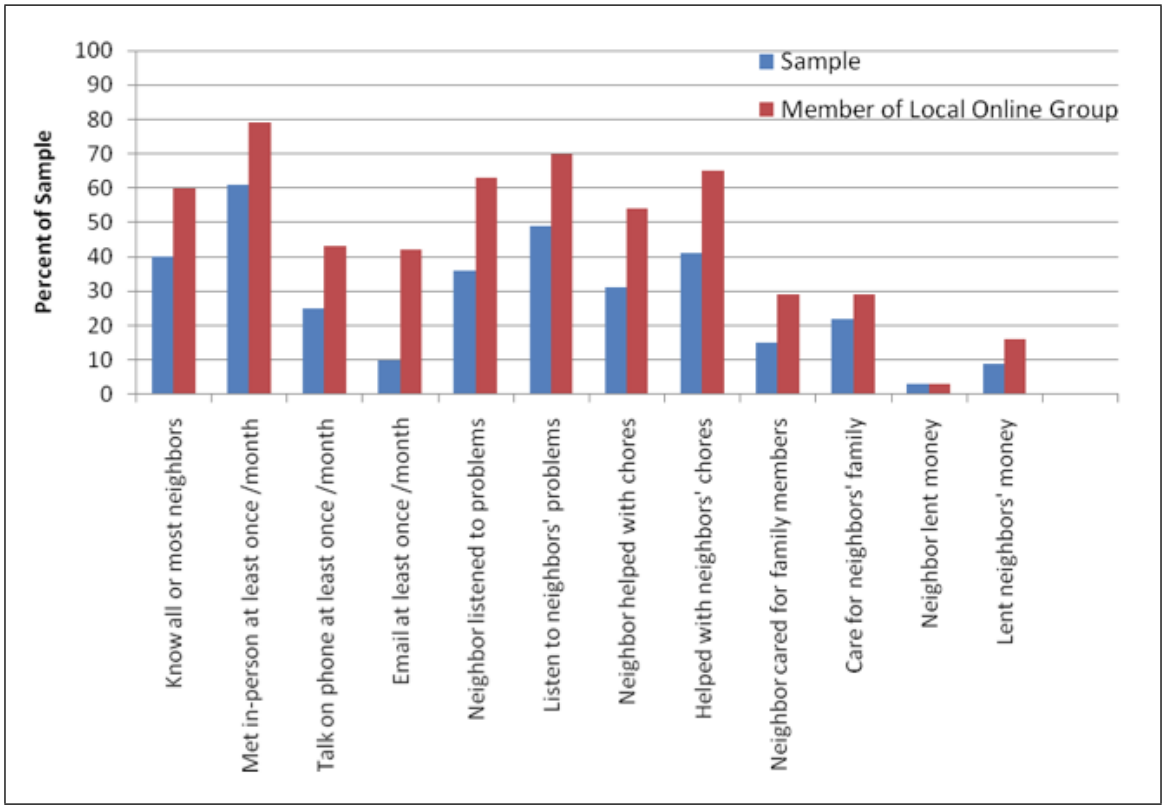


Figure 2.2: Comparison of supportive behaviors of individuals in a local online group to individuals in a national sample, adapted from Hampton et al. (2009, p. 48)

site use are similar. Both argue that increased participation in online networks increases access to supportive alters, increases sense of participation in the community, and increases resources individuals can draw upon when in need. Among the study's population, I expect to see that participation in social network sites increases adaptation to college, operating through a process of increased social support. I now present research on the use of social technologies during transition, identifying unique, supportive mechanisms of social network sites.

2.1.7 Social network site use during transition

In this study, I explore the use of social network sites during the transition to college. This period of transition is associated with role change, geographical relocation, and

support network renegotiation. In this section, I explore some of the structural aspects of support as provisioned in a social network site. This section, a fairly cursory treatment, is meant to provide technical context for the following section of the literature review, which substantially explores transition and support during transition.

Buote et al. (2007) found that the establishment of social support structures, i.e. successful friendships, plays a significant role in positive adjustment to a university environment. It is theorized that use of the social network site during the transition period affords individuals access to supportive resources that may facilitate the transitional experience. In this sense, the social network site is a supportive structure.

Prior to the establishment of a freshman's on-campus social network, he or she must actively manage available social ties. This is a sorting process, in which more successful or productive ties mature to friendship. Rusbult (1980) proposes the *Relationship Investment Model* as a method for understanding this process. In the Relationship Investment Model, commitment and satisfaction are two independent factors motivating relational formation. Commitment is determined by expected outcomes and alternative possibilities, as well as the size of the friendship investment; satisfaction is dependent on outcomes alone. To individuals in transition forming and managing relationships, the affordances of social network sites introduce a potentially mediating factor to Rusbult's model. If we can gather more information, communicate and interact effortlessly, and maintain more ties with social network sites, these technologies have the potential to reshape our relational investment and friendship management processes.

As individuals move through social spheres in the life course, the value of networks as support structures shifts. For example, the individual who uses Facebook during college may find the professional network LinkedIn useful during the first job. Our valuation of a social network site is context-dependent, or *situationally relevant*. We can imagine other examples of situationally relevant social network sites supporting

life transition: a social network site of first-time parents, or a community-based social network site offering new community members recommendations for a good babysitter. During each life transition, new needs emerge, and social network sites potentially address social-informational needs in situationally relevant manners. I now briefly review literature exploring the use of technology during transitions; this literature does not necessarily focus on social network sites.

Handel (2007) studied the use of email and instant messenger applications during the transition to college, exploring the role social technologies play in developing supportive structures and relationships. While Handel found that social technologies were important during the transition, strong effects of use were not found. This non-finding illustrates the potential for different outcomes between social technologies such as email, IM, and social network sites. Whereas email and IM require the sharing of identifiers and, generally, dyadic communication, the social network site affords social value with much less "involvement." As evidenced by the work of Bumgarner (2007) and Joinson (2008), one of the main motivators and uses of social network sites involve social-informational processes: learning about one's environment. This distinct affordance potentially correlates with measures of social support, positioning the social network site as a more supportive technology than email and IM. Other notable researchers in this area include Mesch (Mesch, 2005, 2006; Mesch and Talmud, 2006), who has elaborated the role social technology plays in the development and maintenance of adolescent relationships.

Cummings, Lee, and Kraut (2006) also explored the use of email and IM during the transition to college, focusing on the affordances of the technologies for maintaining non-collocated friendships. The authors highlight the low cost of these technologies as a potential motivator for use in maintaining relationships. Because these technologies are "free," the authors argue we may lower our cost equation for ongoing relationships

management. Of course, these technologies are not really free — email and IM require the time and effort of reciprocal communication sessions, and users of these technologies trade personal information for access to services. The news feed feature of social network sites potentially changes this cost equation; users are able to maintain connection through implicit action. For example, when an individual posts photos to a news feed, the friend network is informed through automated processes. This particular affordance of social network sites increases the potential for "maintained" social capital, the new form of social capital reflecting larger maintained social networks described by Ellison, Steinfield, and Lampe (2007).

Shklovski and colleagues (Shklovski and Mainwaring, 2005; Shklovski, Kraut, and Cummings, 2006, 2008) have explored the use of Internet technology during residential transition. While not college-focused, the research does explore the relationship between Internet use following a transition and various support measures. Through the use of low-cost Internet communication tools, transitional stress is buffered through the maintained connection to supportive family and friends, as well as the distractions provided by the tools during a stressful time. In general, the researchers find that use of Internet technology during transition is beneficial, "suggesting that research and development of applications that can help manage social relationships and increase the feelings of connectedness are an important endeavor" (Shklovski, Kraut, and Cummings, 2006, p. 977).

We have long used Internet tools as a means for mediating social relationships. Social network sites represent a natural progression. Simple, powerful needs motivate use of social network sites. We are driven by a desire for entertainment, using the sites as a way to see our friends pictures or writings. We are driven by a desire to communicate. The teenager may view the social network site as a way to create a new public, with open discourse; others may use the distinct communicative affordances of

the sites as a new way to groom relationships. Individuals also turn to social network sites in times of social-informational need; on the college campus or in a new job, the social network site has the potential to address situationally relevant needs. The social network site appears to be useful in the relational formation and management process.

In this section, I presented theoretical and applied analyses of social network sites. I also explored concepts of context and disclosure in social network sites. Finally, I presented perspectives on the supportive potential of social network site use during life transition. This review has provided a basic context for understanding the ways in which social network sites can be beneficial during life transition. In the next section, I present a more thorough review of transition. Particularly, I focus on conceptions of transition, and identify factors contributing to our adaptation to transition.

2.2 Perspectives on Transition

2.2.1 General concepts

Generally, a transition can be thought of as a phase that occurs between two periods of relative stability (Cowan, 1991). Examples of transitions include the social and developmental transitions to adulthood (Arnett, 2000; Hogan and Astone, 1986), role-altering transitions such as the death of a loved one (Anderson, 1984; Kübler-Ross, 1969) or leaving a job (Ebaugh, 1988), and the transition explored in this study — the transition to college (e.g Fisher and Hood, 1987; Perigo and Upcraft, 1989). As Cowan notes, transition comes in a range of forms: "There are very real problems in the definition of transition. Most writers assume that the meaning is so obvious that it requires little explanation. Transition is loosely equated with change, sometimes qualified by major change" (Cowan, 1991, p. 4). Because of the relative ubiquity of transition, there is variation in the definition of the concept, and research approaches

to transition.

In this section of the review, I present perspectives on the concept of transition. Drawing on a range of theoretical approaches, I review the characteristics, mediators, and outcomes of transition. This review is structured as follows: First, I introduce cognitive, role, and stress theories of transition using applied studies of the transition to college. Second, I introduce two integrative models of transition: Nicholson's and Schlossberg's process models. I then examine the relevant outcomes, mediators, and individual differences that should be measured in the study of transition. In doing so I explore how students integrate social network sites into their transition to college.

2.2.2 Transition and internal and external worlds

Considering the prominence of transition in the life course, a unified theorization of the concept has remained elusive. There are a number of reasons for this difficulty, including the range of transitions one encounters in the life course, lack of agreed-upon conceptual boundaries, and the fact that transition is dual-process, reflecting an interaction between the internal and external world. Coleman (1990) writes of the duality of transition:

> In effect, what may be envisioned is a kind of war between two worlds: the external world of events, which have their own sequence and structure as determined by those outside the actor; and a world internal to the actor. Changes in the first of these worlds constitute a system of observable action Changes in the second world, the internal one, do not appear as observable actions because they take place within the actor. (p. 517)

Coleman's elaboration highlights both the complexity and the fundamental challenge of studying transition. Transition is both an internal and external event, occurring within the individual and in the eye of society. With regard to internal changes

during transitions, Cowan (1991) identifies a range of internalized shifts. In transition, one's sense of self and assumptions about the world are in flux, and as the individual moves from transition to stability there is a new stability in one's internalized assumptions. For example, the transition to college may involve restructuring of one's social identity (Ethier and Deaux, 1994) or the sense of self-conception in a group (e.g. Hogg, 2006; Jenkins, 1996). The transition reflects a restructuring of the internal concept of the external world, as well as the individual's role in that world.

Another approach to the internal component of transition is the study of transitional effects. This approach exists at the boundary of internal and external states. For example, there is significant work exploring the relationship between transition, stress or other negative outcomes (e.g. Cohen and Hoberman, 1983; Ensel and Lin, 1991). An individual experiencing a transition may manifest evidence in the form of increased stress level, poor health, and so on. At the other end of the spectrum, transitions may reflect a change in the self-concept without any observable manifestation. Schlossberg (1981) identifies the concept of "non-events" as transitions; these non-events reflect the dreams and desires for change (a new job or spouse) that never come to fruition, yet still affect the self-concept. Therefore, internal changes can be manifest through derivative components, or not manifest in any observable fashion. Such variety introduces substantial methodological complexity.

Regarding the external changes manifest during transition, we can theorize transition with respect to the observable world, an approach generally found in the social sciences. A cohort can be traced through the life course and observable transitions, such as emergence of puberty, birth of the first child, and death, can be age-graded (Elder, 1975). Transition can also be measured with respect to roles; the timing of role entries and exits provides evidence of transition to the observer, as well as insight into the skill required to manage transition (George, 1993). While these approaches provide

evidence of transition, they often fail to capture the internal component of change that occurs during a transition.

The divergent focus on the external and internal aspects of transition reflects differences in disciplinary traditions. The external manifestations of transition are amenable to the observational techniques of social scientists, while internal manifestations reflect the psychometric and experimental approaches utilized in the psychological and health sciences. This divergence in methodology has structured questions researched and knowledge generated about transitions. Due to the range of interdisciplinary work on transitions, it is outside the scope of this review to cover all approaches to the study of transition. To cover as much area as possible, this review takes an integrative approach that explores both internal and external manifestations of transition, such as the one suggested by Cowan (1991). In the following sections, I present concepts of transition, ranging from grand theories (e.g. interruption theory, role theory) to well-established midrange theories (e.g. the stress hypothesis). The review concludes by exploring the mediating affects of social support on the stress of transition, as well as antecedent and co-occurring individual conditions that may affect transitional outcomes.

2.2.3 Transition as interruption

At a basic level, a transition can be theorized as an interruption to ongoing processes. As we move through life, we construct systems of meaning for the internal and external world, which we rely upon in everyday life. Cognitive and social psychologists refer to these systems of meaning as schemas, and they structure our expectations and action in everyday life. During a transition, these systems of meaning are interrupted by the transition. Mandler (1990, p. 29) writes: "Consider the transition to university. The number of discrepancies is numerous and ranges from very simple everyday events of

waking up in a strange bed, eating different (worse?) food, to more complex social discrepancies such as meeting new people and coping with their differential demands and expectations." A transition interrupts our understanding of the world, challenging us to negotiate our relationship with the world anew. As this review will demonstrate, one's access to support and information about the transitional lifeworld plays an important role in one's ability to adapt to transition.

Mandler's theory of transition as interruption is based on a general theory of emotion. In the early formulation of interruption theory, Mandler (1990, p. 23) states: "The interruption of an integrated or organized response sequence produces a state of arousal which will be followed by emotional behavior." Mandler extends the theory with the following definition:

> Visceral arousal follows perceptual or cognitive discrepancies and the interruption of blocking or ongoing actions. Discrepancies occur when the expectations generated by some schema (whether determining thought or action) are violated. This is the case whether the violating events is worse or better than the expected one-and accounts for visceral arousal in both unhappy and joyful occasions. Most emotions follow such discrepancies. It is the combination of arousal with an on-going evaluative cognition that produces the subjective experience of an emotion. (pp. 23-24)

In Mandler's conception, an interruption of ongoing action produces a response, which may be manifest in stress, emotion, or action. These reactions are common responses to transition or interruption (George, 1993). The general nature of interruption theory facilitates its applicability in a range of contexts. Interruption theory allows a transition to be positively or negatively valenced, and the response to the transition can be internally or externally enacted.

2.2.4 Transition and cognitive schema

A transition represents an interruption to schema, which is a general cognitive construction that "shape(s) how people view and use information" (Howard and Renfrow, 2006, p. 263). Fiske and Taylor (1991, p. 98) describe schemas as "cognitive structure[s] that represent knowledge about a concept or type of stimulus, including its attributes and the relations among those attributed." In essence, schema represents an impression of information processed about prior events, which is used to guide action and make meaning of the world. A transition both interrupts schemas and forces the creation of new schema through the process of adaptation.

Piaget's theories of childhood development specify a dual-process adaptive response to interruption and transition (cf. Piaget and Wedgwood, 1977). When our schemas are interrupted by transition, we engage in a process of either assimilation or accommodation. In assimilation, interruptions are integrated into existing schemas; the interruption is viewed through the schema and does not change perception. Assimilation is an everyday process. For example, the location of a new coffee shop is not likely to cause restructuring of our knowledge of coffee in general. In accommodation, the interruption alters or creates new schemas. When we accommodate, we reshape or construct new schemas to make sense of the new representation of the world. When a child learns the difference between right and wrong, or that he or she can hurt others, that child's schemas of the world are updated. The previous developmental example is sourced from the work of Erikson (1950), whose eight stages of ego formation locate a process of schema formation at a range of developmental stages.

Howard and Renfrow (2006) identify four types of schemas utilized in everyday life:

- *Person schemas* "organize knowledge about particular individuals or specific types of people, usually emphasizing traits or personality categories." Notably, our self-concept is represented by a self-schema, a

type of person schema that "organizes knowledge about one's self."

- *Role schemas organize* "knowledge about norms and expectations associated with particular social positions." Our concept of others' social position, and the stereotypes we hold about them, are governed by role schemas.
- *Event schemas* are "expected sequences in routinized, everyday events such as going to the market."
- *Context-free schemas* provide "processing rules" for ongoing events. (Howard and Renfrow, 2006, p. 263)

Schemas represent the ways in which we make sense of the world, constructing the lens through which we experience the world. According to Fiske and Taylor (1991, p. 121), schemas "influence the encoding of new information, memory for old information, and inferences where information is missing." When encoding information, cues such as gender or race activate schemas that provide a sense of context and meaning for the information being processed. During a transition, our schemas may no longer hold, or they may inaccurately structure information encoding. An example of such an occurrence is found in the Hurtado, Carter, and Spuler (1996) study of Hispanic student transition to college, which found that the role schema that all minorities were "special admits" was found to exert a negative influence on adjustment to college. In another study of adjustment to college, Pancer et al. (2000) found that a student's "integrative complexity," or the complexity of perceptions regarding the transition, was positively associated with adjustment to college. In other words, having a robust schema regarding the transition may better prepare the student for successful adaptation to the transition. In both of these examples, schema adjustment during transition is associated with positive outcomes.

With regards to memory for old information, Fiske and Taylor argue that schemas cause us to consider memory in new light. For example, when one undergoes a residential transition, perception of the place left behind may shift when viewed in the light of the new locale. We've commonly encountered this schema shift when we're reminded that the "grass is always greener on the other side."

Schemas also structure how we draw inference when we lack knowledge. In practice, we may call on a schema to make up gaps when faced with incomplete information. A canonical example is the stranger met late at night in a dark alley. An event schema may define the encounter as potentially dangerous. In this example, the schema makes up for incomplete information by providing an event structure informed by existing knowledge or experience. Schema-defined inferences are responsible a range of stereotypes and outgroup-exclusionary beliefs (Fiske and Taylor, 1991). In the context of the college transition, students with greater negative attitudes towards the transition may "inference" from a negative schema, which may lead to a negative experience during transition (Halamandaris and Power, 1997). Jackson et al.'s study of transition to college revealed "that, relative to other students, those with fearful expectations experienced poorer adjustment on a number of indexes (stress, depression, university adjustment) across their entire university experience. They were also somewhat more likely than others to drop out of our study prior to its completion" (Jackson et al., 2000, p. 2119).

Schema and information behavior

Returning to Howard and Renfrow's conception of a schema as both a representation of knowledge and a way to make sense of knowledge, the interruption of schema during transition can be viewed as an informational event. To assimilate or accommodate to change, individuals engage in an informational process that alters schema. The process

of transmission to college interrupts schema on many levels, from the basic to more complex, higher-level needs (Mandler, 1990). Maslow's hierarchy provides a general outline of the needs required to be addressed during a major transition, such as the transition to college (Maslow, 1970). Individuals in transition are challenged to adapt schemas to find sustenance and shelter (e.g. the dining hall and the dorm). At a higher level of complexity, individuals must build supportive relationships and find belonging. The multidimensional challenge of a major transition can be supported at many levels by information technology and information-seeking interfaces (e.g. Marchionini, 2006).

Savolainen's model of Everyday Life Information Seeking (ELIS) provides a framework for thinking about the relationship between schema and information behavior (Savolainen, 1995). In Savolainen's model, information behaviors are examined in the context of *way of life* and *mastery of life*. Way of life refers to the structure of information behaviors, whereas mastery of life refers to strategies one employs to keep his or her life "in order" (Savolainen, 1995). McKenzie's (2001) complementary field study of the information behaviors of women expecting twins (a major life transition) revealed a range of information behaviors before and during the life transition. From this study, McKenzie created a four-stage model of ELIS applicable to transition, which identifies the following modes of information behavior: active seeking, active scanning, monitoring the context, and information seeking by proxy (McKenzie, 2001, 2003*a*,*b*).

A range of studies have explored the information practice of youth in transition. Hughes-Hassell and Agosto (2007) studied the information behavior of urban teens. Their study is one of transition to adulthood; the senses of self identified in the study (social, emotional, reflective, physical, creative, cognitive and sexual) reflect the needs of a transitional population. Mehra and Braquet (2007) studied the information behavior of queer youth during the "coming out" process. As the youth moved toward

self-identification, information sources included chat rooms, bookstores and role models. After self-identification, the range of information sources increased, primarily with regard to social (groups, clubs, organizations) sources. These findings demonstrate the dynamic nature of information needs during transition, and highlight the supportive role of information resources during transition.

2.2.5 Role theory, role exits, and role entry

Interruption theories of transition are primarily concerned with internal manifestations of change. Writing of the transition to adulthood, Hogan and Astone (1986) point out that transitions occur both within the individual and in the eye of society. As an individual progresses through a transition, he or she will encounter new responsibilities and expectations. In addition, the individual may be socially sanctioned if he or she does not adhere to the post-transitional role (Arnett, 2001). The concept of roles and role transition provides a window on the transitional experience that bridges the internal and external components of change.

Described by Oatley, a role is a "dynamic conception, a pattern that articulates one person's actions with those of others" (Oatley, 1990, p. 70). According to Biddle, roles are associated with social positions and status, they are contextually bound, they are embedded within social systems, and individuals have internal and external expectations of roles (Biddle, 1979, pp. 4-5). Goffman (1959) offers a dramaturgical interpretation of roles, wherein individuals create and manage impressions in the eye of an audience. In his general theory of practice, Bourdieu described an individual's power a function of social capital and his or her habitus — the ability to effectively embody a role (Harker, Mahar, and Wilkes, 1990, discussing Bourdieu, 1977). In these varied perspectives, roles emerge as the product of internal and external structure, with the exhibition of roles an essential social practice.

A change in roles is often associated with a transition. When an individual graduates from high school and takes on the identity of a college student, he or she enacts a role change that is manifest both internally and externally. In the next two sections, I outline perspectives on role change and role entry. As role transition represents an ongoing, cyclical process, the processes of change and entry aren't necessarily ordered, but rather are ongoing, concomitant processes.

Changing roles

In Helen Rose Fuchs Ebaugh's (1988) sociological study of role transition, *Becoming an Ex*, the process of role change is cast as an interaction between internal and external forces. According to Ebaugh, role change is a four-stage process, the components of which are: doubt, alternative seeking, the turning point, and the construction of the ex-role. In Ebaugh's *process model*, individuals move from a period of doubt to alternative seeking, attempting to manage internal needs for consistency and stability. After a turning point is reached, the individual begins to construct their "ex-role", managing a new identity both internally and for others. It is important to note that Ebaugh's book is largely focused on the transition from roles with strong occupational or social identities (i.e. physicians, nuns), a richness not commonly associated with everyday life transitions. However, the elaboration of the change process identifies the strong social and informational components of role transition (e.g. Biddle, 1979).

At the first stage of the role change described by Ebaugh, an individual encounters doubt. Important events, organizational change, or policy change may disrupt the individual's perception of the role and create doubt. Doubt is embedded within social context. Moving forward in the process of role transition, the individual starts to seek alternatives, an information-centric activity. In the "alternative-seeking" stage, the individual weighs alternative roles, and estimates the irreversibility of the role

transition. This process is also embedded in social context, requiring the individual to appraise his or her existing social support network. Notably, if a role transition is socially undesirable, the individual may need to seek new supportive resources.

Ebaugh characterizes the transition from role exit contemplation to action as a turning point, one that "usually occurs in connection with some point in the individual's life" (Ebaugh, 1988, p. 123). After the turning point, the individual start to create an "ex-role," an inherently social and informational process. Supportive networks are then reconstituted or built anew to reflect the individuals new role and needs. At the same time, individuals must learn about their role and the supportive resources available. Ebaugh identifies a number of important characteristics of the transitional process:

- *Reversibility*: The degree to which the individual can return to the previously held role. While a physician may be able to return to his or her professional role, it is not possible for a high school student to return to the role after graduation.

- *Duration*: The duration of the role transition process affects preparation, support networks, and evaluation of alternatives. A hasty role transition may be particularly traumatic (e.g. being fired or excommunicated).

- *Single vs. Multiple Exits*: A role transition can be a single or multi-stage process. The process of leaving high school for college encompasses a span of highly ritualized transitions, whereas a job loss may comprise a single exit.

- *Individual vs. Group Exits*: An individual may experience a role transition individually or with a group. The individual engaging in a group exit generally has a larger support network to draw upon.

- *Control and Voluntariness*: The extent to which the individual has control over the transition is an important factor. The transition initiated and managed by

the individual is likely to allow the individual a higher degree of internal coherence and sense of control.

- *Social Desirability*: In the eyes of society, a transition has varying levels of acceptability. Transitions that are socially desirable tend to be accommodated and supported by society and one's peers. (Ebaugh, 1988, pp. 185-198)

Transition is inclusive of both role exit and entry; it is useful to elaborate the "role exits" the student encounters when leaving for college. These include transitions away from the supportive family network, the stable network of established ties, and the social identity of being a senior member of the high school academic community. Goldscheider and Goldscheider (1999) discuss the transition out of the family home, highlighting both historical and cohort perspectives on home-leaving. Although people leave home for different reasons, the transition away from home is associated with lower experienced support, self-control, and available resources. Such a transition, as Arnett (1997, 1998, 2001) identifies, is necessary for fulfilling the self-concept of adulthood. By experiencing the "challenge" of transitions, the individual becomes an adult in the eye of self and society.

Role entry

In his book on organizational role transition, Ashforth (2001) explored both role entries and exits. Ashforth's theory of role exit draws largely on Ebaugh's process model; therefore, I use Ashforth to elaborate the process of *role entry*. Analyzing the transition into a new role, Ashforth identifies the situational contexts and individual dynamics of the transition as primary structural factors influencing transitional outcomes. The situational context of a role entry generally refers to the contextual influences exerted by external actors and structures (e.g. groups, temporal factors, environmental attributes) during role entry. Individual dynamics are represented in individual-level traits (e.g.

personality, adaptability, motivation) that determine the efficacy of entry into a new role (Ashforth, 2001).

When an individual enters a new role, a primary situational factor is the level of control he or she has during role entry. Ashforth demonstrates this concept by highlighting *strong* and *weak* situations of role entry. In a strong situation, an individual may demonstrate little external control over the role entry, as there already exists "a clear consensus on the right and wrong way to behave" (Ashforth, 2001, p. 150). A classic example of a strong situation might be the first days at military boot camp, where one's experience is strongly governed by rules and norms. The transition to college constitutes a strong situation, with social and academic sanctions for behavior such as not going to class or failing to integrate with the cohort.

The situational context of role entry is important for the individual's socialization and acculturation into group identities. As Ashforth notes, "The stronger the use of normative control, via certain socialization tactics and rites of transition and incorporation, the more likely that the organization will present a prefabricated self for the newcomer to assimilate. Thus, socialization practices largely mediate the impact on the context on self and adaptation" (Ashforth, 2001, p. 182). By increasing the structure of role entry, through rites of transition and incorporation, the individual is more likely to adapt to the shock and stress of the new role.

In the particular context of the transition to college, a number of studies have explored the role situational factors play in encouraging role adaptation (e.g. Buote et al., 2007; Fisher and Hood, 1987; Hurtado, Carter, and Spuler, 1996; Paul and Brier, 2001; Wintre and Yaffe, 2000). Additionally, a number of studies have proposed interventions to increase adaptation. Takahashi and Majima (1994) examined the role preestablished relationships play during the transition to college, finding that a pre-established supportive network increases adaptation to transition. Bohnert, Aikins, and

Edidin (2007) explored the role increased participation in organized activities plays during the transition process, finding that participation lowered dissatisfaction and increased friendship quality. These studies highlight the important role that a social network site can play in facilitating role entry. By increasing opportunities for friendship connections and asynchronous communication, and encouraging "offline" interaction, social network site participation has been shown to increase the student's sense of community and perceived social capital (Ellison, Steinfield, and Lampe, 2007; Steinfield, Ellison, and Lampe, 2008).

The role transition represents an internal and external manifestation of change. This change occurs within the individual and in the eye of society. Drawing on role theory and process theories of role entry and exit, I have presented factors that influence general adaptation to transition, and specifically, the transition to college. In the next section, I turn to an internal manifestation of transition — the stress response.

2.3 Stress and Transition

Mandler's theory of transition as interruption posits that a transition can be viewed as an event that stimulates response. As an individual moves through the life course, events become routinized into patterns of stability and predictability (George, 1993). When these patterns are interrupted, there are periods of general turbulence as the individual attempts to adapt to the interruption (Nicholson, 1989). Implicit in this period of turbulence is a loss of control that opens up vulnerability to stress (Fisher, 1989). Stress is a construction referring to "any environmental, social, or internal demand which requires the individual to readjust his [or] her usual behavior pattern" (Thoits, 1995, p. 54). Therefore, reaction to transition can be quantified through measurement of stress associated with the transitional period. For example, stress reactions

can be gauged for a range of common events and transitions in order to establish normative responses to events (Coddington, 1972*a*,*b*). As a result, the "stressor approach" to studying transition is widely influential in the psychological and health behaviors disciplines.

The concept of transition is generally defined at the paradigm or grand theory level. The stressor approach is somewhat different in that it offers an inductive approach to studying and identifying transition. According to George (1993), the study of stress related to transition highlights the uniformity in certain transitions. In large population studies, there is certain uniformity in stress response to transitions such as moving or the death of a spouse. George also notes that the "stressor approach" provides evidence for the importance of life events in a developmental context. By observing the stress reaction to life events in populations over time, researchers are able to identify points of transition, and normative baselines for response to transition. In the context of the transition to college, a range of studies has established baselines, antecedents, and moderators of the stress response to transition (e.g. Cantor et al., 1987; Compas et al., 1986; Crandall, Preisler, and Aussprung, 1992; Cutrona, 1986; Fisher and Hood, 1987; Pennebaker, Colder, and Sharp, 1990; Zirkel, 1992).

The relationship between transition and stress has been extensively studied in a variety of disciplines. Thoits (1995) reviewed stress and stress interactions, providing an overview of the effects of transition in a health behaviors context. Thoits also carefully outlined the relationship between stress and coping mechanisms, including social support. George (1993) provided insight into the stressor approach from a social sciences perspective, showing how stressors may be observed in population studies. Kessler (1997) explored the relationship between life events, stress, depression, and mitigation techniques. Wheaton (1990) introduced important caveats regarding the stress-reducing potential of transitions; while most studies are concerned with the

stress-generating capacity of transitions, certain transitions may be associated with a reduction of stress. Widowhood after a partner's long illness, or divorce after a turbulent marriage may represent transitions that reduce stress for the individual involved.

Sarason, Johnson, and Siegel (1978, p. 932) outlined the analytic approach to studying stress: "During recent years, numerous studies have investigated the relationship between life stress and susceptibility to physical and psychological problems. Most of these studies have been based on the assumptions that (a) life changes require adaptation on the part of the individual and are stressful, and (b) persons experiencing marked degrees of life change during the recent past are susceptible to physical and psychiatric problems." In the article "Stress, Social Support, and the Buffering Hypothesis," Cohen and Wills (1985) provide an exhaustive overview of the range of instrumentation used in stress studies, and introduce the proactive research approach to stress studies.

Studies of transition and stress generally observe the effects of transition on a population through survey, case-control, or experimental techniques. Exemplar studies include Bolger, Zuckerman, and Kessler (2000); Cohen and Hoberman (1983); Hawkins and Booth (2005); Redfield and Stone (1979); Wheaton (1990); see also Table 2.1. Although the stress response to transition is generally studied quantitatively, qualitative data is often successfully introduced through mixed-methods studies (e.g. Buote et al., 2007; Cantor et al., 1987). Other studies employ a purely qualitative approach (e.g. Liddle, Carlson, and McKenna, 2004).

2.3.1 Life events and stress

The lineage of "stress response" research can be traced back to work on life events. Early work on life events examined the relationship between the duration and frequency of life events and health outcomes (e.g. Coddington, 1972*a*,*b*; Hogan, 1978; Holmes and Rahe, 1967; Redfield and Stone, 1979). Life events research provided a lens to identify

Table 2.1: Methodological approaches to the study of stress during transition

Survey Research	Cross-Sectional	Bolger, Zuckerman, and Kessler (2000) Hogan (1980) Hurtado, Carter, and Spuler (1996) Janiga and Costenbader (2002) Larose and Boivin (1998) Redfield and Stone (1979)
Survey Research	Panel	Aseltine and Gore (1993) Berman and Sperling (1991) Crandall, Preisler, and Aussprung (1992) Ensel and Lin (1991) Hawkins and Booth (2005) Levitt, Silver, and Santos (2007) Magdol (2002) Paul and Brier (2001) Shaver, Furman, and Buhrmester (1985) Wheaton (1990)
Experimental	Laboratory	Baumeister and Leary (1995) Cohen and Hoberman (1983) Zirkel (1992)
Experimental	Case-Control Field Study	Compas et al. (1986) Doss et al. (2009) Ertel, Glymour, and Berkman (2009) Pennebaker, Colder, and Sharp (1990) Pratt et al. (2000) Srivastava et al. (2009)
Qualitative	Interviews, Focus Groups	Buote et al. (2007) Curley (2009) Liddle, Carlson, and McKenna (2004) Wellman and Wortley (1990)

This table represents exemplar studies exploring the relationship between transitional events and stressful outcomes. Not all studies pertain to the transition to college. Many of the studies contained are mixed-method, and were assigned a primary category to highlight the specific contribution of the methodological component.

points of transition and associated health, social, and psychological disturbances. This identification was used to develop proactive interventions to mitigate stress.

The proactive approach, as elaborated in Cohen and Hoberman (1983), Cohen and Wills (1985), or Lin et al. (1979), focuses on the management of stressful events through intervention. In this approach, researchers explore both naturalistic and constructed interventions. An example of a naturalistic intervention is manipulation of the social support provided to people experiencing stress (e.g. Cohen and Wills, 1985), whereas an example of a constructed intervention would be a program promoting behavioral change to manage stress (e.g. Pratt et al., 2000). The difference in approach to intervention has led to divergent methodologies. Naturalistic interventions are more likely to be analyzed with observational data (cross-sectional and panel surveys), and constructed interventions are more likely to be analyzed with experimental and quasi-experimental studies (Table 2.1).

The study of stress is a large, multi-disciplinary endeavor, concerned with more than transitions. As described in the reviews of Cohen and Wills (1985), Thoits (1995), and Kessler (1997), the stress approach is generally concerned with all stressful events in the life course. George (1993) described the origin of the stress approach:

> The major impetus to development of stress research was the desire to better understand the relationships between social location and illness Initial conceptualizations of the link between stress and illness were simple and based on a homeostatic view of human lives. Stressful events were hypothesized to mediate the effects of social location on illness. (p. 356)

Due to the positioning of the stress research agenda, transition research is a natural concomitant. Many of the most stressful events we encounter are associated with transitions (e.g. divorce, death of a spouse, leaving home, marriage, loss of a job). To explore what stress research can tell us about transition, I now elaborate the stress

response to transition. In doing so, I identify transitionally-relevant stress-related variables, antecedents and moderators.

2.3.2 Studying transitional stress

Studies of the stress reaction to transition generally focus on the levels of stress generated by a transition, or the ways in which stress affects adaptation to transition. In these studies, the transitional individual's stress level is generally treated as either a dependent or covarying variable. In studies where stress is the dependent variable, the transition (or being "in transition") is often the independent variable. In studies where stress is a covariate or interaction, the level of adaptation to transition is generally the dependent variable.

It is important to note that the concept of stress actually refers to a penumbra of observable traits. As such, measures and conceptions of stress vary among researchers and disciplines. For example, the Aseltine and Gore (1993) study of mental health in adaptation to the transition from high school employs stress as a dependent variable. Paul and Brier (2001) employ stress indicator variables as potential mediators of "friendsickness" during the transition to college, identifying a significant negative association between measures of self-esteem and "friendsickness." In this design, increased levels of transitional stress, manifest through decreased self-esteem, are shown to exacerbate the negative outcomes of transition.

Characteristic of many of the "stress response" studies, the Fisher and Hood (1987) longitudinal analysis of the transition from high school to college highlights the significant negative relationship between transitional state and measures such as psychological disturbance, obsessiveness and absent mindedness. Such measures capture the gross effect of being in a transitional state — in which one experiences an interruption to schema and routine while having to manage the new responsibilities of the transition.

The Isakson and Jarvis (1999) study of academic transition employs a three-stage data collection: before, during, and after the transition. The researchers find that while stress measures such as daily hassles and adaptive coping increase during the transition, the effects diminish as the transitional period ends.

Analytic approaches to transitional stress

Two major explanations of variance in the stress response to transition are an individual's antecedent psychological state and the particular characteristics of the transition (Wheaton, 1990). Studies have demonstrated a relationship between antecedent mental and emotional states and transitional outcomes (e.g. Kwan et al., 2003; Srivastava et al., 2009; Tamir et al., 2007). This variant of transition study is employed by developers of intervention and assistance programs (e.g. Entwisle and Alexander, 1993; Pratt et al., 2000), and those interested in understanding individual determinants of response to common transition (Buote et al., 2007).

Other studies explore the characteristics of particular transitions. It is generally assumed that transitions are stress-inducing events, but as Wheaton (1990) demonstrates, transitions have the potential to alleviate stress. Stress reactions to transition vary with characteristics of the transition; such characteristics include the length of the lead-up period to the transition and whether or not the transition is scheduled. For example, the death of a loved one after a long illness may produce a lesser stress reaction than a sudden death. A sudden divorce might produce extreme stress, but a divorce after a long period of acrimony may reduce stress.

Elder's Life Course perspective argues that the stressful effects of transition vary between different cohorts, based on life experience (Elder, 1975, 1998). A cohort that has lived through the Great Depression, for example, may react more negatively to the income elasticity of a job transition than a cohort that has not encountered such

poverty. The varying scope and effects of transition demonstrate the challenge of establishing a single paradigm of transition. Cowan (1991) draws attention to the fact that transitional outcomes vary based on a range of situational factors. In the next section, I review two key integrative approaches to transition that potentially account for these situational factors.

2.3.3 Integrative approaches to stress and transition

Much of the literature previously reviewed establishes a causal link between life events, such as transition, and stressful outcomes. The transition to college is a well-established stressful state, and the purpose of this study is to explore the extent to which participation in a social network site can mitigate stress and further successful adaptation. As these two outcomes are distinct, it is useful to draw on existing literature that explores these two outcomes simultaneously. I present two such integrative models of transition, by Nicholson (1989) and Schlossberg (1981). Nicholson's process model highlights the stages and various dimensions of transition. Schlossberg's variance model of transition provides both theoretical and applied predictive structure. The following section explores these complementary approaches to understanding transition.

Nicholson's model of transition

Nicholson (1989) offers a process model of transition that complements the work of Ebaugh (1988) and Ashforth (2001), but is not limited to a focus on role transition. Nicholson describes the transition cycle as a four step, recursive process of *preparation, encounter, adjustment* and *stabilization.* Describing job transition, Nicholson writes:

> Expectations and motives rule the Preparation stage (the period leading up to the point of change); emotions and perceptions are pre-eminent in the Encounter stage (the first days and weeks of familiarization with a new

Table 2.2: Nicholson's transition cycle

Transition Cycle	**Tasks and Goals**	**Pitfalls and Problems**	**Strategies and Remedies**
Preparation	Developing helpful expectations, motives and feelings	Fearfulness, reluctance, unreadiness	Realistic preview, advance contacts, self-appraisal
Encounter	Confidence in coping, enjoyment in sense-making	Shock, rejection, regret	Social supports, slack in system safety, and freedom to explore and discover
Adjustment	Personal change, role development and relationship building	Misfitting, degrading, grieving	Real work to do, early success, useful failure through fast feedback and mutual control
Stabilization	Sustained trust, commitment and effectiveness with tasks and people	Failure, fatalism, faking	Goal-setting and appraisal for role evaluation and discretion management

Adapted from Nicholson (1989, pp. 89-92)

> job); assimilation and accommodation govern the Adjustment stage (the period of developing performance and psychological change); and relating and performing dominate the Stabilization stage (the steady state achieved after Adjustment). (p. 88)

Nicholson then provides an overview of the tasks, problems, strategies, and remedies available at each stage of the transition cycle, reproduced as Table 2.3.3.

Nicholson uses the transition cycle to create a nine-dimensional system for analysis of transitions, "through which it is proposed any single instance of transition can be comprehensively and precisely profiled" (Nicholson, 1989, p. 97). Again, there are similarities to the models proposed by Ebaugh and Ashforth. Nicholson's nine dimensions and boundary conditions are reproduced as Table 2.3.3.

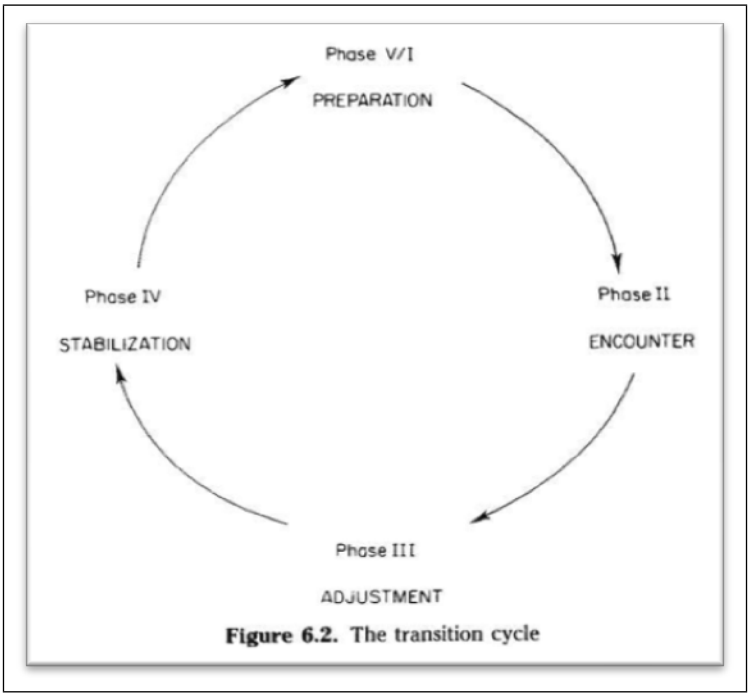


Figure 2.3: Tasks and goals in the transition cycle, adapted from Nicholson (1989)

Schlossberg's general model

Schlossberg's (1981) general model of human adaptation to transition provides a roadmap for the study of transition. According to Schlossberg, in the process of adapting to transition, there are three important factors for consideration. The first factor reflects the characteristics and perception of the particular transition. For example, is the transition a role change? How is it viewed? Schlossberg cites the source, timing, onset, and duration of the transition as important components of this factor. Generally, the transition to college is viewed as an upward role change, with predictable onsets, timing, and duration (Shaver, Furman, and Buhrmester, 1985). For most, the transition is associated with increased autonomy, as the student embraces residential independence and adulthood in the eye of society (Arnett, 2001).

Schlossberg's second factor affecting adaptation to transition reflects the characteristics of the pre- and post-transition environment. These refer to the social and

Table 2.3: Nicholson's dimensions of transition

Dimension	**Description**	**Upper Boundary**	**Lower Boundary**
Speed	How often do they occur?	Fast	Slow
Amplitude	How radical is the change?	High amplitude	Low amplitude
Symmetry	How much time adjusting vs. time performing?	Long adjustment	Short adjustment
Continuity	Any meaningful connections between transitions?	High continuity	Low continuity
Discretion	How much autonomy in controlling the process?	High discretion	Low discretion
Complexity	Are multiple adaptations and adjustments required?	High complexity	Low complexity
Propulsion	Who started the cycle and why?	Self-propelled	System-propelled
Facilitation	Who/what helps progress through the cycle	High facilitation	Low facilitation
Significance	Does adjustment change the individual or organization?	High significance	Low significance

Adapted from Nicholson (1989, p. 98).

institutional support systems available to individuals in transition, as well as the physical setting of the transitional environment. An individual's support system is a primary means through which adaptation to transition can be affected. Individuals can be supported with a range of interventions, including therapeutic interventions (e.g. Kenny and Rice, 1995), adaptations to the transitional experience (e.g. Ashforth, 2001), and through the social support of one's social network (e.g. Cohen and Hoberman, 1983; Cohen and Wills, 1985).

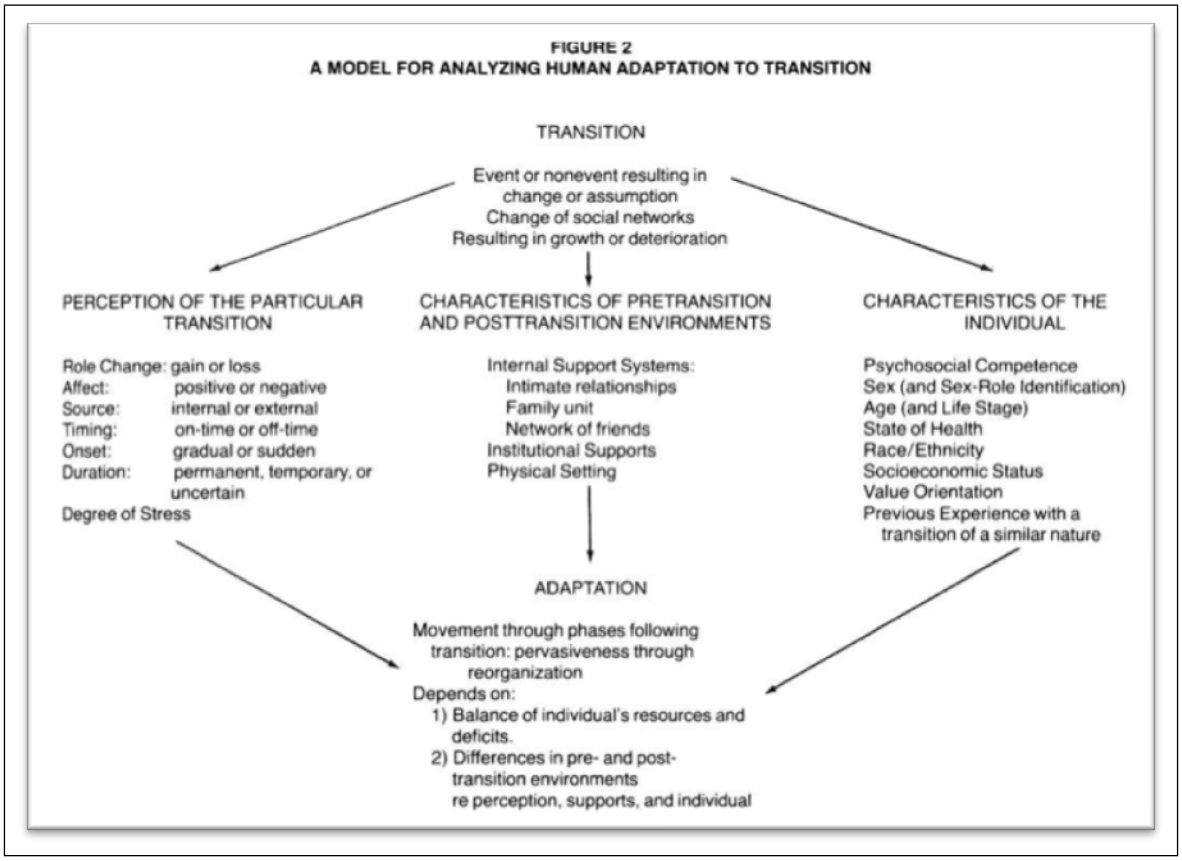


Figure 2.4: Schlossberg's general model, adapted from Schlossberg (1981)

The third factor introduced by Schlossberg regards individual characteristics, such as psychosocial competence, sex, age, ethnicity, socioeconomic status (SES), values and previous experience with transition (Schlossberg, 1981, p. 5). Researchers study individual characteristics to understand the effects of demographic and social-psychological factors such as depression, loneliness, and self-efficacy on adaptation to transition. In particular, social-psychological variables have been shown to mediate adaptation to transition in a variety of settings (e.g. Bandura, 1977; Cantor et al., 1987; Cutrona, 1984; Radloff, 1991).

To this point, I have explored four perspectives on transition. The first perspective, transition as interruption, represents a cognitive understanding of transition as interruption to schema. The second perspective utilizes role theory to explore conceptions

of transition in a social world. The stressor response to transition was elaborated in the third perspective. Finally, integrative perspectives on transition were presented, particularly the models of Nicholson and Schlossberg. The next section examines individual response to transition, including antecedents and mediators of the response to transition.

2.3.4 Social support and transition

According to Sarason and Sarason (2009), the concept of social support grew out of sociological investigation of the effects of social relationships. Durkheim (1951), in his well-known study of suicide, identified the relationship between lack of social ties and suicidality. Although work such as Durkheim's articulated the positive aspects of being embedded in a supportive network, it was not until 1976 that the concept of social support was causally linked to positive health outcomes (Sarason, Sarason, and Pierce, 1990). The work of Cobb (1976) and Cassel (1976) established the first major hypothesis regarding social support: that social support was valuable as a buffer against stress. Regarding the *buffering hypothesis*, Cohen and Wills write: "This is termed the buffering model because it posits that support 'buffers' (protects) persons from the potentially pathogenic influence of stressful events" (1985, p. 310).

In a review of processes and structures of social support, House, Umberson, and Landis highlight a key methodological question regarding the buffering effects of social support: "Some have argued that the apparent buffering and even main effects of social relationships on health are actually spurious methodological artifacts, due to the confounding of measures or the existence of an underlying factor (e.g. personal attributes such as social skills or personal competence) which determines levels both of health and of social relationships or support" (1988, p. 296). In a complex social situation, it is methodologically challenging to untangle the process and directionality of

socially supportive effects. As Bambina (2007) notes, even the cognitive mechanisms of social support remain debated, with some theorists arguing that perception of support alone is a significant buffering mechanism.

As an alternative to the buffering hypothesis, numerous researchers have proposed a *main effect* model of social support, which argues "that social resources have a beneficial effect irrespective of whether persons are under stress" (Cohen and Wills, 1985, p. 310). It is termed the main effect model "because the evidence for this model derives from the demonstration of a statistical main effect of support with no Stress X Support interaction" (Cohen and Wills, 1985, p. 310). The main effect model argues that simply being in the presence of a supportive network improves health and well being. Like the buffering hypothesis, the main effect model is methodologically challenging. While it may be true that being embedded in a network increases well being, some networks are more beneficial than others. In fact, some networks may cancel each other out, confound each other, or present no effect. This is particularly compelling in the context of social network sites, where the supportive effect of being in a large online network is likely to have less of a positive effect than being in the presence of a large offline network.

2.3.5 Components and processes of social support

Social support is generally described as having four components: Tangible or instrumental support, informational support, emotional support, and network or companionship support (Cutrona, Suhr, and MacFarlane, 1990). It is notable that within the broad literature on the topic, and wide range of disciplines studying social support, there seems to be general agreement on the components of social support (cf. Bambina, 2007; Cohen and Gottlieb, 2000; Cutrona, Suhr, and MacFarlane, 1990; House, Umberson, and Landis, 1988; Sarason, Sarason, and Pierce, 1990; Wellman and Wortley, 1990; Wellman

and Gulia, 1997). The components of social support are defined by Cutrona, Suhr, and MacFarlane:

- **Tangible Support**: "Concrete assistance," including financial aid, transportation, provision of goods and services, and a range of other forms of active assistance.
- **Informational Support**: The provision of "information, advice, and guidance concerning possible solutions to a problem." For example, drawing on a friend's knowledge regarding an ailment and potential remedies.
- **Emotional Support**: Drawing upon the network for caring and sympathy, and general emotional stability.
- **Network Support**: "Feeling part of a group where members share common interests and concern" (1990, p. 31).

It must be noted that emotional support and network support (i.e. friendship) are closely related, though the varying magnitude of these supports prompt their separation. The effects of social support are meaningful at two levels: the *perceived level* and the *received level* (Sarason, Sarason, and Pierce, 1990). Perceived social support is the psychological sense that social support is available when need arises. In this understanding, social support is a resource that can be drawn upon, and the availability of perceived resources buffer the effects of stressful situations. Received support, on the other hand, refers to actual, experienced social support. This definition reflects real resources that are drawn upon in times of need. Sarason, Sarason, and Pierce (1990) note the methodological challenge of measuring two levels of the construct, highlighting the need for separate instruments to measure perceived and received social support.

As social support is dependent on both individual and situational factors, measurement models of social support should include moderating factors where appropriate.

Goldsmith (2004) introduces a number of variables that moderate the effects of social support. According to Goldsmith, moderating variables should focus on individual or "interpersonally relevant predispositions" (2004, p. 18). In the context of the transition to college, measures of depression (Fisher and Hood, 1987), loneliness (Larose and Boivin, 1998; Paul and Brier, 2001), satisfaction with life (Ellison, Steinfield, and Lampe, 2007; Liu and LaRose, 2008), and self-esteem and self-efficacy (Liu and LaRose, 2008; Tamir et al., 2007) have been explored as moderators of the effects of social support.

In Schlossberg's theory of adaptation to transition, the three main factors mediating transition are the perception of the particular transition, the characteristics of the transitional environment, and individual characteristics. I have examined the relevant aspects of Schlossberg's first factor through the explication of theoretical perspectives on transition, and review of literature on the transition to university. Schlossberg's second factor, characteristics of the environment, identifies how the outcome of the transition can be affected by external factors. Of particular interest is the socially supportive role of the social network site during the transition from high school to college. I now turn to Schlossberg's third factor, individual characteristics. In this final section, I explore the transition to adulthood, using the lens of emerging adulthood.

2.3.6 Social support characteristics of the study population

This study explores the supportive role social network sites play during the transition to college. The majority of the study's population share similar characteristics: they are experiencing a major role transition, many are experiencing a residential transition, and the transition marks an important step in the greater transition to adulthood. Hogan and Astone's (1986) review of the transition to adulthood highlights the multidimensional nature of the transition: the transition to adulthood is social and developmental,

it occurs in the eyes of the law and society, and different cohorts experience the transition in different ways. Schulenberg, Sameroff, and Cicchetti (2004) note the inherent complexity and importance of the transition, illustrating the life-long implications of different trajectories acquired during the transition to adulthood. Situated among many important transitions, the effects of a positive transition to college can have lifelong social, psychological, and tangible benefits.

Early work on the transition to adulthood explored the role that sequenced events, such as moving away from home and marriage, play in the development of adult identity (e.g. Goldscheider and DaVanzo, 1985; Hogan, 1980; Marini, 1984). This functional view of transition did not capture the richness of individual transition, nor did it explain variance in the transition to adulthood across cohorts (e.g. Elder, 1994, 1998). Recently, Arnett has put forth the perspective on emerging adulthood (see Arnett and Tanner, 2006). Arguing that industrialized society has new and distinct expectations of the transition to adulthood, Arnett introduces "emerging adulthood" as a cogent developmental stage between adolescence and adulthood.

On the concept of emerging adulthood, Arnett (2000) writes:

> I propose a new theory of development from the late teens through the twenties, with a focus on ages 18-25. I argue that this period, emerging adulthood, is neither adolescence nor young adulthood but is theoretically and empirically distinct from them both. Emerging adulthood is distinguished by relative independence from social roles and from normative expectations. Having left the dependency of childhood and adolescence, and having not yet entered the enduring responsibilities that are normative in adulthood, emerging adults often explore a variety of possible life directions in love, work, and world-views. (p. 469)

According to Arnett, the concept of emerging adulthood is "distinct demographically, subjectively, and in terms of identity explorations" (2000, p. 470). Using survey techniques, Arnett identifies the age range of 18-25 as possessing distinct demographic characteristic of "emerging adulthood." Arnett shows that individuals in the 18-25 age range are subjectively different from those in bracketing cohorts: they feel a heightened sense of responsibility, but they do not universally feel that they have achieved adulthood. Arnett notes: "Perhaps it is difficult for young people to feel they have reached adulthood before they have established a stable residence, finished school, settled into a career, and married (or at least committed themselves to a long-term love relationship)" (2000, p. 472).

Arnett argues that emergent adulthood is a place for the exploration of identity in the areas of "love, work, and worldviews" (2000, p. 469). While adolescent identity-exploration processes have been extensively documented (e.g. Berzonsky, 1991; Kroger, 2004; Valentine and Holloway, 2002), emerging adulthood offers yet another opportunity for identity exploration. Of relevance to this study, the affordances of social network sites are particularly suited for such identity exploration, enabling individuals to manage identity and presentation dynamically throughout the course of emerging adulthood (Zhao, Grasmuck, and Martin, 2008). While such digital exploration is often posed as a potential negative because of identity traces left behind (e.g. DiMicco and Millen, 2007), the value of exploration enabled by the technology may mitigate potential negative effects (e.g. Barker, 2009).

Individuals making the transition to college have unique needs, as they are participating in a multidimensional transition. In addition to leaving home and establishing new roles, they are entering the period of life known as emerging adulthood. While many of the needs the population encounters may be fairly uniform (e.g. needing to find a place to eat, buy groceries, find one's way to class), there are individual needs

that may be particularly well-addressed by social network sites. These include the development and maintenance of supportive networks and the exploration of identity and self-presentation that occurs during the transition to adulthood. As certain types of participation in social network sites has been demonstrated to be supportive in nature (e.g. Ellison, Steinfield, and Lampe, 2007), this research focuses on social support provisioned through social network sites.

To this point, I have reviewed literature about social network sites, transitions, and processes of support during transition. For individuals to successfully adapt to transition, they must locate and draw on supportive resources, and they must address the social-informational challenges of transition. In the remaining sections of the literature review, I explore these social-informational processes. Particularly, I review models of information behavior, and examine how individuals address everyday life information needs in transition.

2.4 Models of Information Behavior

According to Wilson (2000), information behavior is:

> The totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face- to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given. (p. 49)

Following Wilson's definition, information behavior refers to the penumbra of behaviors associated with the development and recognizance of information need, the passive

and active seeking of information, and the processing and use of information. Information behavior is essential, a fundamental human trait evolving over millennia (Spink and Cole, 2006). Researchers exploring information behavior conduct inquiry in a variety of settings, including academic environments (Ellis, 1993), the work place (Ellis and Haugan, 1997), and non-work settings associated with "everyday life" (Savolainen, 1995).

In this section, I elaborate a range of theories and concepts regarding information behavior. In doing so, I examine a number of conceptual models of information behavior and field studies of information behavior sourced primarily from the information science literature. I elaborate these models to identify the informational role that social network sites play for students making the transition to college.

2.4.1 General concepts

Case (2002), in his review of information behavior, uses a matrix to explore relevant factors associated with information behavior research (Figure 2.5). In the matrix, information behavior studies are characterized by their task-orientation and person-orientation (Case, 2002, p. 7). Task orientation refers to the *task locus* of study; a study can be *task-oriented* or *nontask-oriented*. An example of a task-oriented study is Bystrom (1996), in which information seeking strategies of municipal workers were evaluated for tasks of different complexity (see also Vakkari, 2003). Nontask-oriented studies include Fisher's work on information grounds (Counts and Fisher, 2008; Fisher, Durrance, and Hinton, 2004; Fisher, 2005; Fisher, Landry, and Naumer, 2006) or McKenzie's work exploring information practice in health settings (McKenzie, 2002, 2003*a*, 2006). In these studies, the interactions between the individuals and their information environment are the locus of inquiry.

Table 1.1
Contrasting Examples of Information Behavior Research Questions

	Person Oriented	System Oriented
Task-oriented studies	• How do lawyers make sense of their tasks and environment?	• What kinds of documents do engineers need for their work, and how might the corporate information center supply them?
	• How does a manager learn about job-related information *outside of* formal organizational channels?	• How satisfied and successful are student searches of a university library's Web-based catalog?
	• What happens when a voter has too much information about a candidate or an issue?	• How much use do medical doctors make of medical databases?
Nontask-oriented studies	• How do the elderly learn about and cope with problems or opportunities that come up in their daily lives?	• How does the public use a library for personal pleasure and growth: what they ask for, borrow, and read?
	• Why do TV viewers choose one program over another, and what satisfactions do they achieve in doing so?	• How do we persuade teenagers to act in healthy and responsible ways? What messages about drug abuse do they attend to, in which medium, and why?
	• Why do people browse in stores when they have no explicit need in or intention to buy?	• Why do people ignore safety warnings on packages and advertisements?

Figure 2.5: Case's matrix, adapted from Case (2002)

Case's second categorization of information behavior research regards the *person-orientation* of the study (Case, 2002). In this component of the matrix, studies of information behavior can be either *systems-oriented* or *person-oriented*. Systems-oriented studies explore the interaction of an individual with an information system, such as an information retrieval system (e.g. Borgman, 1986; Ingwersen, 1992; Ingwersen and Jarvelin, 2005). Person-oriented studies explore the strategies people use to address

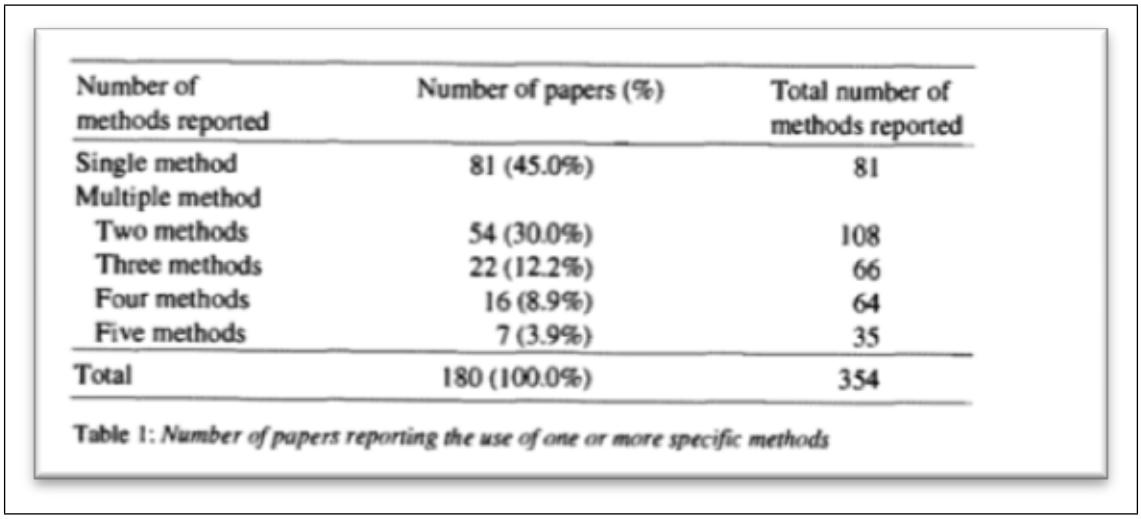
informational gaps. The growth of person-oriented studies in information science reflected a significant shift in field. Dervin and Nilan (1986) made the case for person-orientation in their seminal review, arguing that user focus is an essential concomitant to systems-orientation in the process of studying information behavior.

Writing in 1983, the eminent librarian James Krikelas observed "for the point of view of mass, user studies probably form the largest single body of research literature in librarianship" (Krikelas, 1983, p. 5). He cites an estimate that over 1,000 user studies have been published to date. Indeed, the user study is a core research element in the field, and user studies are voluminous. Using ARIST reviews of information needs, uses, and seeking studies, Case (2002) estimated that there are over 10,000 studies in the domain, as estimate he calls "conservative" (p. 224). It must be noted, therefore, that this review only covers a small portion of this research.

2.4.2 Theory in information behavior research

The role of theory in information behavior research has been the subject of a number of reviews. Particularly, researchers are interested in the use of theory in information behavior research, the interdisciplinary reach of the theorization (and meta-theorization), and methodological trends in information behavior research. Research on information behavior tends to draw from a wide theoretical base, with a particular focus on social science and library and information science (LIS) theories (McKechnie, Pettigrew, and Joyce, 2001). In addition to employing theory in their work, information behavior researchers tend to produce and enhance theory, more so than most other sub-disciplines of LIS (McKechnie, Pettigrew, and Joyce, 2001; Pettigrew and McKechnie, 2001).

Although information behavior research (and LIS research in general) tends to have interdisciplinary orientation (McKechnie, Pettigrew, and Joyce, 2001; Pettigrew and McKechnie, 2001), citation practices are insular. McKechnie et al. (2005) found that



Number of methods reported	Number of papers (%)	Total number of methods reported
Single method	81 (45.0%)	81
Multiple method		
Two methods	54 (30.0%)	108
Three methods	22 (12.2%)	66
Four methods	16 (8.9%)	64
Five methods	7 (3.9%)	35
Total	180 (100.0%)	354

Table 1: *Number of papers reporting the use of one or more specific methods*

Figure 2.6: Multiple methods in human information literature, adapted from McKechnie et al. (2002)

information behavior research was used primarily within the LIS communities, with 85% of the citations of information behavior research occurring within the field. Information behavior research, while integrative in theoretical focus, exerts little influence on other fields. Researchers have attempted to create conceptual maps between theorization in information behavior and other disciplines. A recent example is work by Goggins and Erdelez (2009) that highlighted the theoretical overlaps, and conceptual similarities between work in information behavior and human-computer interaction.

Julien (1996) and Julien and Duggan (2000), in a series of content analyses, examined the theoretical orientation and interdisciplinary nature of information needs and uses studies. The analyses focus on information behavior research in the time frame from 1984 to 1998, and investigates the orientation of interdisciplinary citation practices in information behavior research. The researchers draw on the McKechnie, Pettigrew, and Joyce (2001) analysis of interdisciplinarity, finding that 43% of interdisciplinary citations originated in the social sciences, 16% in computer science, 14% in organizational studies, 14% in the physical sciences, and 11% in health sciences (Julien and Duggan,

Specific methods used

Table 2 summarizes the type of specific methods reported in the articles.

Method	Number of times used(%)
Interviews	123 (34.8%)
Surveys and questionnaires	72 (20.3)
Observation	49 (13.9)
Content and document analysis	41 (11.6)
Diaries and personal journals	16 (4.5)
Transaction log analysis	12 (3.4)
Focus group interviews	9 (2.5)
Think-aloud protocols	8 (2.3)
Secondary data analysis	5 (1.4)
Experiments	4 (1.1)
Standard tests	4 (1.1)
Bibliometrics andcitation analysis	3 (0.8)

Figure 2.7: Research method trends in human information literature, adapted from McKechnie et al. (2002)

2000). These estimates are generally in line with the Pettigrew and McKechnie (2001) investigation of theory use in information science (IS), where it was found that 45% of the theory cited in IS literature was from the social sciences, 30% from within IS, and 19% from the physical sciences.

Other research documents the range of theories and methods applied to information behavior research. McKechnie et al. (2002) explored the methodological focus of information behavior research in a sample of literature from 1993 to 2000. Information behavior research was found to employ a range of methods (Figure 2.6), with a focus on interviews (35%), surveys (20%), observation (14%), and content analysis (11%) (Figure 2.7). Overall, 43% of the studies reviewed used qualitative methods, 26% used quantitative methods, and 15% used mixed methods. Notably, 55% of the studies McKechnie et al. reviewed employed multiple methods. Consistent with the theoretical diversity of the field, a range of methodological approaches appear to be

valid for studying questions of information behavior.

2.4.3 Core concepts in information behavior

As defined by Wilson (2000), information behavior is an umbrella concept, covering a range of behaviors associated with the seeking and use of information. Wilson defines information seeking as "the purposive seeking of information as a consequence of a need to satisfy some goal" (p. 49). Information use, therefore "consists of the range of physical and mental acts involved in incorporating the information found into the person's existing knowledge base" (p. 50). Antecedent to information seeking is an "information need," which represents a contested area of information behavior. I begin by exploring the concept of an information need.

Information needs

The concept of the information need is of particular relevance to the information professional, often charged with addressing the need. Taylor (1968), writing in the context of question negotiation in the reference transaction, identified four levels of information need: visceral, conscious, formalized, and compromised. The visceral need, an abstract concept, refers to the actual need of the information user. The conscious and formalized needs refer to semantic representations of the need, in the user's mind and as expressed in conversation. Finally, compromised needs are needs structured in the context of an information system, where the "searcher must think in terms of the organization of particular files and of the discrete packages available" (Taylor, 1968, p. 277).

Taylor highlights how needs are represented at a number of levels, indicating the possibility of disconnect between a user's perceived and expressed needs. Krikelas (1983) theorizes the information need as a temporal construct: information needs can be either immediate or deferred (Krikelas, 1983, p. 8). This is a simplistic construction,

but it highlights the complex nature of information needs. At any time, we can define immediate needs; these are needs we can express and act upon. Our deferred, or "kinetic" needs represent a set of information needs that we carry with us at all times, that we subconsciously act upon. Therefore, we are in a continual information need-state, and only a set of our information needs are discrete.

Wilson (1981) offers criticism of the conception of information need, particularly the instrumentation of information needs in user studies. First, Wilson highlights that needs can be operationalized in many forms (wants, demands, etc.), and these forms are context-dependent. Second, needs occur at many levels, including the person level (psychological and cognitive needs, etc.), the role level (social or work role, etc.), or the environmental level (physical or socio-cultural environment, etc.). This inherent complexity makes the study of information needs challenging due to the necessary explication of the context, and level at which needs operate (Wilson, 2000). Response to Wilson's concerns include the increased contextual and situational focus in information behavior, as evidenced by the turn towards the study of information seeking in context (Vakkari, 1996).

The concept of an information need may be variable, but the important role of information needs as antecedent to a wide range of information behaviors warrants their study. Case (2002) highlights three conceptual approaches to information needs. The first — seeking answers — draws on the previously discussed work of Taylor (1968) and Krikelas (1983), highlighting the representative variability in information needs. To fully comprehend the information need, systems and methods must adapt to the variability of the information need as it passes through representational spaces.

Representing needs and knowledge states

Case (2002) argues that information needs represent uncertainty, and that processes

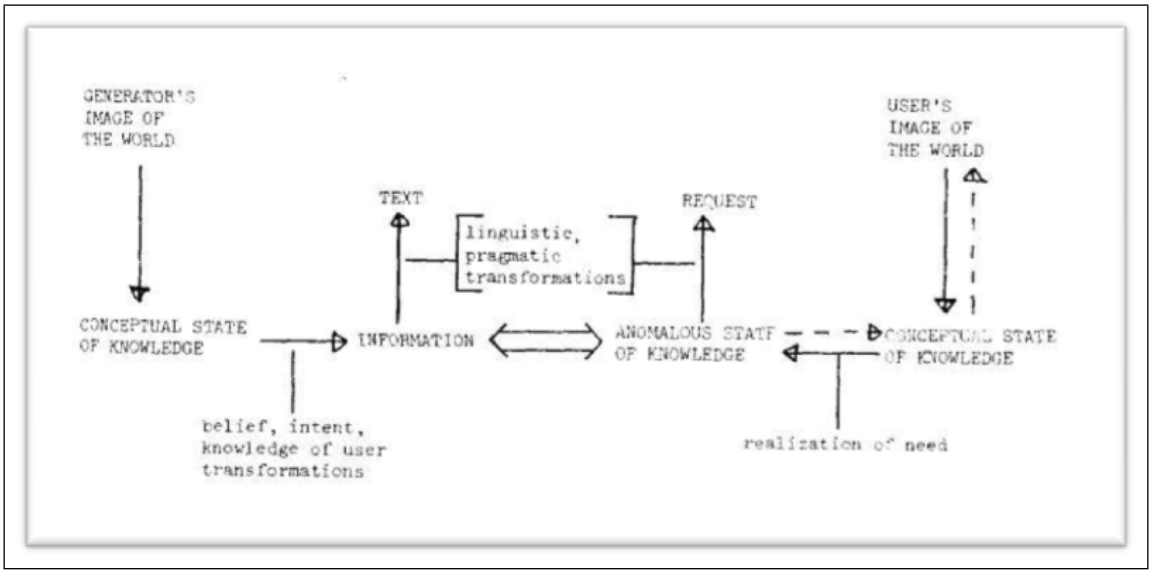


Figure 2.8: Belkin's anomalous states of knowledge, adapted from Belkin (1980)

of uncertainty reduction allow the location of the information need. In this domain, Belkin's (1980) theory of anomalous states of knowledge (ASK) describes the process through which representations of information needs are solidified through repeated inquiry. As the information seeker engages in a search process, the "non-specifiability" of the uncertainty is reduced over seeking cycles (Figure 2.8). The concept of an ASK is of particular import to designers of information systems, as technical features such as relevance feedback may assist in reducing the ASK.

In Kuhlthau's (1993*b*) process-oriented theory of searching, an information need (uncertainty) initiates the information search process, and is defined as "a cognitive state that commonly causes affective symptoms of anxiety and lack of confidence" (Kuhlthau, 1993*b*, p. 111). By engaging in the search process, the individual addresses his or her uncertainty, reducing anxiety and increasing confidence (Kuhlthau, 1993*a*,*b*).

More generally, the concept of uncertainty reduction can be traced to Shannon (1948) and Weaver (1949), whose formulations of information theory highlighted the uncertainty-reducing properties of information (Figure 2.9). Uncertainty reduction as

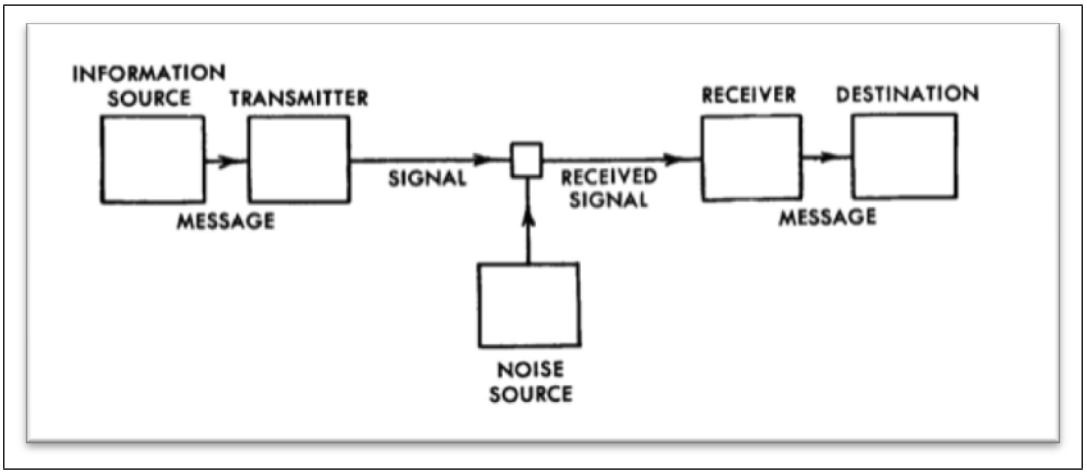


Figure 2.9: Weaver's theory of information, adapted from Weaver (1949)

an information strategy has been studied in other disciplines, including communications (Berger and Calabrese, 1975; Sunnafrank, 1986; Brashers, 2001) and social psychology (Grieve and Hogg, 1999; Hogg, 2000). Notably, a cross-disciplinary approach to uncertainty reduction has been applied extensively in studies of computer-mediated communication (CMC). Walther and colleagues (1992; 1992; 1994; 1995; 1996) position CMC as fundamentally uncertainty-reducing in nature; the hyperpersonal perspective (Walther, 1996) argues that with uncertainty reduction, ties developed in CMC can have similar strength to offline ties.

Making sense of information needs

Finally, Case (2002) argues that information needs can be thought of as ways to make sense of our world. This perspective is most commonly associated with Brenda Dervin's (Dervin and Dewdney, 1986; Dervin and Nilan, 1986; Dervin, 1992, 1998, 1999) process theory of "sensemaking" (Figure 2.10). In the sensemaking framework, Dervin terms the information need a "gap"; the gap is contextual, and an individual engages in information seeking behavior to address, or make sense of, the gap.

The term "sensemaking" is employed in a number of allied domains, and while the

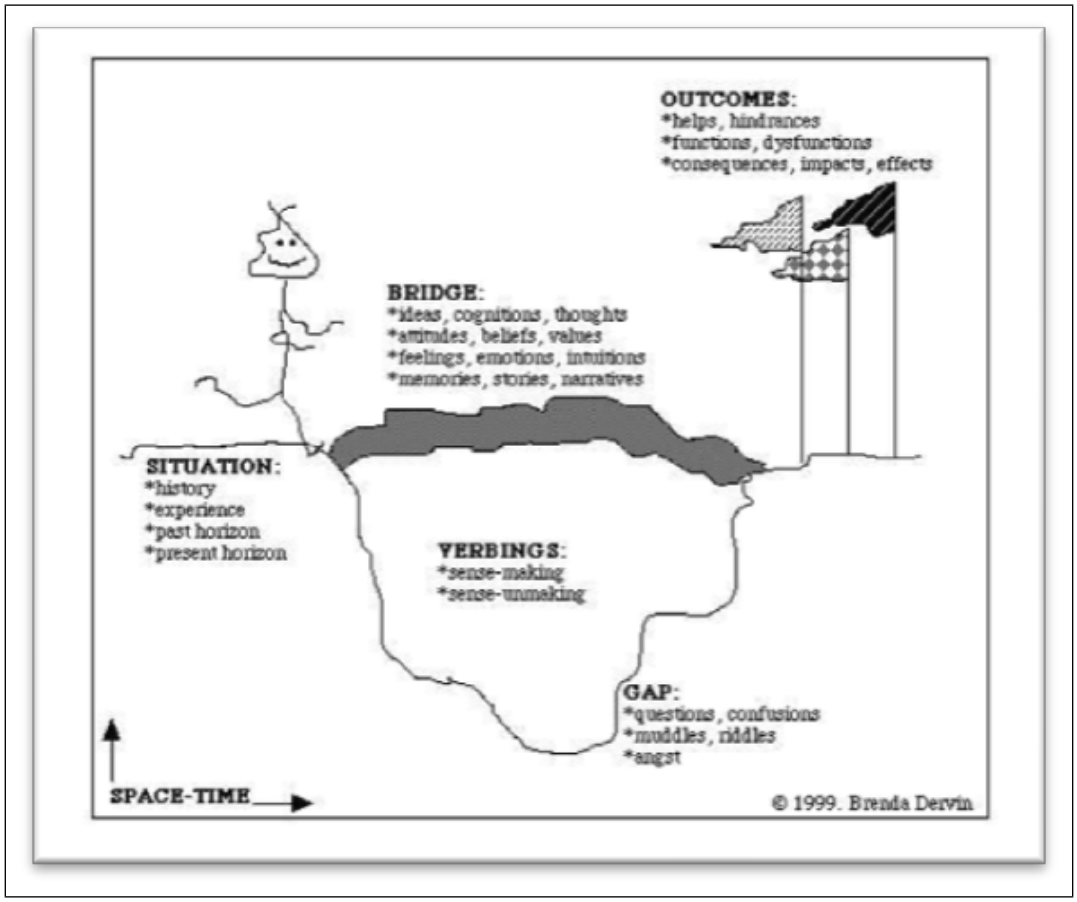


Figure 2.10: Dervin's sensemaking, adapted from Dervin (1992)

central concept ("making sense of the world") is similar, there is variance in implementation between domains. In the HCI community, sensemaking is theorized as a way to develop new understandings from data and representations, such as information visualizations (Furnas and Russell, 2005; Russell et al., 1993). In organizational theory, sensemaking refers to the ongoing process of order-making (construction of reality) based on lived experience (Weick, 1993, 1995; Daft and Weick, 2000; Weick, Sutcliffe, and Obstfeld, 2005).

In these various interpretations, the mechanics and actors involved in sensemaking vary (particularly organizational sensemaking), but common threads exist. First, the conception of the gap, a context-dependent information need, is a common thread.

Second, sensemaking is a process in which the actor draws upon available resources to address the gap. Finally, upon addressing the gap, the actor understands the world anew.

Stable and predictable information needs

With the growth of the information-seeking-in-context frame, and resultant turn towards naturalistic methodologies, much emphasis has been placed on the subjective nature of information needs. In certain contexts, information needs have a stable or fixed nature. Considering Maslow's hierarchy of needs, Marchionini (2006) argues that our "higher-level needs are often informational" (p. 42). There are a certain ongoing set of needs that must be addressed physically, emotionally, and informationally. For example, the individual experiencing a job loss is beset by a range of new information needs, including a need for affiliation, energy, orderliness or conjunctivity, ego achievement, and a need for work (or, a sense of purpose) (Payne, 1990, p. 261).

In the transition from high school to college, students are required to adapt to a "new set of academic and social systems" (Terenzini et al., 1994, p. 63), to build supportive friend networks (Paul and Brier, 2001), and to achieve basic orientation with the new locale (Watson, 1993). In the case of both job and college transition, needs are necessarily contextual (a transitioning worker in the engineering field may have different needs than one in the legal field), but needs-in-context are generally stable for a transitional cohort. For this reason, both of these transitions have significant social and informational support infrastructure (e.g. Brand and Burgard, 2008; Jackson et al., 2000; Pancer et al., 2000, 2004; Pratt et al., 2000).

In additional to transitional populations, stable information needs are observed in work settings. Gorman's (1995) synthesis explored the range of information needs physicians address to maintain occupational stability. Similarly, Hirsh and Dinkelacker

(2004) studied the information needs of information workers, exploring the range of electronic sources consulted to address their needs. Understanding information need as represented in behavior or system allows information researchers to inductively understand information behavior. Cothey's (2001) longitudinal study of undergraduate information search patterns, for example, utilized transaction logging to measure how information need representations change with system experience. In a situation where the information need is repetitive or cohort-dependent, the automatic recognition of information need provides an opportunity to better serve the needs of information consumers.

Collaborative and integrative approaches to information needs

A collaborative construction of the information need can be seen in Pirolli's foraging model (Pirolli, 2007, 2009). In this model, information needs are perceived as collective, and information foragers work together to address the information need. This approach is particularly interesting for understanding information needs in a social and collaborative context, such as during the transition to college. In these contexts, information needs arise and are addressed by groups of actors; foraging theory argues that as group diversity increases, so does the ability to address the information need. By distributing the representation of the need, actors with different understandings of the need can more accurately address the need.

Although the concept of the information need is problematic in instrumentation, there are conceptual similarities in theoretical formulation. A number of integrative models have been put forth, such as Spink and Cole's (2006) integrative formulation of information behavior, Niedzwiedzka's (2003) and Godbold's (2006) general models, and Marchionini's (2008) human-information interaction approach. Spink and Cole (2006) highlight similarities between the various models, developing a process that

integrates modular thinking, foraging, and metaphor generation to produce an outcome of adaptation and survival. The human-information interaction (Marchionini, 2008) paradigm highlights how new forms of interaction with information — rather than systems — require a process-oriented approach to analysis. It is not enough to study information, people, or technology alone, as our representations of needs are consistently affected by our interactions with ubiquitous digital information.

2.4.4 Information seeking behavior

According to Marchionini, information seeking is a "process driven by life itself" (Marchionini, 1995, p. 28). That is, information seeking is an essential and ongoing activity where humans seek to address their needs through the information seeking process. In the context of the electronic environment, Marchionini identifies the "problem" as the kernel of information seeking. To address the problem, the seeker engages in search tasks, the outcomes of which are organized and contextualized by domains and settings (Marchionini, 1995). Information seeking occurs in a wide range of environments, both online and offline (in earlier formulations, electronic or non-electronic). For example, Chatman's work on janitors, single mothers, and the aging (Chatman, 1996) and feminist booksellers (Burnett, Besant, and Chatman, 2001) represent information practice in offline settings.

In the literature on information seeking, there is a clear delineation between work and non-work information seeking. The everyday life information seeking (ELIS) perspective describes the range of non-mediated information seeking strategies individuals employ to maintain their "sense of coherence" and "mastery of life" (Savolainen, 1995, p. 264). The ELIS approach was developed to document information seeking strategies in non-work and non-academic settings, which comprised a substantial amount of information seeking research to date (Spink and Cole, 2001). According to Spink and

Cole (2001), the difference between the everyday life setting and the work or academic setting is its unsystematic nature; ELIS covers the wide range of information behaviors individuals employ in everyday life. In contrast, in the academic or work setting, information seeking may be systematic, such as preparation of a research paper or task-based searching (e.g Ellis, 1993; Ellis and Haugan, 1997; Kuhlthau, 1993*b*).

The divide that exists between work and non-work information seeking studies is a legacy artifact. Before information technologies achieved present ubiquity, information-seeking behaviors were primarily studied in the context of systems (e.g. Bates, 1979; Borgman, 1986; Marchionini and Shneiderman, 1988; Marchionini, 1989) or organizations (e.g. Krikelas, 1983; Kuhlthau, 1988). Only organizations such as libraries and businesses could afford complex information systems. In contrast, a recent nationally representative study of information behavior found that 77% of Americans had Internet access (Estabrook, Witt, and Rainie, 2007). Of college students, 50% of males and 33% of females report spending more than 3 hours a day on the Internet (Jones et al., 2009). Access to information and information seeking tools has increased significantly, and it is now normative to turn to an electronic information resource in a time of need. This increase in information access has led to the emergence of the human-information interaction (HII) perspective (Marchionini, 2008), which explores the ways in which access to ubiquitous digital information affects cognition, representation, and information behaviors.

Although the work/non-work distinction in information seeking literature may be artifactual, there are a number of reasons the split persists. One of the vertices of Case's matrix of information behavior is task-centricity, and in the work setting it is more likely the information searcher will encounter specialized tasks (Vakkari, 2003). Research in work settings may also differ by data and methodologies from non-work studies (Lamb, King, and Kling, 2002). A work setting may afford greater availability

to subjects or data such as search or activity logs. Finally, the orientation of inquiry varies between work and non-work studies. In the work context, relevant information behaviors are often bound (limited to context), whereas in everyday life, individuals encounter a wide range of challenges in their struggle to maintain a sense of coherence.

The study of transition to college is necessarily situated in an academic setting, a common location for task-based studies. A primary goal of this study is to understand how the social network site is integrated into everyday life information processes during transition. This goal is challenging because the study exists between organizational and everyday life classification. The study's situational factors complicate the matter. First, the transition to college presents both fixed and variable information needs (Pratt et al., 2000). Second, academic success, commonly studied as task-based challenge, is generally conceived as a correlate to successful transition to college (DeBerard, Spielmans, and Julka, 2004).

There are a large number of models of information behavior (Fisher, Erdelez, and McKechnie, 2005). I have briefly reviewed the general concepts of sensemaking, anomalous states of knowledge, information foraging and human-information interaction to identify the concept of an information need. In the following section, I explore models of information seeking relevant to the life transition. These models are Kuhlthau's information search process, Ellis' behavioral model of search, Wilson's model of information behavior, Sonnenwald's information horizons, and Marchionini's concept of the personal information infrastructure.

Kuhlthau's information search process

Theorized primarily from task-based settings, Kuhlthau's (1993*b*) information search process (ISP) (Figure 2.11) is a framework for understanding the interaction between affective, cognitive, and physical states over the stages of the information search process.

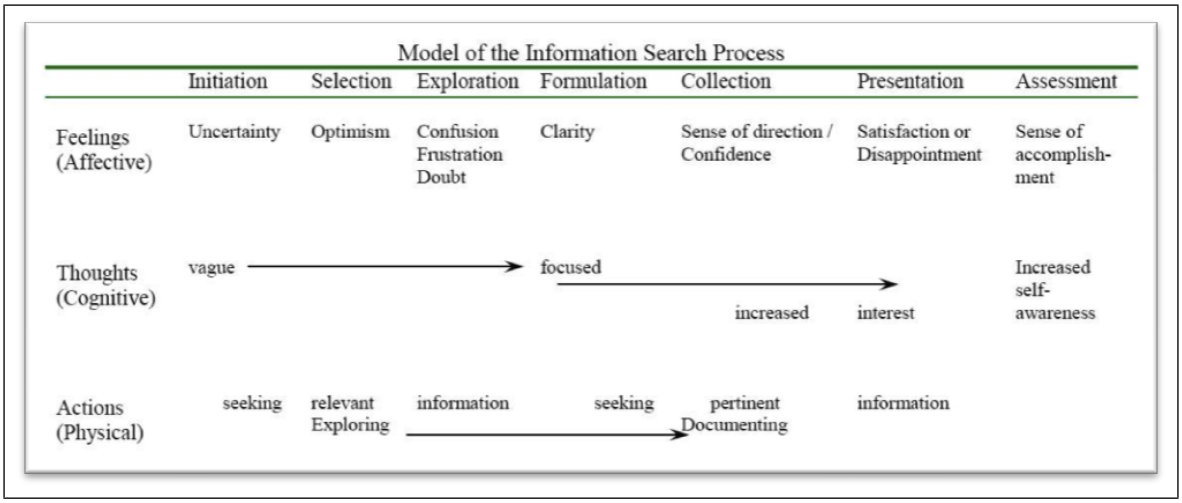


Figure 2.11: Kuhlthau's information search process, adapted from Kuhlthau (1993*b*)

The connection between search and affective state was the major contribution of the model; as an individual addresses his or her information need, both cognitive and affective states change. Kuhlthau's model identifies six stages of the information search process:

- Task Initiation: At the beginning of the search task, the individual feels uncertainty, and acts to reduce this uncertainty through information search.
- Topic Selection: The individual then selects a topic, which Kulthau argues increases optimism as uncertainty is reduced.
- Prefocus Exploration: In the stage of exploration, the individual casts a wide search for information on the topic. At an affective level, the individual may be confused or frustrated.
- Focus Formulation: After exploring for some time, the individual focuses in on selective tasks, increasing clarity.
- Information Collection: After achieving focus, the individual targets their information search, and documents findings.

- Search Conclusion (Presentation): At the conclusion of the search process, the individual begins writing. (Kuhlthau, 1993*b*, pp. 40-53)

Kuhlthau's model is notable for its extensive specification, and the connection of the search stage to affective processes. Also notable is the theorization of the uncertainty principle, an elaborated concept of the information need. The six corollaries applied to the uncertainty principle are the process, formulation, redundancy, mood, prediction, and interest corollaries. Kuhlthau's process model has been applied in a range of settings, including in law firms (Kuhlthau and Tama, 2001) and among securities analysts (Kuhlthau, 1999). Recently, Hyldegard (2006) found support for the affective interactions specified in the ISP model in a collaborative search setting.

Ellis' behavioral model of search

Ellis' (1989) behavioral model of search specifies interaction between behavioral characteristics and information search outcomes. Ellis does not specify the search process as necessarily stage-based. Rather, Ellis specifies a series of "features" of the search process. They are:

- Starting: The beginning of the search process.
- Chaining: Following information leads, such as footnotes, through information indices.
- Browsing: Browsing for information in a semi-directed fashion.
- Differentiation: Using trusted sources to critically appraise information.
- Monitoring: Engaging in scanning to maintain awareness.
- Extracting: Finding information in a source.

- Verifying: Checking the factual accuracy of the information.
- Ending: Concluding the search with a final search or scan of information. (Ellis, 1989, pp. 183-189)

Similar to Kulthau's model is the task-based nature of Ellis' model, having been tested in both academic and engineering settings (Ellis, 1993; Ellis and Haugan, 1997). Where Ellis and Kuhlthau diverge is the linear orientation of the models. The stages of ISP are linear, whereas Ellis' model allows for general nonlinearity in browsing and monitoring. Such behavior is applicable in electronic environments, and in social network sites. With increased access to information, it stands to reason that the information seeker will be able to deploy tools and processes to more actively monitor the information space. While not necessarily part of a linear search model, this search behavior allows for the discovery of concurrent or opportunistic information, which occurs with increasing frequency in large search systems. Most notably, this orientation allows the integration of non-task based information seeking; the individual may find information in non-task modes.

Wilson's models of information behavior

Wilson has extensively reviewed (Wilson, 1999*a*,*b*), critiqued (Wilson, 2000, 2006), and theorized the study of information behavior (Wilson, 1981, 1997). By placing the information seeker in context, Wilson's models elaborate the interaction of the information seeker in context. In Wilson's first model of information behavior (Wilson, 1981), the information seeking actor is visualized in nested contexts of person, role, and environment.

- An individual's physical, affective and cognitive needs are ongoing and interrelated, structuring information needs at the person level.

- The individual operates in social roles, which may prioritize or limit search behaviors.
- Finally, these roles exist within a series of environments, which limits the resources, access, and structures the needs at hand. (Wilson, 1981, p. 7)

In addition to specifying the interactions between contexts, Wilson points out that a range of barriers may limit our information seeking behavior: "Many factors other than the existence of a need will play a part: the importance of satisfying the need, the penalty incurred by acting in the absence of full information, the availability of information sources and the costs of using them, and so forth. Many decisions are taken with incomplete information or on the basis of beliefs, whether we call these prejudices, faith or ideology" (Wilson, 1981, p. 8).

Wilson's (1997) second model of information behavior (Figure 2.12) represents a major revision to the first model, with a heavy focus on the interaction between the individual and the environment for information seeking. This model draws on literature from psychology and sociology to document the interactions in information search. Wilson posits five stages of information behavior:

- *Context of Information Need:* This stage places the information seeker necessarily "in-context," as with Wilson's first model.
- *Activating Mechanism:* Wilson argues that stress, and our need to cope with stress, drives the information search process.
- *Intervening Variables:* Intervening variables interact with the seeker's ability to address information needs. Wilson specifies psychological, demographic, role, environmental, and social variables as intervening in nature, drawing on a range of interdisciplinary research.

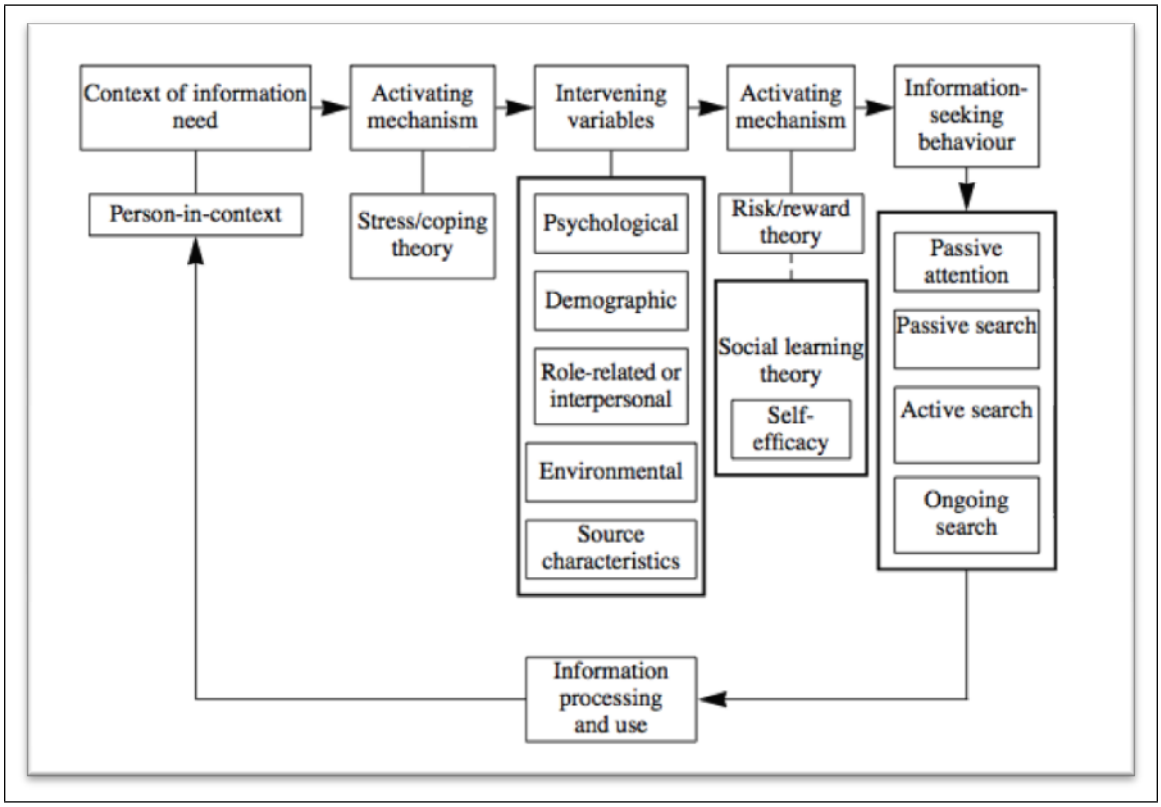


Figure 2.12: Wilson's second model of information seeking, adapted from Wilson (1997)

- *Activating mechanism:* Using risk/reward theory and social learning theories, Wilson explains what activates information behaviors.

- *Information seeking behavior:* Wilson argues that information seeking has four forms: passive attention, passive search, active search, and ongoing search (Wilson, 1997, p. 596).

It is clear that the drawback to Wilson's second model is its high degree of specification. However, Wilson's second model is strongly grounded in psychological, sociological, and health behaviors theory. Wilson's second model also allows for a number of testable hypotheses, particularly with regards to interaction effects on the intervening variables.

Wilson's two models represent two significant advancements. First, Wilson's conception of person-in-context foreshadowed the naturalistic turn of information behavior. As information behavior diversified, practitioners necessarily had to think about how an individual's context informs their information behavior (e.g. Barreau, 1995; Cross, Rice, and Parker, 2001). Second, Wilson's integration of the interdisciplinary perspective allowed for testable elaboration of information behaviors (e.g. Heinstrom, 2005).

Sonnenwald's information horizons

In general models of information-seeking-in-context, a range of social and technical factors structures an individual's experience of an information resource. Context shapes the information needs and venues for information access. Sonnenwald's (1998) model of information horizons (Figure 2.13) provides an elaboration of the interaction between context and informational resources. In the model, contexts and resources create an information horizon that "constrains and enables information-seeking behavior" (Sonnenwald, 2005, p. 191). According to Sonnenwald, "When an individual has decided to seek information, there is an information horizon in which they can seek information. An information horizon may consist of a variety of information resources such as: social networks... documents... information retrieval tools... and experimentation and observation in the world" (Sonnenwald, 1998, p. 185). Sonnenwald introduces five propositions to define the concept of information horizon:

- *Proposition 1:* Human information behavior is shaped by and shapes, individuals, social networks, situations, and contexts.
- *Propositions 2:* Information behavior occurs in situations and contexts, and is constructed by our perception of these situations and contexts.
- *Proposition 3:* In situations and contexts, there are information horizons that provide a space for action.

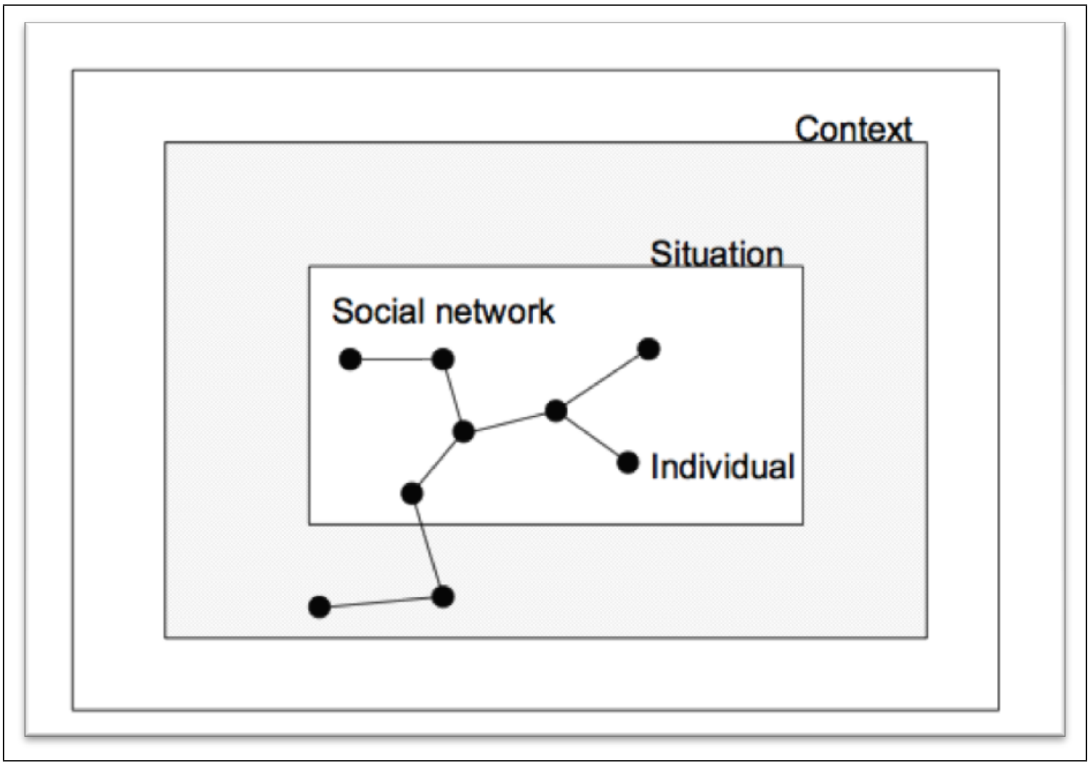


Figure 2.13: Sonnenwald's information horizons, adapted from Sonnenwald (1998)

- *Proposition 4:* Human information behavior may, ideally, be viewed as collaboration among an individual and information resources.
- *Proposition 5:* Information horizons may be conceptualized as densely-populated solution spaces. (Sonnenwald, 1998, pp. 181-187)

Sonnenwald operationalizes the concept of an information horizon by exploring the interaction between contexts, situations, and social networks (the three main concepts of an information horizon). Whereas a context represents the particular lifeworld of the information seeker, the situation describes particular constructions within contexts. For example, Sonnenwald identifies the committee meeting as a particular situation within the larger context of academia (Sonnenwald, 1998, p. 180).

Of particular relevance to this study is the conception of the social network as a critical component of the information horizon. In information horizon studies, individuals

are encouraged to create a graphical representation of their information horizon, which can be analyzed as a social network (Sonnenwald, Wildemuth, and Harmon, 2001). In the information horizon model, social networks represent the set of actors participating in a certain information horizon, as well as their articulated tie structure. For example, in the Sonnenwald and Pierce (2000) study of military command and control centers, dense social networks were shown to increase situational awareness. Notably, Sonnenwald and Pierce's conception of density differ somewhat from definitions specified by Wasserman and Faust (1994), which define density as a rate-independent measure of graph centrality. Nevertheless, the concept of the social network as an information resource is important. Our social networks can provide information and access to informational resources, as well as bridge structural components of contexts and situations.

The process orientation of information horizons is also of relevance to this particular study. As the individual addresses information needs in context, he or she articulates a more "densely-populated solution space." Accumulation of resources is a process particularly amenable to socio-technical contexts; the greater facility information seekers have with electronic resources, the more dense their solution space grows. In the context of a social network site, the concept of "density" may refer to the accumulation of information-providing connections. While a network of primarily weak ties may not appear particularly dense in a graph representation, the interconnections of information horizons implicit in networked technologies may produce useful, collaborative information horizons (e.g. Reddy and Jansen, 2008; Spence, Reddy, and Hall, 2005; Talja and Hansen, 2006).

Marchionini's personal information infrastructure

Marchionini's (1995) conception of a personal information infrastructure (PII) describes the relationship between the information seeker, the information system, and a range of contextual factors. According to Marchionini (1995), the personal information infrastructure is:

> A collection of interacting mental models for specific information systems; mental models for events, experience and domains of knowledge, general cognitive skills... and specific cognitive skills related to the organizing and accessing information; material resources such as information systems, money and time; metacognitive resources... and attitudes towards information seeking and knowledge acquisition. (p. 11)

An individual's PII reflects the relationship he or she has with information technology, his or her mastery of the technology, and how the information sourced from the technology affects and shapes him or her. Marchionini has advanced the concept of the PII into the human information interaction perspective (Marchionini, 2006, 2008).

An individual's personal information infrastructure reflects an interaction of the individual's cognitive abilities and skills, mental models of technologies, and resources available at hand. As an individual gains greater mastery of an information technology, the individual's mental model of the technology will shift, as well as the individual's cognitive reliance on the technology. Marchionini argues that an individual's general cognitive ability, domain expertise, and systems expertise interact to structure the information-seeking process. To explicate this interaction, Marchionini (1995) identifies information seeking behavior at the following levels of granularity:

- *Patterns* "most often reflect internalized behaviors that can be discerned over time and across different information problems and searches."

- *Strategies* are "sets of ordered tactics that are consciously selected, applied, and monitored to solve an information problem."

- *Tactics* are "discrete intellectual choices or prompts manifested at behaviors actions during an information-seeking session."

- *Moves* are "finely grained actions manifested as discrete behavioral actions such as walking to a shelf, picking up a book, pressing a key, clicking a mouse, or touching an item from a menu." (pp. 71-75)

When an individual interacts with an information system, the information interaction is multiform, and can be studied at a range of levels with a variety of methods. For examples, patterns can be explored with transaction logs (Marchionini, 2002) or with qualitative methods (Rieh, 2004). Using a novel search interface Belkin et al. (1995) explored how the strategies of information-seekers could be improved using scripts. At the granular level, Wildemuth (2004) combined transaction logs with qualitative analysis to identify tactics and moves of searchers.

In the preceding section, I analyzed a number of models of information seeking relevant to the study. These models were Kuhlthau's information search process, Ellis' behavioral model of search, Wilson's models of information behavior, Sonnenwald's information horizons, and Marchionini's concept of the personal information infrastructure. Generally, these models describe the search process as being cognitively and behaviorally affective. As we seek information, we develop understandings of concepts, resource horizons or systems that shape our future inquiry. In all of the models, our information seeking is structured by contexts and situations. These constructs represent the various social, technical, political, resource-based, and otherwise structural factors that affect — either positively or negatively — our information seeking process. With these similarities in mind, I now turn my focus to specific models and theories of direct

application to the study.

2.5 Collaborative Information Behavior and Social Network Sites

To this point, I have explored a range of theoretical approaches to information needs and information seeking. In the following section, I explore information behavior during transition, collaborative information behavior, and information theory as applied to social network sites. In the transition to college, students are challenged to address a range of information needs that are interwoven between technology and social context. Analyzing applied models of information behavior, I provide context for the study of information behavior in social network sites during the transition to college.

The literature on information behavior can be generally classified as either being task oriented or non-task oriented. The transition to college involves challenges amenable to both task and non-task oriented study. A task-based study may explore how an individual addresses a single information need, or how an interface facilitates a search for information about that need. Non-task studies, on the other hand, explore the individual's relationship with information, as well as the economic, social, and cultural factors affecting the information relationship.

In the following section, I draw upon the everyday life information seeking (ELIS) perspective. The ELIS perspective is a holistic approach to transitional information seeking that occurs between social and technical contexts. I present theories of information encountering and information grounds, as they have particular relevance to the technical context of the study. Finally, I describe collaborative information practices from both a technical and practice-oriented approach. In covering this literature, I present theoretical work that bridges some of the gaps introduced by social network

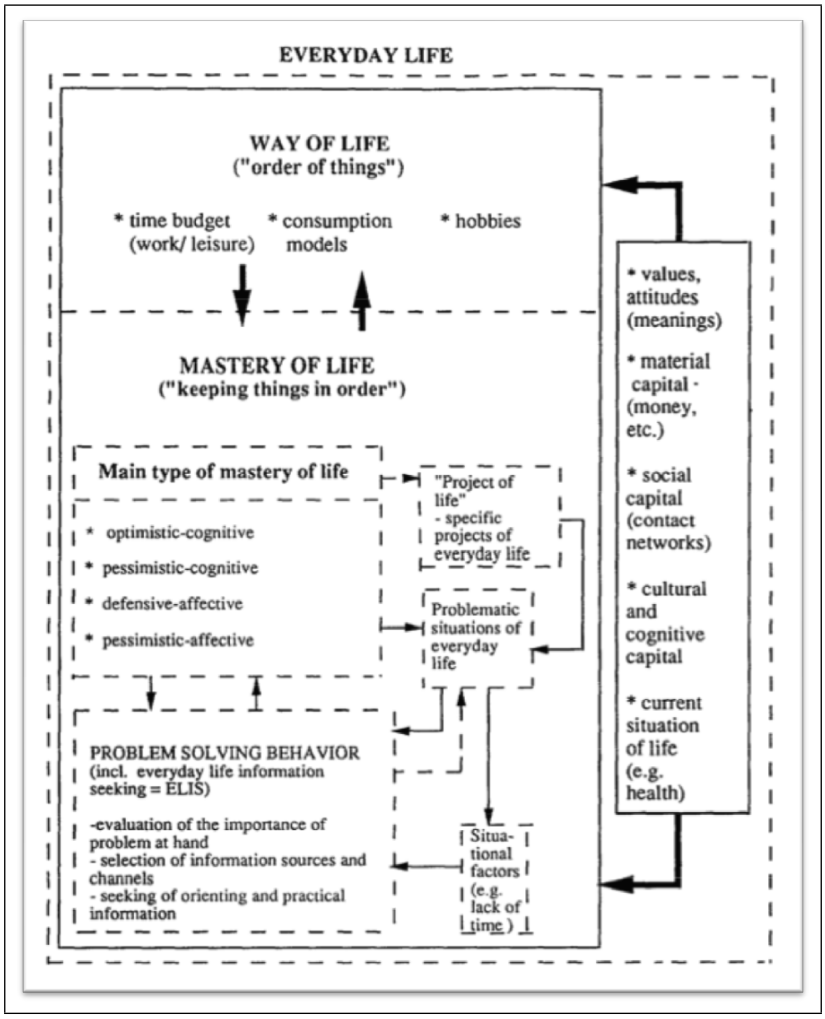


Figure 2.14: Everyday life information seeking, adapted from Savolainen (1995)

sites, particularly the intensive online-offline connection of the mediated information environment.

2.5.1 Everyday life information seeking

According to Savolainen (1995), the everyday life information seeking (ELIS) framework "attempts to contribute to this little cultivated area of information-seeking studies by suggesting a new approach to non-work information seeking in the content of way of life" (p. 260). ELIS is generally concerned with how individuals engage in information

seeking in the context of "way of life" and "mastery of life" (Figure 2.14). Drawing on Bourdieu's conception of habitus, Savolainen specifies "way of life" as our maintenance of "order of things." In our everyday lives, we draw on information resources to accomplish ongoing tasks; in this sense, we develop strategies to maintain order in our worlds. By developing an "order of things," individuals are better able to maintain a sense of "internal coherence" in their everyday life (Savolainen, 1995, p. 263). Internal coherence is an important concept in the context of this study, as one of the fundamental propositions of transition is a loss of coherence (Cantor et al., 1987; Conti, 2000; Liukkonen et al., 2008).

The second major concept of ELIS is "mastery of life." Mastery of life refers to the passive or active processes an individual utilizes to maintain a sense of control over his or her life. Savolainen defines the concept as follows: "Mastery of life is a general preparedness to approach everyday problems in certain ways in accordance with one's values" (Savolainen, 1995, p. 264). Following the critical approaches of Bourdieu and Giddens, Savolainen orients mastery of life in a structural frame; one's expectations of positive life mastery are shaped iteratively by norms, experience, culture, and values.

In ELIS, information-seeking behaviors are those that help us maintain mastery of life; Savolainen uses a matrix to examine the various components of information seeking as problem solving. The first vertex of the matrix corresponds to the "degree of rational considerations in a problem-solving situation" (Savolainen, 1995, p. 264). This vertex can be analyzed in terms of the cognitive versus affective degree of the problem-solving approach. Savaolinen's second vertex is the "expectancy towards solvability of the problem" (Savolainen, 1995, p. 264), which is presented as optimistic or pessimistic expectancy. Therefore, in our everyday information processes, where we seek to maintain mastery of life, we can approach tasks as:

- *Optimistic-cognitive*: Problems that can be solved with significant cognitive work.

- *Pessimistic-cognitive*: A less ambitious approach to problem solving; realizing through analysis that problems may not be solved.

- *Defensive-affective*: An optimistic frame towards problems, but the individual stays away from challenging problems.

- *Pessimistic-affective*: Savolainen terms this "learned helplessness," where information seeking is not used to address problems. (Savolainen, 1995, pp. 265-266).

These four categories of information seeking characterize the everyday information seeking behavior of individuals. The second stage of Savolainen's exemplar study explores the range of information sources the respondents draw on in their everyday lives. These sources are social, environmental, and mediated. In the work of Chatman (1991, 1996, 1999) we see how an individual's social position can affect information sources, perceptions, and behaviors. Finally, Savolainen employs critical incident interviews to examine individual mastery of life in everyday information seeking practices. This value-sensitive analysis demonstrates the different types of problem solving and approaches to life that are reflected in information behavior.

The ELIS framework provides a useful orientation for the user-centric study of information behavior. By accepting that information seeking actors exist in context, we can better elaborate the orientation of the individual's information seeking practices. At the time of the model's conception, user-centric studies of information seeking in everyday life contexts were rare. The ELIS framework claimed ground for user-centric information seeking research, providing a set of questions and tools that are now used extensively. Notably, Savolainen's ELIS framework is just that, a framework, which can be applied in a range of ways and in varying contexts. In this study, I explore ELIS in a transitional context.

2.5.2 Everyday information practices in transition

McKenzie's (2003*b*) model of information behavior was developed in a transitional contexts, and focuses primarily on information acquisition during transition. In the model, McKenzie identifies two phases of information practice in transition: *connection* and *interaction* (Figure 2.15). These practices can be observed in four phases of information acquisition: active seeking, active scanning, non-directed monitoring, and by proxy. McKenzie's model describes the series of interactions individuals have with information as they move through their everyday lives; at various levels (or phases) the individual manages a variety of information acquisition behaviors (by seeking or scanning for information). Important to McKenzie's model is the concept of incidental acquisition, described as "serendipitous encounters in unexpected places" and "observing or overhearing in unexpected settings"(McKenzie, 2003*b*, p. 26). Also notable is McKenzie's conception of "by proxy" information behavior, where information is channeled to an individual after that individual has been identified as in-need.

McKenzie elaborated this model of information behavior primarily in the context of major health and lifestyle transition. In a study of women pregnant with twins, McKenzie (2001, 2002) employed interviews and content analysis to identify the ways in which participants connected with information resources. In this work, McKenzie identified various phases of acquisition, noting the important role of incidental and proxied acquisition in the information process. McKenzie's later work evaluated information acquired in heterogeneous environments, focusing on the tensions between traditional forms of authority and folk authorities in the context of major transition (McKenzie, 2003*b*).

McKenzie's work highlights the importance of information encountered in everyday settings. Casually conversing with a friend, or leafing though a magazine at the store, we encounter information that we didn't search for, but that addresses information needs.

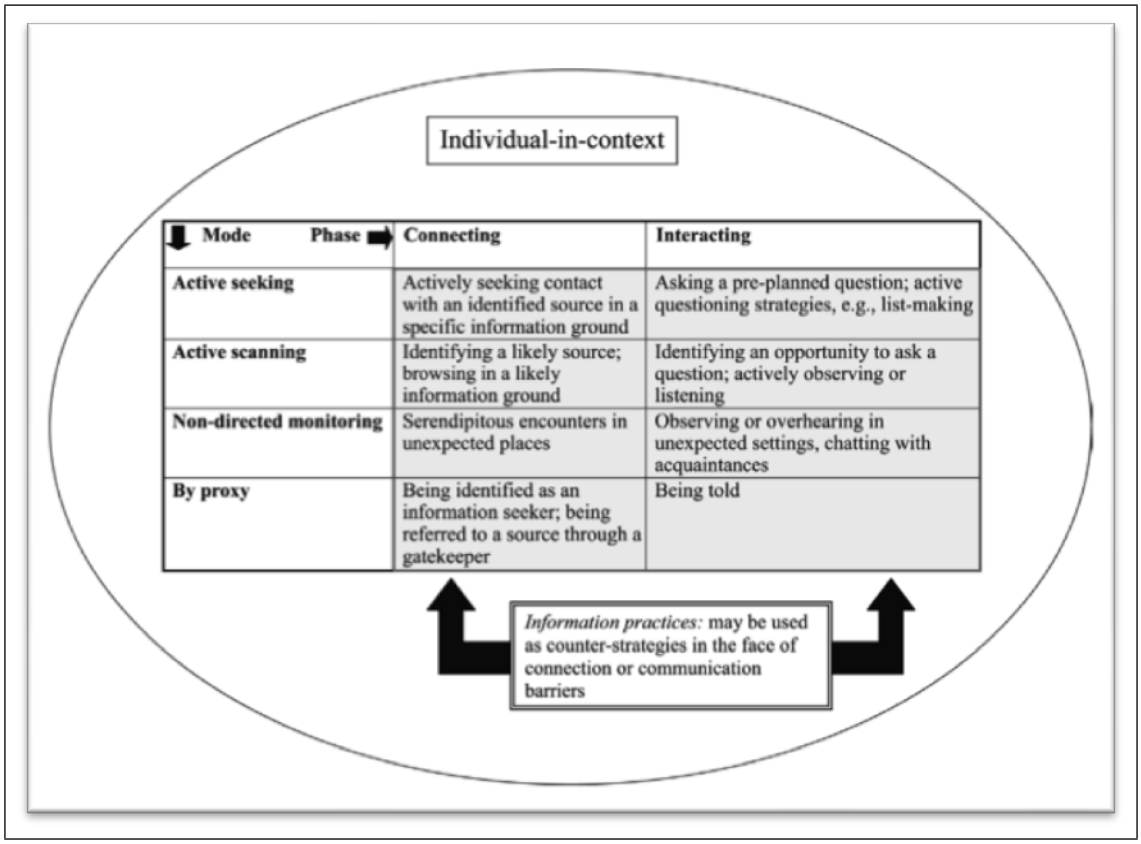


Figure 2.15: McKenzie's model of information practice, adapted from McKenzie (2003*b*)

Other times, we are exposed to information that creates new, unanticipated needs. This is the opportunistic acquisition of information, or encountering of information.

2.5.3 Everyday information encountering

Various models of information behavior have a specification for "encountering" information. For example, Ellis includes the specification for "monitoring." Wilson's second model includes passive behaviors such as "passive attention" and "passive search." Marchionini's "observational strategies" highlights the range of stimuli a seeker is exposed to when searching for information. In any setting, we are exposed to information that may be relevant to our immediate information needs, or the latent needs Krikelas (1983) terms "deferred needs." McKenzie's model of ELIS integrates the concept of

encountered information in the third phase, "non-directed monitoring." According to McKenzie, non-directed monitoring "involved serendipitously encountering or recognizing a source... in an unlikely place, while not seeking information at all... or while monitoring information sources... with no intent other than to become more generally informed" (McKenzie, 2003*b*, pp. 26-27).

Non-directed monitoring has been explored in various contexts by information researchers. Erdelez has termed the phenomenon "information encountering" (Erdelez, 1996, 1999). Information encountering is an experiential practice that reflects information users, their environment, information needs, and the information encountered. Erdelez and Rioux (2000) explored information encountering on the Internet, finding a high degree of information encountering as well as "shared information encountering," a practice where an individual shares encountered information with others. The ease of sharing encountered information on the Internet is evidenced by the popularity and wide range of social bookmarking and link sharing sites (Delicious, Reddit, Digg, etc.). The research led to the development of a conceptual framework specifying that information encountering consists of *noticing, stopping, examining, capturing* and *returning* (Erdelez and Rioux, 2000).

Williamson (1996, 1998) offers another interpretation of encountered information, termed "incidental information acquisition." Williamson's model focuses on the sources and contexts of encountered information, and features an ecological model that locates the user at the center of social networks and media. The model features differing levels of incidental acquisition occurring at different tie strength. For example, family members and friends may provide incidental information of differing relevance than mass media (Williamson, 1996). Williamson's model is useful in the context of social network sites, where ties of differing strength may provide information of differing relevance (e.g. Granovetter, 1973; Pettigrew, 2000; Gilbert and Karahalios, 2009).

The concept of information encountering is important in the context of social network sites, as "news feed" style interfaces actively encourage the encountering of information from a diverse group of contacts. In a transition, an individual may not feel that relationship strength is sufficient to initiate interaction. An interface could facilitate interaction by creating opportunities for individuals to interact. For example, noticing that a potential friend is at an event may create an opportunity for interaction, should the individual decide to attend the event. In a social network site, where ties are contextually important, designers could funnel context-relevant information to the individual in transition (Stutzman, 2010).

2.5.4 Systems that enable encountering of information

In the HCI community, numerous studies have explored information encountering. For example, Ackerman explored the effect of social activity indicators in a mediated setting (Ackerman and Starr, 1995; Ackerman and Palen, 1996). Erickson and Kellogg (2000) extend this work, presenting social activity or "translucence" indicators and evaluating their impact on the information-sharing capacity of work groups. In applied analysis of teenage instant message (IM) use, Grinter demonstrated that the IM system provided access to a wide range of information encountering, primarily within a bounded set of contacts (Grinter and Eldridge, 2001; Grinter and Palen, 2002; Grinter and Eldridge, 2003).

In a study of organizational blogging, Yardi, Golder, and Brzozowski (2009) identified patterns of organizational blog use, exploring when and how organizational blogs are accessed as social and informational resources. The researchers found that blogs provide the occasion for new social-informational encounters, and the opportunity for organizational feedback. It is important to note that while systems and interfaces may increase information encountering, deepen relationships between virtual team members,

and afford new senses of mediated participation, cultural and technological barriers remain. Olson and Olson (2000) argue the point that virtual systems will not overcome these complications in remote work.

Social network sites are novel socio-technical systems that enable encountering of information. In a social network site, individuals construct a profile listing personal information, they establish connections with fellow users, and they engage in communicative activity with these articulated connections (boyd and Ellison, 2007). In this study, the primary social network site employed during the transition to college is Facebook. This system is characterized by the fact that most ties articulated in the digital setting (among the college population) represent an offline tie (Lampe, Ellison, and Steinfield, 2006). Students use Facebook to find and encounter information about their friends (Bumgarner, 2007; Joinson, 2008). Use of Facebook by college students and individuals in transition has been shown to be beneficial for social capital and self-esteem (Ellison, Steinfield, and Lampe, 2007; Steinfield, Ellison, and Lampe, 2008).

Social network sites, and particularly Facebook, have systems to stimulate the encountering of information. This system, the news feed, is described by Miller and Jensen (2007):

> Introduced in the fall of 2006, the Facebook news feed is now a core feature automatically generated for all Facebook users every time they sign-in. The news feed employs RSS technology to display Profile information that has been updated by the Friends of a Facebook user. The result is an easy-to-read customized digest of recently edited digital content. Each Profile also has a Mini-Feed displaying the last 10 updates made by the user. The feeds present users with two ways to stay abreast of content changes: one lists updates made by Friends and the other chronicles personal Profile updates. The presence of the news feed means that most students spend time reading

> information that Facebook puts in front of them, not what they seek out on their own. (p. 2)

The news feed has been shown to positively stimulate contributions to the social network site (Burke, Marlow, and Lento, 2009), and to provide a location for viral diffusion of socially interesting content (Sun et al., 2009). Participation in a social network site exposes individuals to a wide range of content. In a transition, the social network site may serve as a nexus, connecting individuals that have weak and growing social ties, allowing for the efficient transfer of information within an emergent social network. In a transition, the social network site closely resembles Fisher's conception of the information ground.

2.5.5 Social network sites as information grounds

Fisher (2005) defines information grounds as "environments temporarily created when people come together for a singular purpose, but from whose behavior emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information" (p 185). Fisher notes the temporality of information grounds. While we might easily identify the library or clinic as a rich information ground, information grounds can occur in a wide range of spaces. Increasingly, the "places" we construct in networked technology also represent rich and supportive information grounds (Gulia and Wellman, 1998; Wellman, 2001, 2002). Fisher terms these information dense spaces "information grounds" (Fisher, Durrance, and Hinton, 2004; Fisher, 2005; Fisher and Naumer, 2006) (Figure 2.16). I now apply Fisher's conception of the information ground to social network sites, exploring how social network sites can act as information grounds during transitional periods.

The first proposition of information grounds is that they can occur anywhere. Following boyd (2004, 2007), a social network site represents a "ground" where context is

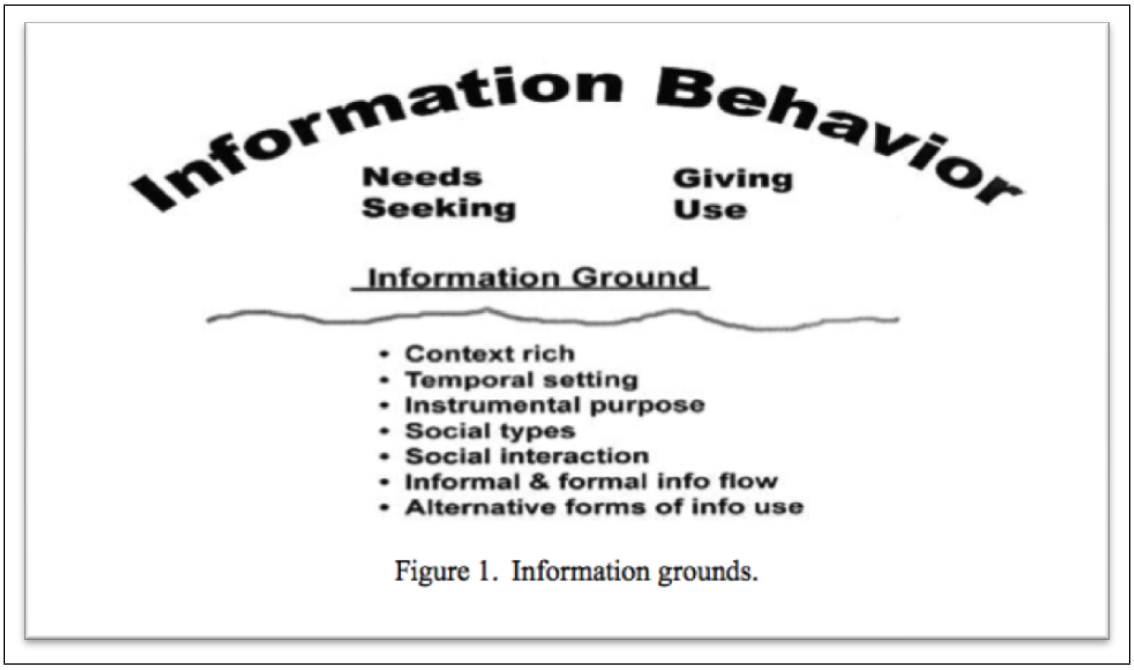


Figure 2.16: Fisher's information grounds, adapted from Fisher and Naumer (2006)

"written into being" (boyd and Heer, 2006) as a result of articulated connection. The place constructed is temporal and contextual, and reflects a socio-technical interaction of network articulation, algorithm, interface (system-level variables constructing the representation of the ground), and device. In a study of multiple profile maintainers, Stutzman and Hartzog (2009) identified the device as shaping context; individuals associated particular devices with certain shapes or representations of the information ground. Other research has highlighted the discursive construction of place in social network sites (Goodings, Locke, and Brown, 2007; Thelwall, 2008*b*) as shared linguistic symbols represent a first order cultural signifier (Geertz, 1973, p. 43).

The second proposition of information grounds is that people gather in the grounds primarily for reasons other than information sharing. While ongoing communication in social network sites represents a fundamentally informational transaction, a range of variables affect social network participation. Employing uses and gratifications theory, Bumgarner (2007) identified "friend functions" as a primary use of social network sites.

In a similar analysis, Joinson (2008) identified "keeping in touch" as a factor motivating use. boyd (2007) analyzed youth social network site use, demonstrated that the sites present a space to "hang out" with classmates. Although use of a social network site represents an informational action, these sites are viewed differently from a place of information dissemination such as a library. They are places for ongoing social interaction, where information is gathered and transferred.

The third proposition of information grounds is that they are attended by different *social types* that play different roles in the information flow. Fisher's elaboration of type borrows from Chatman's (1999) theory of life in the round. Social types are the ways actors are typed or labeled in a social system, and the type structures expectation of behavior (e.g. Becker, 1984; Goffman, 1966). In the study of mobile social network sites, Counts and Fisher (2008) identify a number of types that play specific roles in the information ground. In a socio-technical system, types can emerge from the technical system, social role, or combination of both. For example, the Kumar, Novak, and Tomkins (2006) identification of various types in Yahoo data sets demonstrate interaction of system-level and behavioral characteristics in socio-technical systems. With the large scale adoption of social network sites (Lenhart, 2009), there is bound to be replication of a range of social types into the information ground.

Propositions four and five of information grounds — social interaction is a primary activity, and people engage in formal and informal information flow — represent activity essential to the social network site. For proposition four, I employ Miller's (2008) analysis of phatic culture in social network sites. Phatic interactions at those designed to have a purely social function; Miller argues that social network sites are particularly effective in this regard. For proposition five, I draw on the range of information shared in a social network site (e.g. De Souza and Dick, 2009; Lenhart and Madden, 2007; Stutzman, 2006). The social network site enables wide-ranging information flow, from

important interpersonal conversations to game playing.

Proposition six argues that information acquired in information grounds is used in a range of ways, and this information provides "physical, social, affective, and cognitive" benefits. Many positive outcomes of social network site use have been demonstrated (e.g. Ellison, Steinfield, and Lampe, 2007; Steinfield, Ellison, and Lampe, 2008; Burke, Marlow, and Lento, 2010), but this remains an area rich for exploration. This study seeks to map the affective role of social network site use during transition, exploring social and psychological outcomes. The beneficial aspects of social network site use will provide fodder for exploration for years to come.

Fisher's final proposition that sub-contexts exist within the information ground is particularly evident in social network sites. There are a number of ways one can demonstrate this proposition; of particular relevance is the interaction between sub-context and privacy in social network sites. As the information ground is constructed from a social context (boyd and Heer, 2006), individuals are challenged to manage their disclosures to sub-contexts. For example, a disclosure to close friends may be viewed in a different light in the sub-context of family members. Writing about Friendster, boyd (2006) explored the challenges of sub-contexts:

> As the site grew, different groups started joining. The centrality of the network decreased at the same time that people were forced to face conflicting social contexts. While the site proliferated amongst Burners, gay men, and bloggers, it also spread into new groups. As those on the periphery of these communities extended invitations to their friends who were not members of one of those initial subcultures, different social practices began to evolve and context collisions began to take place. It did not take long before the early adopters came face to face with their bosses and high school classmates. This created an awkward situation as participants had to determine

how to manage conflicting social contexts. (para 46)

Following Fisher, it is useful to see social network sites through the lens of the information ground. These grounds are rich in information, resources, and opportunities for incidental acquisition of information. They are places where people can go to find information of specific task-relevance (Scale, 2008; Skeels and Grudin, 2009), conduct information scans or sweeps (Hancock, Toma, and Fenner, 2008; Lampe, Ellison, and Steinfield, 2006), monitor information (Dwyer, 2007; Lampe, Ellison, and Steinfield, 2007), and encounter information (Greenhow and Robelia, 2009; Thompson, 2008). The way the information is acquired in the ground, the way it is used, and the affective outcomes of its use represent large, context-dependent questions.

The value drawn from social network sites is heavily context-dependent. For example, during a transition, individuals may find the site to be more valuable in the beginning stages as information needs are greatest. Of course, the value of a social network site depends on the ties individuals create in the site. An individual's experience with the site will vary based on the collaboration partners available. In this sense, collaboration is as important as context. In the final section of this review, I explore the research on collaborative information behavior, identifying collaborative information behaviors in social network sites.

2.5.6 Collaborative information behavior in social network sites

Perspectives on collaborative information behavior

When an individual seeks information in context, he or she is likely to engage external actors in the search process. From the incidental information encounter to the reference interview, many of our everyday experiences occur in some sort of collaborative setting (Foster, 2006). In fact, most of the models and perspectives included in this review

are implicitly collaborative; the information seeker in context necessarily draws on collaborative resources when addressing gaps. Therefore, the conception of collaborative information behavior (CIB) as something "apart" from information behavior is a false dichotomy.

As defined by Talja and Hansen (2006), collaborative information behavior is:

> An activity where two or more actors communicate to identify information for accomplishing a task or solving a problem... CIB thus varies from ad hoc sharing of information between team members to a planned division of labor where some members work together to find information for a specific task whereas others focus on other issues. (p. 114)

Although this definition covers a wide range of behaviors, it is useful for placing some bounds. Particularly, CIB represents information behavior that exists in a shared or collaborative context (two or more actors working together). Notably, Talja and Hansen's definition allows for variation in task formulation; in the collaborative setting, information behavior can be of task- and nontask-orientation. For example, collaborative information behavior can occur when working on a directed task (two students searching for information about a problem) or in a nontask setting (a collaborator's offhand sharing of a link with information value).

Research interest in CIB is partly a function of the growth of systems that support CIB. The Internet and digital communication tools have created opportunities for collaborative information seeking. In particular, the growth of "Web 2.0" technologies such as social bookmarking and social network sites increase opportunities for CIB (Marchionini, 2006; Marchionini and White, 2009). Social network sites support and create opportunities for CIB. Golovchinsky, Qvarfordt, and Pickens (2009) define the following forms of collaborative information behavior:

- Intent: CIB can be either explicit or implicit. In the explicit context, collaborators work together on informational tasks. Implicit CIB, on the other hand, reflects an interaction with a representation of the collaborative context. An example the authors provide is a stochastic representation in a recommendation engine.

- Depth of mediation: This refers to the "depth" at which the system mediates collaboration, such as at the algorithm or interface level.

- Concurrency: This reflects the synchrony or asynchrony of the collaborative medium.

- Location: This reflects the collocation of the members of the collaborative team. (pp. 48-49)

Returning to Case's matrix, studies of collaborative information behavior can also be categorized for their person-centricity. In a system that supports CIB, researchers are interested in the various information practices of the actors, and the effects the systems have on successful need-resolution. Golovchinsky, Qvarfordt, and Pickens (2009) elaborate the person-centric view by introducing the following social roles in CIB:

- Peer: In a collaborative system, the peer represents a structural equal, and encounters the same technology as the primary (seeking) actor.

- Domain expert: Compared to a peer, the domain expert has greater knowledge of the subject area.

- Search expert: Compared to a peer, the search expert has greater fluency with the search system.

- Prospector/Miner: The prospector highlights useful venue for search, while the miner engages in the deep-search process (pp. 49-50).

We see evidence of these social types in the Reddy and Spence (2008) study of CIB in an interdisciplinary medical setting, particularly the role of domain expert. As medical teams work together to provide diagnosis and care, the domain expert is often consulted as an important collaborative information resource during patient care episodes. Pirolli's (2009) model of social information foraging highlights the role of prospectors and miners; as a group concentrates efforts on a complex search, Pirolli's model predicts that diversity (more prospectors/miners) increases the likelihood of task resolution. The important role of search expertise is evident in the Chi (2009) model of social search. As systems incorporate social data and feedback, they may provide searchers a more relevant and satisfying experience.

The Morris (2008) and Spence, Reddy, and Hall (2005) surveys of knowledge workers and academics provide direct insight into CIB practices. In the context of collaborative search, Morris explored the activities, frequency, and tasks encountered in collaborative search. Looking over someone's shoulder during search or emailing/IMing search results were common practices. Approximately 75% of the respondents indicated engaging in collaborative search activities on a monthly level, for tasks such as travel planning, shopping, and searching for literature and technical information. In the academic context, individuals were most likely to engage in collaborative information seeking when projects required domain knowledge outside the seeker's expertise (Spence, Reddy, and Hall, 2005). It should be noted that with increased collaboration, novel challenges emerge (Cummings and Kiesler, 2005; Fidel et al., 2004; Hyldegard, 2006), and a range of contextual factors affect the effectiveness of collaboration.

Collaboration and social network sites

As identified in the section on information grounds, social network sites are "where people can go to find information of specific task-relevance (Scale, 2008; Skeels and

Grudin, 2009), conduct information scans or sweeps (Hancock, Toma, and Fenner, 2008; Lampe, Ellison, and Steinfield, 2006), monitor information (Dwyer, 2007; Lampe, Ellison, and Steinfield, 2007), and encounter information (Greenhow and Robelia, 2009; Thompson, 2008)." Joinson (2008) identified eight themes of social network site use. They are (listing those with 5 or more mentions):

- Keeping in touch (52 mentions)
- Passive contact, social surveillance (19 mentions)
- Re-acquiring lost contact (15 mentions)
- Communications (11 mentions)
- Photographs (11 mentions)
- Making new contacts (5 mentions) (p. 1029)

These behaviors are similar to those identified in analyses by Bumgarner (2007) and Lampe, Ellison, and Steinfield (2006, 2008). Primary behaviors on social network sites include the establishment of social ties, relational maintenance, learning about one's friend network, and the presentation and sharing of various facets of identity. The goals of participation in a social network site may include increased socialization and acculturation in context, expansion and development of new social ties, increased in-group awareness, maintenance of ties that would have otherwise been lost, the accumulation of social capital, and the provision of social support (e.g. Ellison, Steinfield, and Lampe, 2007; Hampton et al., 2009; Park, Kee, and Valenzuela, 2009; Steinfield, Ellison, and Lampe, 2008; Subrahmanyam et al., 2008; Valenzuela, Park, and Kee, 2009).

Returning to the taxonomies outlined by Talja and Hansen (2006) and Golovchinsky, Qvarfordt, and Pickens (2009), I now highlight a number of instances of collaborative

information behavior in social network sites. In doing so, I explore applicable factors from Talja and Hansen's (2006) dimensions of collaborative information behavior.

Asynchronous/Synchronous activities: Social network sites support both synchronous and asynchronous interaction; with the exception of chat features such as Facebook chat, the majority of interaction is asynchronous (boyd, 2007; Thelwall, 2008*a*). Asynchronous interaction can occur through the news feed, wall postings, photo tagging, link sharing, commenting, and direct messaging. The synchrony intervals of these features vary, but they do not contain activity or status indicators that would otherwise imply synchronous interaction (Erickson and Kellogg, 2000).

Co-Located/Remote collaborations: Social network sites support both local networks, and networks at a distance. In local collaboration, social network sites increase awareness of peers, allowing for the coordination of activities that may not have existed without the system (Hogan, 2009). With regards to remote collaborations, Ellison, Steinfield, and Lampe (2007) argue that social network sites enables a new form of social capital — maintained social capital — that represents benefits accumulated from the maintenance of remote collaborators.

Planned and unplanned collaboration: Social network sites support the development of plans through a range of practices and features (e.g. invites, events, broadcast communication tools). These tools are equally useful for spur-of-the-moment collaboration, and the mobile components of social network sites support last-minute forms of coordination known as "hypercoordination" (e.g. Ito, Okabe, and Matsuda, 2005; Ling and Pedersen, 2005).

Direct and indirect collaboration: Talja and Hansen describe indirect collaboration as a mediated form of collaboration, such collaboration as through an expert system. Social network sites use a variety of algorithms to suggest interactions; it is likely that graph-analytic processes could identify in-network collaborators based on a range of

characteristics (e.g. Gilbert and Karahalios, 2009). The observational elements of the social network site (socially browsing profiles or observing interaction through the news feed) reflect another form of indirect collaboration.

Coordinated and differentiated activities: Talja and Hansen consider the coordination and differentiation of activities primarily in a collaborative work flow. Coordination refers to the extent to which collaborators work together to solve a task, and differentiation refers to how a task can be split up among collaborative work teams. This criterion is most effectively applied to systems (asking how well a system supports coordination/differentiation), but we can also ask it of practice. A social network site is not explicitly set up to address tasks and workflows, but workflows and coordinated/differentiated activities clearly occur in the sites. Consider the examples of social network site use by groups to organize political activity (e.g. Shirky, 2008), a typical coordinated activity. With regards to differentiated activities, social gaming (Warr, 2008) and tagging (Coenen et al., 2006) represent situations where collaborators work in a differentiated fashion to achieve larger-scale goals (such as new knowledge representations).

Golovchinsky, Qvarfordt, and Pickens (2009) encourage us to think about depth of mediation, and the roles of individuals in CIB. Depth of mediation refers to the extent to which a system mediates collaboration. Facebook's news feed algorithm, for example, employs deep mediation when suggesting content for users (Burke, Marlow, and Lento, 2009); a user's experience of the news feed is a function of the collaborations established in the social network site. Other systems may have less mediation, delivering a standard experience that is "unaware" of the explicit and implicit collaborations in the site. Therefore, depth of mediation is an applicable factor in the analysis of social network sites.

The component of roles in collaborative information behavior also raises questions. In a social network site, the main relationship is peer-based; there is little variation in interface beyond personalization and customization. Domain experts may represent users with particular skill in crafting social messages, facilitating collaboration or providing enhanced privacy. The domain experts exist in the peer framework, but are users that have an increased fluency with the system. Considering search experts, prospectors ,and miners, these are users that also exist within the peer frame but have developed specific skill at searching for and finding social information. These skills may be functionally oriented (crafting better searches) or be socially constructed (putting data representations together in unique ways to expose new knowledge). These roles are particularly useful when thinking about Pirolli's social information foraging model, which specifies an ecological approach to collaborative task-solving.

Studies of ELIS do not explicitly require a task-based perspective, and they implicitly allow collaborative behavior (placing the information seeker "in context"). Savolainen's (1995) perspective explores the range of information behaviors individuals use to maintain their "way of life" and "mastery of life." Savolainen grounds the concept of "way of life" in Bourdieu's notion of habitus. According to Bourdieu, habitus is a theory describing the social construction of practice (Bourdieu and Wacquant, 1992). Returning to Joinson's (2008) analysis of social network site use, we see the concept of "passive contact" or "social surveillance" emerge as a motivating factor. By participating in the social network site, an individual may be habituated into cultures and identities. By observing and interacting with peers, the individual gains information about the norms of practice in the particular context, therefore representing a process enabling the internalization of a location's habitus. A particular question we can ask of nontask-based system-centric CIB is how the system supports this process of habituation. Savolainen terms this concept "informational habitus," representing the

structuring role information plays in everyday life processes (Savolainen, 1995, p. 290).

Talja and Hansen (2006) adopt a practice-based approach to collaborative information behavior:

> The processes of information seeking, retrieval, filtering, and synthesis take place within and are deeply embedded in work and other kinds of social practices. Information seeking and retrieval are dimensions of social practices. They are instances and dimensions of our participation in the social world in diverse roles, and in diverse 'communities of sharing.' Receiving, interpreting, and indexing informationgiving names to pieces of information for the purposes of retrieval and re-useare part of the routine accomplishment of work tasks and everyday life. (p. 125)

Rather than focusing on the task-based aspects of collaborative information behavior, I explore the outcomes of participation. Participation in social network site is a form of collaborative information behavior, a mutually structuring process that constitutes practice.

To explore the concept of participation as collaborative information behavior, I (and Talja) draw on Lave and Wenger's (1991) concept of situated learning. Lave and Wenger argue that knowledge is situated in context, and that learning is an embodied process that occurs through participation in communities of practice. By partaking in the community through legitimate peripheral participation, the joiner acquires knowledge (the task skills) and knowledge of practice, including the norms of the situations and the roles the joiner must play. In that sense, knowledge (and learning) is a fully embodied process (see also Brown, Collins, and Duguid, 1989). I believe that participation in a social network site enables situated learning of the "community," offering habituation into the practices, norms and values of the offline community. Such processes have been observed in "electronic networks of practice" (Wasko and Faraj, 2000, 2005).

Social network sites afford a unique opportunity for the study of legitimate peripheral participation as a collaborative information behavior.

Conclusion

This review explored concepts of everyday and collaborative information behaviors as applied in social network sites. First, I presented a range of perspectives on everyday life information seeking. I focused on Savolainen's theorization, and McKenzie's model which was derived from the study of transitional information behaviors. ELIS provides a useful approach for theorizing transitional information seeking. I then explored theories of information encountering and information grounds, as they have particular relevance for the study's context. I then elaborated how social network sites enable the encountering of information, and how they act as information grounds. Finally, I examined collaborative information practices. In covering this literature, I presented applied and theoretical work that bridges some of the gaps introduced by social network sites, particularly the intensive online-offline connection of the mediated information environment.

Chapter 3

Research Design

During a life transition, a social network site is a useful place to turn for the social and informational support that facilitates adaptation. To demonstrate this point, I examine the dynamics, uses, and outcomes of social network site uses during the transition to college.

3.1 Research Framework

This study explores the structure and process of social network site use during the transition to college. The transition to college is a major life event requiring adaptation to new settings, informational challenges, and role identities (Terenzini et al., 1994). The transitional period is one of significant stress, with positive social support associated with successful adaptation (Pratt et al., 2000). The social network site is a place where the student can address the informational challenges of transition, and draw support from a group of alters.

In this study, I employ three components of analysis across two data sets (Figure 3.1). With these components, I explore the structural dynamics, uses, and outcomes of social network site participation during a life transition. Separately, these components contribute an understanding of social network site use during transition. Together,

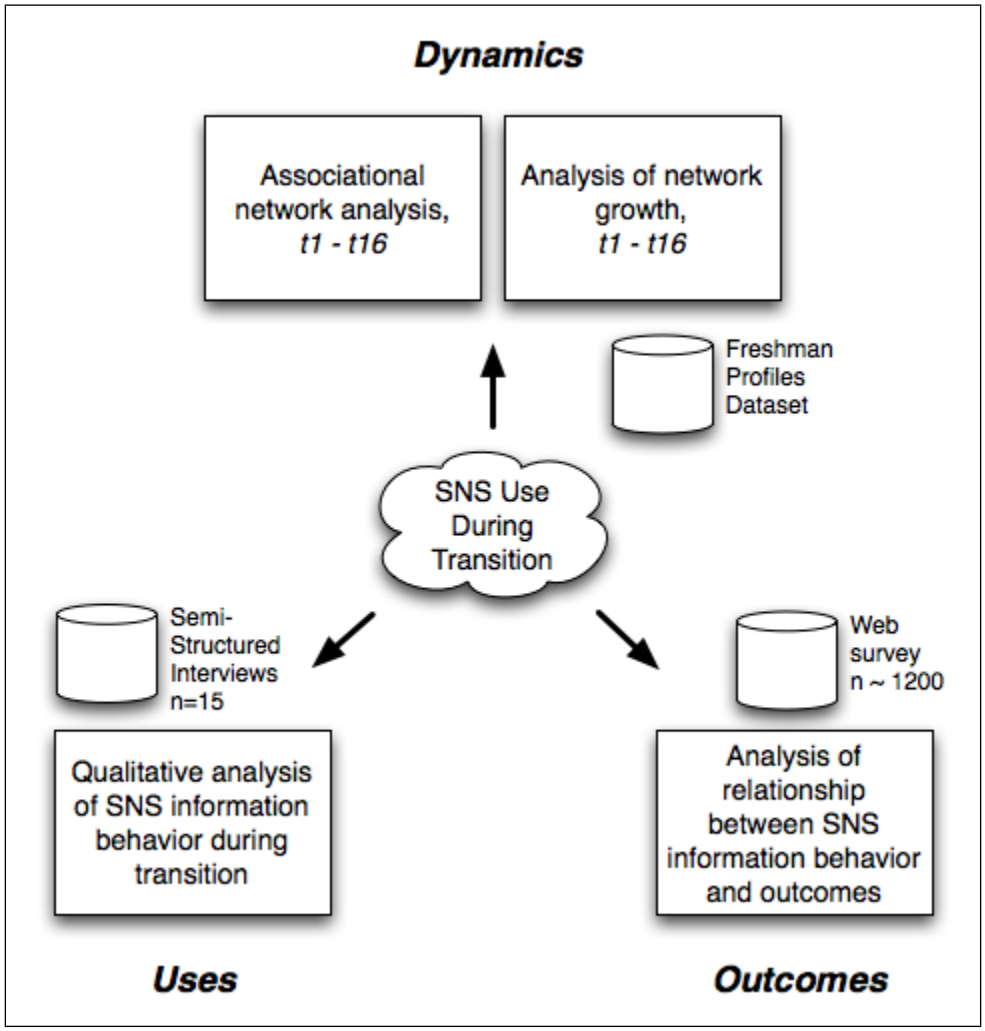


Figure 3.1: Research questions and data sets employed in the study

the components represent a comparative methodology that draws upon systems, observational, and interview data to explore socio-technical system use in transition. The components of the study are described:

- **Component One**: Identification of factors of association in a social network site during transition, and longitudinal modeling of socio-technical support network during early-phase transition. This component draws on a data set of Facebook profiles.

- **Component Two**: Modeling of relationship between social network site socio-informational behaviors and adaptation outcomes. This component draws on a large-scale survey of college freshmen.

- **Component Three**: Qualitative analysis of social network site information behavior during the transition to college. This component draws on 15 interviews with college freshmen.

A secondary goal of this study is the triangulation of multiple methods when studying transition. I am interested in how large-scale observational data can be used to inform qualitative work, such as surveys or interviews. Following Russell's conception of sensemaking (Russell et al., 1993), I explore how the analysis of large-scale structure can contribute to an understanding of the transitional process. Within Chapters 4 and 5 the reader will note that, in some cases, variable or question choice is influenced by the structural analysis of component one. In Chapter 6, I reflect on this methodological triangulation.

3.2 Component One: Network Dynamics During Transition

Transitions, such as the transition to college, are associated with a high degree of stress (Fisher and Hood, 1987). Acting as a buffer or direct effect, an individual's supportive social network has been demonstrated to mitigate stress, facilitating adaptation to the transition (Cohen and Wills, 1985; Hays and Oxley, 1986). It is worthwhile to understand the collective dynamics of supportive social networks during transition. In component one, I explore the networks articulated by freshmen at UNC-Chapel Hill in the social network site Facebook over the course of the 2005 fall semester.

In my analysis, I explore the structural dynamics of transitional social networks. First, I identify factors of association in the transitional networks articulated in the social network site. In this analysis, I explore social, structural, and demographic factors that influence the creation of ties during transition, and I explore how the strength of these factors change over time. Second, I use econometric modeling to identify social network site profile factors that contribute significantly to the growth of the socio-technical network over the course of the semester. This analysis identifies content creation and sharing behaviors that are associated with the expansion of an individual's socio-technical support network.

3.2.1 Data

The data employed in this analysis was sourced from the Facebook profiles of UNC freshmen, collected on a weekly interval over the course of the 2005 fall semester (8/30/05-12/27/05). The data collection was approved by Facebook (Appendix A), and the research study was declared exempt by the IRB (Appendix A). Similar data sets have been collected with the knowledge of Facebook and used in research (Hamatake, Lifson, and Navlakha, 2005; Lampe, Ellison, and Steinfield, 2007; Lewis, Kaufman, and Christakis, 2008; Mayer and Puller, 2008). In the computer and information sciences, the harvesting of data from webpages (i.e. "crawling") is a common phenomenon (e.g. Brin and Page, 1998; Kao et al., 2004; Liu, Maes, and Davenport, 2006; Ting and Wu, 2009).

To protect the privacy of students, I collected data from a "connection-less" account. In doing so, I ensured that only students whose profiles were available to the entire UNC Facebook network were included in the collection. Compared to the work of Lewis, Kaufman, and Christakis (2008), no confidence boundaries were violated in the collection of this data (that is, no subjects were included because of their relationship

with the researcher). All data has been post-processed to derivative elements, limiting identifiability in accordance with 45 C.F.R. 164.514(a)(b).

3.2.2 Research question one: Factors of association

In the first component of the analysis, I identify factors associated with the establishment of connections in the networks data set. Using self-reported information collected from the profiles, I employ statistical modeling to identify factors that are associated with the formation of ties between actors. For example, we may expect that an individual is more likely to be connected (via Facebook friend connection) to someone that lives in the same dorm as the individual, as compared to a random person on campus. Exponential random graph modeling (hereafter, ERGM; also commonly known as p^* modeling) allows an empirical hypothesis test regarding network structure (e.g. Robins et al., 2007; Wasserman and Pattison, 1996). As described by Goodreau (2007, p. 234), the ERGM specifies the probability of connection between actors n as:

$$Pr(\,Y{=}y) = \frac{1}{k}\exp\{\Sigma_A \eta_A g_A(y)\} \tag{3.1}$$

where A is an index of potential modeling vectors *g(y)*, η_A represents the log-odds of a tie, and $\exp\{\Sigma_A \eta_A g_A(y)\}$ is constrained by k, the normalizing constant. Using Markov simulation to compare the observed set of connections to an Erdos-Renyi random graph, ERGM produces pseudo-likelihood estimates (similar to maximum likelihood estimates) of the probability of a tie. In the analysis, the articulated network is compared to the simulated random graph. Based on this comparison, the model provides estimates of the probability of a tie, given a common associative factor. These estimates are interpreted in a similar fashion to the results of a logistic regression, and when exponentiated they can be directly interpreted as the odds of a factor influencing connection between two actors in the network.

While the theory behind ERGM dates back almost thirty years (Hunter et al., 2008; Wasserman and Pattison, 1996), ERGM has recently grown in popularity because of the increasing prevalence of network data sets, the availability of large-scale research computers, and the development of the Statnet software package (Handcock et al., 2008). Statnet is a suite of modules for the R statistical platform that provides advanced network analysis capabilities, including the modeling of exponential random graphs. In addition to using Statnet to model factors of association with ERGM, I am also able to compute general descriptive network models (Wasserman and Faust, 1994).

3.2.3 Research question two: Modeling network growth

In the second component of the analysis, I use statistical analysis to test hypotheses regarding factors associated with the growth of networks in the social network site during transition. The dependent variable employed in this analysis is the size of an individual's local campus network in the social network site. This research directly builds on previous work by Lampe, Ellison, and Steinfield (2007). Their paper, "A Familiar Face(book): Profile Elements as Signals in an Online Social Network," explores the relationship between profile activity and the acquisition of friends in Facebook. My analysis employs the framework specified in their paper, and extends the findings to a panel data set.

The data employed in the analysis of network growth takes the form of a dynamic panel, with sixteen observations of profile content at weekly intervals. Because the dependent variable is autoregressive (i.e. the observation at time t is influenced by the observation at time *t-1*), the data is not amenable to longitudinal ordinary least squares modeling. I use econometric techniques to produce estimates robust to panel-level autoregression and heteroskedasticity. The general equation for the panel model is:

$$Y_{ij} = \alpha + \beta_1 x_{ij1} + \ldots + \beta_n x_{ijn} + \beta Y_n x_{ijn} + \epsilon_{ij} \tag{3.2}$$

where α is the intercept, $\beta_2 x_{ij} + \ldots + \beta_n x_{ij}$ represents a vector of covariates and predictors, and $\beta Y_n x_{ijn}$ represents the lagged predictor.

On a college campus, behaviors are shaped by the local network, particularly the dorm network. Localized behavioral norms may cluster, demonstrating patterns of clustered variance when compared to the network on whole. In my empirical analysis of network formation, I observed that the residence hall plays a strong associative factor. Therefore, I cluster the data set by dorms. A technique for modeling panel data that takes into account patterns of clustered group-level variance is latent growth curve modeling, with variance fixed at the dorm level and a lagged dependent variable accounting for the autoregressor.

To explore the effects of dorms, I apply a multi-level model, in which individuals are grouped by residence, and the individual trajectories over time are analyzed as a latent growth curve (LGC). LGC is a variant form of a hierarchical linear model (Bryk and Raudenbush, 2002) that useful in panel modeling. In my analysis, the time variable is nested within the individual, creating a latent slope within individuals. The model I specify is "multi-level" because I have defined three levels. The first level is within residences, the second is individuals within residences, and the third is time within individuals. The general form of the equation is:

$$Y_{ij} = \alpha + \beta_1 + \beta_2 x_{ijw} + \ldots + \beta_n x_{ijn} + \zeta_{1j} + \zeta_{2j} x_{ij} + \zeta_{3j} x_{ij} + \epsilon_{ij}, \tag{3.3}$$

where α is the intercept, $\beta_2 x_{ij} + \ldots + \beta_n x_{ij}$ represents the vector of covariates and predictors, residence is modeled as a random effect (ζ_{3j}), the individual is modeled as a fixed effect (ζ_{1j}) within residence, and time is modeled as a level one random

effect (ζ_{2j}). Compared to standard longitudinal linear models, multi-level modeling offers a number of attractive properties. Under optimal conditions (i.e. complete data), standard longitudinal models and latent growth curve models perform identically. By accounting for variance attributable to configuration, the precision of estimates is increased, assuming there is a meaningful grouping effect. Based on my analysis of network structure, I am able to provide evidence that grouping within dorms is meaningful, and model this effect.

3.3 Component Two: Outcomes of Social Network Site Use During Transition

A growing body of literature indicates that participation in social network sites can produce positive outcomes (e.g. Ellison, Steinfield, and Lampe, 2007; Park, Kee, and Valenzuela, 2009; Steinfield, Ellison, and Lampe, 2008; Valenzuela, Park, and Kee, 2009). In the second component of my analysis, I explore the relationship between transitional uses of the social network site and adaptation to the college transition.

Two major challenges of transition include adaptation to transition and the management of transitional stress. In this section, I use quantitative analysis to explore the relationship between the use of social network sites for support and integration during transition and overall adaptation to transition. The generative component of this work involves the creation of measurement scales for *supportive* and *integrative* uses of social network sites during transition. In the evaluation, I employ a series of hierarchical multiple regressions to explore first-level relationships between the constructs I have created and transitional outcomes. I then employ a structural equation model to simultaneously test the hypotheses I have constructed. This component of the analysis provides a robust evaluation of the relationship between social-informational uses of

social network sites and the adaptation of individuals to transition.

3.3.1 Data

The data for section two was collected with a large survey in the Spring of 2010. All freshmen at UNC-Chapel Hill were contacted and invited to participate in a survey about social network sites and the transition to college. Data collection ran from April 22, 2010 until May 15, 2010. A total of 1,198 surveys were started, and 988 surveys were completed. Survey response is discussed in greater depth in Chapter 5. In the survey I collected data on social network site use during the transition to college, individual psycho-social disposition, and overall adaptation to college. My analysis draws on a range of descriptive and inferential techniques. Finally, I employ structural equation modeling (SEM) to test the hypotheses specified, and report these findings.

3.3.2 Model specification: Social-informational processes

The central challenge of a transition is adaptation (e.g. Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989). Adaptation is a contextual experience, but the study of transition reveals a number of common factors. First, transitions are normative, governed by structural rules and expectations. Second, transitions pose informational challenges. Third, transitions require the development of a supportive network. I hypothesize that three social-informational processes in social network sites may facilitate adaptation during the transition to college.

These processes are:

- Role and identity management
- Information seeking and encountering
- Social network augmentation

The first process, role and identity management, describes how the individual uses the social network site for individual exploration and acculturation processes. Information seeking and encountering concerns the extent to which the individual uses the social network site to find and encounter information about the transitional lifeworld. Social network augmentation describes how the social network site facilitates the deepening of relationships in the transitional setting. I have developed original constructs to measures each of these processes.

3.3.3 Model specification: Support during transition

A second challenge of adaptation to transition is management of stress related to transition. Numerous studies have demonstrated that social support mediates stress through either a buffering or direct effect. The buffering effect is primarily psychological; our perception of the ability to call on supportive alters reduces stress (Cohen and Wills, 1985). The direct effect is interactional and network dependent (Cohen and Wills, 1985). At the interactional level, the support process occurs through interaction such as help and supportive messages. At the network level, the support process occurs through positive influence. A social network site provides a location for the perception and transmission of support during transition. Therefore, I expect that use of the social network site for social support increases adaptation to transition.

In this analysis, I design a novel construct to measure the use of social network sites for social support during transition. I draw upon the Cutrona, Suhr, and MacFarlane (1990) four-level definition of social support to define this construct. The four components are emotional support, informational support, esteem support, and tangible support. Following the Cutrona, Suhr, and MacFarlane (1990, p.39, Table 2.2) scheme, the components of social support have the following dimensions:

- **Information support**: Suggestions/advice, referral, clarification, situation appraisal, teaching.
- **Tangible support**: Leave alone, loan, direct task, indirect task, active participation, tension reduction.
- **Emotional support**: Willingness, relationship, physical affection, confidentiality, sympathy, listening, understanding, encouragement, prayer.
- **Esteem support**: Compliment, validation, relief of blame, reassurance.

To evaluate the supportive nature of social network sites, I measure informational, tangible, and emotional (collapsing esteem into emotional) support processes in social network sites using original scales.

3.3.4 Evaluation

To evaluate the supportive and social-informational uses of social network sites during transition, I employ three multiple regression analyses and a structural equation model. In the analyses, I employ two outcome measures. In the first regression, the dependent variable is experienced social support, as measured by the Barrera Jr., Sandler, and Ramsay (1981) Index of Socially Supportive Behaviors. After validating the relationship between supportive and social-informational uses of social network sites during transition and experienced social support, I use the next two regressions to predict adaptation to college. The outcome measure in the final two multiple regressions and structural equation model is degree of adaptation. Adaptation is assessed using the Baker and Siryk (1989) Student Adaptation to College Questionnaire (SACQ).

The first multiple regression, predicting experienced social support, takes the following form:

$$\text{Step 1} : Y_{ij} = \alpha + \beta_1 x_{ij1} + \ldots + \beta_n x_{ijn} + \epsilon_{ij}, \tag{3.4}$$

where α is the intercept and $\beta_1 x_{ij1} + \ldots + \beta_n x_{ijn}$ represents a vector of covariates. This model, evaluated with hierarchical regression, provides a baseline model against which the model with predictors can be compared.

In the second step of the model, I predict experienced social support using the social-informational processes scale (SNS-SIP), and sub-scales (SNS-SIP RF, SNS-SIP IF, SNS-SIP SNA). The general form of the equations are:

$$\text{Step 2a} : Y_{ij} = \alpha + \beta_1 x_{ij1} + \ldots + \beta_n x_{ijn} + \beta_k SNS\_SIP_{ijk} + \epsilon_{ij} \tag{3.5}$$

$$\begin{aligned}\text{Step 2b} : Y_{ij} = \alpha + \beta_1 x_{ij1} + \ldots + \beta_n x_{ijn} + \beta_k SNS\_SIP\_RF_{ijk} \\ + \beta_l SNS\_SIP\_IF_{ijl} + \beta_m SNS\_SIP\_SNA_{ijm} + \epsilon_{ij},\end{aligned} \tag{3.6}$$

where α is the intercept, $\beta_1 x_{ij1} + \ldots + \beta_n x_{ijn}$ represents a vector of covariates, and $\beta_k SNS\_SIP_{ijk}$ (3.5) and $\beta_k SNS\_SIP\_RF_{ijk} + \beta_l SNS\_SIP\_IF_{ijl} + \beta_m SNS\_SIP\_SNA_{ijm}$ (3.6) represent the vector of predictors.

In the third step of the model, I predict experienced social support using the social network site support scale (SNS-S), and sub-scales (SNS-S IS, SNS-S TS, SNS-S ES). The general form of the equations are:

$$\text{Step 3a} : Y_{ij} = \alpha + \beta_1 x_{ij1} + \ldots + \beta_n x_{ijn} + \beta_k SNS\_S_{ijk} + \epsilon_{ij} \tag{3.7}$$

$$\text{Step 3b} : Y_{ij} = \alpha + \beta_1 x_{ij1} + \ldots + \beta_n x_{ijn} + \beta_k SNS\_S\_IS_{ijk} + \beta_l SNS\_S\_TS_{ijl} + \beta_m SNS\_S\_ES_{ijm} + \epsilon_{ij}, \quad (3.8)$$

where α is the intercept, $\beta_1 x_{ij1} + \ldots + \beta_n x_{ijn}$ represents a vector of covariates, and $\beta_k SNS\_S_{ijk}$ (3.7) and $\beta_k SNS\_S\_IS_{ijk} + \beta_l SNS\_S\_TS_{ijl} + \beta_m SNS\_S\_ES_{ijm}$ (3.8) represent the vector of predictors.

After predicting experienced social support, I evaluate two more regression models. These models predict two sub-factors in the Baker and Siryk (1989) Student Adaptation to College Questionnaire, employing the same parameterization described in equations 3.4 - 3.8.

After evaluating the three sets of equations individually, I use a structural equation model to estimate the impact of SNS-S and SNS-SIP on adaptation to transition, as measured by the combined sub-factors of the Student Adaptation to College Questionnaire. The structural equation model is described as:

$$\eta_i = \alpha + \theta\eta_i + \Gamma x_{1i} + \zeta_i, \quad (3.9)$$

where η_i is the model for the latent construct, α is the vector of intercepts, $\theta\eta_i$ is the matrix of relations among latent variables in the model, Γx represents a vector of regressors between variables in the model, and ζ_i is the error vector (following Muthen, 1984). The structural equation model allows for simultaneous evaluation of η_i, student adaptation to college, and the regressive structure of the model.

3.4 Component Three: Uses of Social Network Sites During Transition

In the third component of the study, I conduct a retrospective analysis of social network site use during transition, interviewing students that recently completed a transition to college. Drawing on previous work in everyday life information seeking, I research how college students use the social network site for information seeking during the transition to college.

3.4.1 Data

In component three, I draw on semi-structured interviews collected during the spring of 2010. I used interviews to study the informational uses of social network sites during the transition to college for two reasons. First, interviews are a strong methodological fit, in line with the context of inquiry and previous ELIS research. Second, interviews are an important component in the mixed-methods framework of the study, addressing research questions not amenable to quantitative analysis. Interviews provide richness that is lacking in quantitative analysis, and allow estimation of the content- and criterion-weakness of the quantitative measures.

The consideration of methodological form (i.e. what types of interviews to use) is a function of the goals of the study and previous contextual knowledge of the subject (Strauss and Corbin, 1990). Since much is known about transition, particularly the transition to college, I use this knowledge to guide question construction. I employ semi-structured interviews, and analysis that is both inductive and deductive.

In conducting semi-structured interviews, I had three goals. First, I wanted to develop an understanding of the population's use of social network sites and their attitudes towards disclosure and privacy. This "background" work provides comprehension

of the transitional student's information lifeworld. Second, I wished to better understand processes of support in social network sites. This contextualized the processes of support I study, and allowed me to reflect on of the ecological validity of my findings. Finally, I wished to understand, practically, how students draw on social network sites as information resources during transition. This research perspective is guided by everyday life information seeking theories of information behavior (e.g. McKenzie, 2001; Savolainen, 1995). The interview questions are listed in Appendix C.

3.4.2 Procedure

I interviewed 15 freshmen at the University of North Carolina that used Facebook during their transition to college. Participation was solicited via campus mass-mailing and by personal invitation to prior survey participants that indicated willingness to participate in more research. The main procedure of the study involved a 50 minute semi-structured interview. All participants were interviewed in person, and participants were paid $15.00.

Upon completion of data collection, the interviews were transcribed, and the data were analyzed following the grounded theoretical approach described in Charmaz (2006). The analysis was conducted with Atlas.Ti 6.0 software. The analysis process first involved open coding the relevant sections of the interviews. Once the coding scheme stabilized, codes were primarily assigned from the codebook, and open codes were applied as they emerged. Upon coding the interviews, I iteratively refined the codes by linking and merging codes. Following this refinement of the coding scheme, axial coding was applied to cross-cutting codes. Finally, the axial codes were analyzed to identify themes in the data set.

3.5 Conclusion

The purpose of this research is to identify how supportive and informational uses of social network sites facilitate adaptation to transition. Within this research question I have two primary goals. The first goal of the research is to understand the dynamics of socio-technical networks during transition, which is explored in Chapter 4. The second goal of the research is to identify outcomes and uses of social network sites that facilitate adaptation to transition, which is explored in Chapter 5.

Chapter 4

Network Dynamics During Life Change

4.1 Introduction

Transitions, such as the transition to college, are associated with a high degree of stress (Fisher and Hood, 1987). Acting as a buffer or direct effect, an individual's supportive social network has been demonstrated to mitigate stress, facilitating adaptation to transition (Cohen and Wills, 1985; Hays and Oxley, 1986). The supportive properties of social networks depend on the configuration and size of the networks. It is therefore empirically and theoretically worthwhile to study the collective dynamics of social networks during life transition. In the following chapter, I explore the social networks articulated by freshmen at UNC-Chapel Hill during their transition to college in the fall semester of 2005. This data set was collected with the knowledge of Facebook and the exemption of the university Institutional Review Board.

In this chapter, I explore two substantial research questions regarding the dynamics of transitional social networks as articulated in Facebook. These questions are: What

factors influence the structure of transitional networks over time, and what factors influence the growth of transitional networks over time? To address these questions, I first examine the factors of association that produce structure in the networks articulated in Facebook. In that analysis, I identify social, structural, and demographic factors that are associated with the creation of bonds in Facebook, using dynamic modeling to explore how the strength of these factors change over time. To understand the dynamics of network growth, I use econometric modeling to identify social network site profile factors and behaviors that contribute significantly to the growth of socio-technical networks over the course of the transition.

The purpose of this chapter is to explore how social networks, as articulated in the social network site Facebook, change during the process of transition to college. This analysis explores the dynamics of two primary structural characteristics of networks — their size, and their configuration. By exploring these two components, I provide a picture of network dynamics during transition that can be used to contextualize the relationship between networks created during transition and the outcomes of participation, which is explored in depth in Chapter 5.

4.2 Factors of Association

The processes behind the selection and construction of dyadic bonds between individuals are a fundamental area of study in the social sciences (e.g. Baumeister and Leary, 1995; Homans, 1961; McPherson, 1983). Beyond the heuristic appeal of understanding what factors attract individuals to one another, it has been repeatedly demonstrated that the structure of an individual's affiliation network is associated with economic, social, psychological, and health outcomes (e.g. Blumstein and Kollock, 1988; Giordano, 2003; McPherson, Smith-Lovin, and Cook, 2001). In his classic study, Granovetter (1973) demonstrated the role of affiliation networks in economic success; individuals

were more likely to find job opportunities through the weak ties in their affiliation networks. More recently, the work of Christakis and Fowler has demonstrated the affective role that affiliation network plays in smoking cessation (Christakis and Fowler, 2008), obesity (Christakis and Fowler, 2007), and depression (Rosenquist, Fowler, and Christakis, 2010).

The structure and size of the affiliation network is tightly linked to the outcome of a transitional process. An individual's adaptation to transition is contingent on integration into the new environment, and the management of stress associated with transition. These contingencies draw heavily on the network the individual constructs during transition. To address the information needs required for integration, an individual may turn to friends for recommendations about good restaurants, banks, or playgrounds, for example. While reality is not in any way as deterministic as this example, the individual that has an affiliation network with more collective knowledge about these important, subjective bits of information, may very well find his or her integration into the new environment accelerated (e.g. Shklovski, Kraut, and Cummings, 2006). In the case of stress management, an individual that has a strong pre- and post-transition social support network will likely find his or her transition facilitated, compared to those that have a sparse network to call upon in times of tangible and emotional need (e.g. Furnham, 1990; Magdol, 2002).

4.2.1 Transitions within Blau space

As the composition of an individual's affiliation network is strongly linked to transitionally-relevant outcomes, it is important to understand the factors and processes that support network formation. These processes have been extensively theorized and empirically analyzed in a range of disciplines (Fehr, 1996). Peter Blau's theorization of the process of affiliation (Blau, 1977), now colloquially referred to as *Blau space,* is a highly-regarded

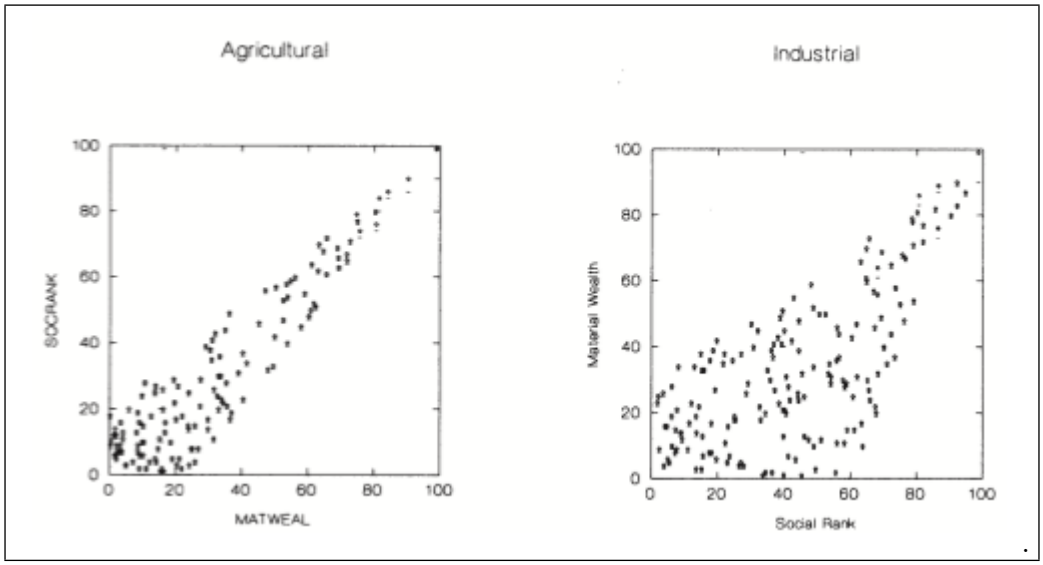


Figure 4.1: Two-dimensional Blau space, adapted from McPherson (2004)

structural explanation of affiliation processes. Described by McPherson (2004):

> Blau space is the k-dimensional system regarding the sociodemographic variables as dimensions, rather than as variables. Each locus in Blau space is a point described by k-coordinates. The relationships among points are defined by distances in the coordinate system. Blau space is spatial because the distances between positions are the primary focus, rather than the relationship among variables. (p. 264)

Through the lens of Blau space, social and demographic factors such as ethnicity, status, and geographic location are thought of as distances, which in turn produce constraints on the formation of the affiliation network. Because Blau space is k-dimensional and therefore hard to conceptualize, McPherson provides a two-dimensional example. In Figure 4.1 I present a scatterplot comparing social rank and material wealth in agricultural and industrial societies. In agricultural societies, where economic production is the result of a highly deterministic process (e.g. amount of land, number of farmhands) the correlation between social rank and material wealth is very strong. In industrial

societies, where innovation and efficiency can create outrank wealth, the correlation is less strong. In this conception of Blau space, structural factors such as the type of economy constrain the relationship between sociodemographic factors in the society.

Macro-level social factors such as type of economy, regional geography, and religion fundamentally shape the affiliations structured in Blau space. For example, the "social distance" between individuals living in mountainous locales may be very different from individuals living in flat geographies, even if the physical distance is identical. Of course, Blau space, and our ecology of affiliation, is more than just a product of macro-level structure. As McPherson (2004) notes:

> The net result of these processes is the creation of a very high dimensional social arena, in which much of the action occurs locally. The institutional structure of society enforces and reinforces the sorting processes that allocate persons to positions in the stratification system. People move from group to group on daily, weekly, monthly, yearly and life-cycle schedules. The trajectories through which people move are orchestrated by the institutional structures of family, work, religion, medicine, government and so forth. Change of position in years of age takes place in a regular rhythm over the life course, while position in years of education usually stabilizes in early adulthood. (p. 267)

One such micro-level Blau dimension is educational attainment. Drawing on General Social Survey data, McPherson illustrates (Figure 4.2) structural patterns of connection between individuals in the two-dimensional Blau space of education and age. This illustration demonstrates how education and age spatially constrain a likelihood of connection between individuals. In the k-dimensionality of Blau space, causality is not assumed to be wholly attributable to the specified factors. While the framework is

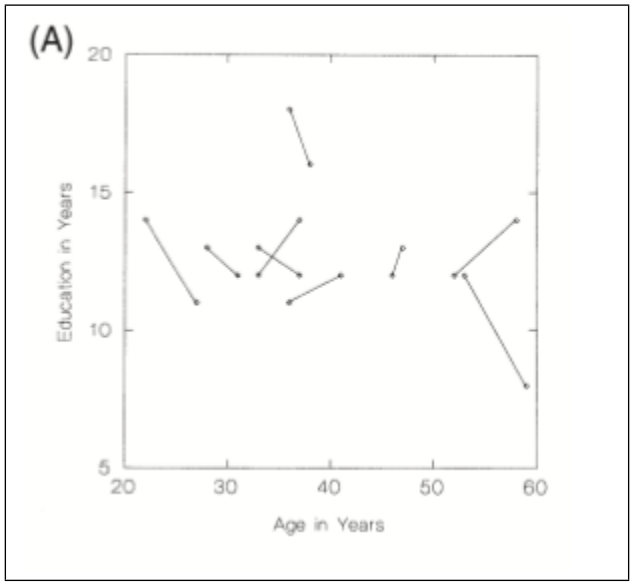


Figure 4.2: Dyadic relationships in Blau space, adapted from McPherson (2004)

deterministic, the effects of the factors are part of a social, technical, and cultural process, much of which is unmeasurable. Therefore, in my study of factors of association, claims of causality are limited.

In the past thirty years, Blau space has been constructed in the academic and popular discussion of *homophily*, or the principle of self-similarity governing interpersonal relationships (McPherson, 1983; McPherson, Smith-Lovin, and Cook, 2001). Homophily can be viewed as a confirmatory Blau space, in which closeness to others is a function of shared k-dimensions. Recently, large-scale articulation of social ties in digital corpora has allowed researchers to induce and test Blau dimensions (e.g. Kossinets and Watts, 2009; Lewis, Kaufman, and Christakis, 2008; Wimmer and Lewis, 2010). The following component of my study extends this line of research, exploring the effect of self-similar Blau factors on patterns of association across the Facebook networks of UNC's freshman class in the fall of 2005.

4.2.2 Data collection and data set

The data collection for this component of the study occurred between August 30, 2005 — the first day of fall semester — and December 13, 2005, the end of fall semester. On a weekly basis, a web crawler captured the Facebook profiles of individuals that self-identified as freshmen at the University of North Carolina at Chapel Hill. Only individuals with publicly accessible profiles within the University of North Carolina network are included in the study[1]. At the time, an individual's profile that was open to the "UNC" network was exposing data to approximately 35,000 students, faculty, and staff; for this reason the IRB provided a research exemption (Appendix A).

Table 4.1: Observations by week, longitudinal data collection

Week	Observations	Percent	Cumulative %
1	3,087	5.85	5.85
2	3,177	6.02	11.86
3	3,229	6.12	17.98
4	3,205	6.07	24.05
5	3,280	6.21	30.26
6	3,304	6.26	36.52
7	3,325	6.30	42.82
8	3,331	6.31	49.13
9	3,331	6.31	55.44
10	3,349	6.34	61.78
11	3,356	6.36	68.14
12	3,361	6.37	74.50
13	3,368	6.38	80.88
14	3,366	6.38	87.26
15	3,365	6.37	93.63
16	3,363	6.37	100.00

Counts of number of unique observations per week, fall 2005 longitudinal collection.

[1]Between 2004 and 2007, Facebook's global network was segmented into smaller networks, such as schools, workplaces, and geographic regions. At the time, these "networks" represented a meaningful privacy boundary. See boyd and Hargittai (2010) for historical perspective. As of writing, the concept of "networks" as privacy boundary has been largely deprecated in Facebook.

During the data collection, I observed 3,499 unique profiles. These unique profiles accounted for 52,797 observations over the course of the 16-week data collection. Counts of observations per week are presented in Table 4.1. In longitudinal data collection, attrition within the subject pool is a prime threat to validity of findings (Harris, 1998). There are many causes of attrition, including subject mortality, relocation, or unwillingness to participate. These causes primarily affect long running, burdensome studies. The data collection for this study, on the other hand, was observational in nature and occurred during a fairly short time interval of one semester. Therefore, case-level missingness is most likely attributable to privacy policy change (i.e. making the profile private and unavailable to the crawler), data collection error (e.g. website failed to respond to query, data corruption in transfer), or entry to the subject pool after data collection has begun. Table 4.2 provides insight into patterns of case-missingness in the subject pool, identifying that for 82% of unique profiles, all 16 weeks of observations are present. Visual inspection of missingness patterns indicate that the majority of missingness is due to late pool entry, rather than attrition during the study.

Upon collection, the Facebook profiles were processed using an XML parser, and individual profile elements were both anonymized and abstracted. This process involved the removal of personally identifiable information and the conversion of personally identifiable information into derivative factors. For example, many individuals shared their "IM Screenname." The screenname itself was removed from the data set, but a derivative effects code that measures *if* the case shared a screenname remains. Another example is the listing of interests and favorites. After processing, the only derivatives that remain are counts of the interests and favorites.

As a result of the profile data extraction, I was able to build network "edge lists" of the articulated ties within the freshman network. Within a Facebook profile, an individual can articulate a reciprocal tie to any other willing member in the service.

Table 4.2: Patterns of missing data, longitudinal data set

Frequency	Percent	Cumulative	Pattern
2885	82.45	82.45	1111111111111111
96	2.74	85.20	.111111111111111
60	1.71	86.91	..11111111111111
46	1.31	88.23	111.111111111111
38	1.09	89.31	11111111111
30	0.86	90.17	111111111111
30	0.86	91.03	...1111111111111
21	0.60	91.63	1111111111
18	0.51	92.14	1111111
275	7.86	100.00	(other patterns)
3499	100.00	100.00	

This table describes patterns of case-wise missingness within the 16 weeks of data collection. The majority of subjects are represented for all 16 weeks. The rightmost column indicates the shape of the missing data. For example, 96 observations are missing week one and no other weeks.

Because I am interested in the freshman cohort, I only extracted dyadic ties articulated between freshmen. In creation of the edge lists, anonymous identifiers were assigned to each member of the data set, ensuring that network representation can not be directly linked back to the actual identity[2].

In survey research, it is fairly uncommon to encounter a data set with near-complete coverage of a large population. Generally, when the sampling population exceeds 5% of the target population, the Finite Population Correction (FPC) can be applied to account for increased precision associated with high coverage (Kish, 1965). I have not applied the FPC to the following estimates, for reasons both technical and empirical. The primary empirical reason is that non-FPC standard errors are more robust, thus

[2]It must be noted that anonymity in social network data is theoretical. With network structure and vertex attributes, it is generally possible to identify individuals within a network. Therefore, these data may never be shared, they are protected with access-control password and encryption, and they are abstracted so that the impact of unintended leakage would be minimal.

decreasing the likelihood of type I error. The second empirical reason is the self-reported nature of the data. Had I been working from a data set with rigorous collection procedures (e.g. administrative records, in-person survey administration) I would feel more comfortable applying the FPC. Therefore, in the following study, standard errors are presented with the assumption of an infinite population.

4.2.3 Analytic framework

Research has identified the important role of an individual's support network in adaptation to transition. In this component of the study, I analyze the structure of socio-technical networks — the networks articulated in the socio-technical space of Facebook — during transition. I have two primary research goals. First, I wish to identify factors that are associated with the establishment of ties in the socio-technical network during transition. Second, I wish to identify factors that contribute to the growth of the socio-technical network during transition.

During transition, individuals call upon support networks to address needs. These support requests may be tangible, emotional, or informational in nature (Cutrona, 1986). The Blau space framework allows us to envision how individual and structural factors might constrain the support available to an individual. Consider the relationship between socioeconomic status (SES) and transportation availability. During a transition, a college student may need to borrow a car to go grocery shopping or to a doctor's appointment. If that student's network is of high SES, he or she may be more likely to find transportation support than a student with a low SES network. This simple example illustrates the relationship between the constraints of Blau space and supportive outcomes.

We must consider the relationship between the support structures articulated in socio-technical networks and potential supportive outcomes. Is a Facebook network of

a different class than the individual's core discussion network (e.g. Marsden, 1987) or the cognitive group (e.g. Dunbar, 1998)? The simple answer is yes, the socio-technical network is of a different class, and it is a class worthy of study. We know that among the study's population, the networks articulated in Facebook largely reflect in-person connections (Lampe, Ellison, and Steinfield, 2006). By logic, we also know that the networks do not contain ties where one member of the dyad does not use the service. At the time of the network data collection, parents, counselors, and post-college-age brothers and sisters were not likely to have Facebook accounts. In a supportive context, the Facebook network can be thought of as a set of latent ties that can be activated if necessary. Facebook therefore represents a connective infrastructure, with values and affordances that may affect transmission of support.

In the following section, I explore the network data set at two levels. First, I identify the role of structural factors of association in tie formation. This analysis is conducted longitudinally, and it explores how the effects of structural factors shift during transition. Second, I utilize network analysis to provide high-level descriptive analytic mappings of the network during transition. In doing so, I am able to explore and identify factors relevant to the construction of socio-technical support networks during transition. When combined, this analysis provides significant insight into my first research goal of the chapter: identifying factors that are associated with the establishment of ties in the socio-technical network during transition.

4.2.4 Research questions

This component of the study proposes to identify factors of association in the socio-technical network. Drawing on self-reported information posted to Facebook profiles, I identify Blau factors that both increase and decrease the likelihood of dyadic tie

formation. Using the Blau space framework (Blau, 1977; McPherson and Ranger-Moore, 1991; McPherson, 2004) and McPherson's conception of "ecologies of affiliation" and homophily (McPherson, 1983; McPherson, Smith-Lovin, and Cook, 2001), I explore the associative strength of *preference*, *socio-demographic*, and *configuration* factors.

In McPherson's review, core k-dimensions of Blau space are identified[3]. A primary set of Blau factors is found in the "institutional structure of society" which "enforces and reinforces the sorting processes that allocate persons to positions in the stratification system" (McPherson, 2004, p. 267). These institutional structures include profession, religion, and political affiliation; they are the individual *preference* trajectories within Blau space.

McPherson then explores socio-demographic factors, noting that "dimensions in which change takes place the most slowly are the socio-demographic dimensions such as physical location, age, gender, years of education, occupation, and income" (McPherson, 2004, p. 267). *Socio-demographic* factors are one of the most essential, primary factors in Blau space.

Finally, I introduce the concept of *configuration* factors. During the transition to college, we have control over some, but not all components of the change. The university may pick our housing, or deny us access to an important, wait-listed course. I propose that configuration factors reflect the placement of an individual into a k-dimension by an external deterministic process. In this sense, configuration factors represent enacted organizational economy that constrains and maps new trajectories through Blau space.

[3]Although McPherson "identifies" Blau dimensions, it is recognized that these factors are dynamic and evolutionary in nature, and therefore any mapping is both contextual and incomplete.

Facebook profiles and factors of association

The Facebook profile contains a wide variety of information that is amenable to treatment as factors. Factors are a measurement variable with discrete levels, and I use the term similarly to the concept of factors in an analysis of variance (ANOVA). This analysis explores the relationship between shared factors — the independent variable — and the likelihood of shared tie — the dependent variable. For example, the analysis lets us explore if same-gender pairs, possessing a shared factor, are likely to associate. In each case, I hypothesize that the factor is associative. The null hypothesis is that the shared factor does not significantly affect the likelihood of association when compared to a random network.

The evaluation of factors of association is conducted using exponential random graph modeling (ERGM). As described by Goodreau (2007, p. 234), the ERGM specifies the probability of connection between actors n as:

$$Pr(\,Y{=}y) = \frac{1}{k}\exp\{\Sigma_A \eta_A g_A(y)\}, \tag{4.1}$$

where A is an index of potential modeling vectors *g(y)*, η_A represents the log-odds of a tie, and $\exp\{\Sigma_A \eta_A g_A(y)\}$ is constrained by k, the normalizing constant. Using Markov simulation to compare the observed set of connections to an Erdos-Renyi random graph, I am able to produce pseudo-likelihood estimates (similar to maximum likelihood estimates) of the probability of a tie.

The intuition of this analysis is as follows: if a network has structure, than the ties within the network are not random. Erdos-Renyi provides the logic for the simulation of a random network[4], against which the observed structure can be compared. The

[4]Erdos-Renyi is not the only random network model. Newman, for example, provides models of random networks that may better approximate the structure of networks with less dimensionality (Newman, Watts, and Strogatz, 2002).

ERGM model then explores if, compared to the random network, the observed network exhibits structure attributable to the proposed factor. The output of the estimation model is interpretable as a logit coefficient, and therefore when exponentiated produces an odds ratio. From this, I am able to describe the magnitude of the shared factor's influence on the odds of a tie in the observed network.

4.2.5 Research variables

This analysis explores the role preference, socio-demographic, and configuration factors play in the structuring of socio-technical networks during transition. I now describe the composition of the three factor types.

Preference factors

Preference factors capture individual academic and lifestyle choice. In this analysis I model the effect of shared political views, and shared academic major on the likelihood of shared ties.

1. **Political Views**: Facebook allowed individuals to select from the following political views: Very Conservative, Conservative, Moderate, Liberal, Very Liberal, Libertarian, Apathetic/Other.

2. **Academic Major**: Facebook allowed individuals to choose up to two majors from the list of undergraduate majors at UNC-Chapel Hill. This analysis matches on the primary (first) major.

Socio-demographic factors

Socio-demographic factors represent societal-level Blau dimensions. In this component of the analysis I explore the effect of shared gender, "interested in" status, and North Carolina residency.

1. **Gender**: Facebook allowed individuals to select either male or female.

2. **Interested In**: In a Facebook profile, an individual could designate genders which they are "interested in." For example, a man can express interest in a woman, a woman can express interest in a woman, and so on. I do not interpret "interested in" to reflect sexual orientation, but rather to be an indicator of expressed Blau factor preference. Individuals can choose more than one "interested in" category, this analysis matches on the primary category.

3. **North Carolina Residency**: As UNC is a state school, with 82% of students from North Carolina, I expect that in-state students have an advantage in tie formation during the transition. This derivative factor was created based on wether or not the individual stated a North Carolina city as their "hometown."

Configuration factors

Configuration factors reflect the placement of an individual into a k-dimension by an external deterministic process. In this sense, configuration factors represent meaningful, socially structuring processes that depend on external agency. In this component of the analysis I explore the effect of shared residence hall, and the effect of shared relationship status.

1. **Residence Hall**: Facebook allowed individuals to choose from a list of residence halls on campus.

2. **Relationship Status**: Relationship status reflects an individuals relationship with a significant other person. Options include single, in a relationship, in an open relationship, or married.

4.2.6 Analytic plan

In the analysis, I employ an additive model-building approach that used the following strategy: First, I used ERGM to estimate the effect of individual factors. The explanatory strength of individual factors was then assessed with the Akaike's Information Criterion (AIC). Second, using an additive approach, I jointly estimated the effects of factors, again using the AIC for between-model comparison. Finally, I employed network analysis to describe shifts in macro-level network structure over the course of the fall semester.

In practice, the estimation of ERGM models is conceptually similar to regression. Using the notation of regression, we can think of the exploration of individual associative factors as employing the equation:

$$\left(\frac{1}{\lambda}\right) N_{observed} = edges + \beta_i + \epsilon, \tag{4.2}$$

where the log-odds of a tie being observed in the network structure ($\left(\frac{1}{\lambda}\right) N_{observed}$) is a function of the *edges*, the coefficient of the factor (β_i) and an error term ϵ. Therefore, the additive model is simply:

$$\left(\frac{1}{\lambda}\right) N_{observed} = edges + \beta_i + \beta_j + \beta_k \ldots \beta_z + \epsilon, \tag{4.3}$$

where β_j is the coefficient of the second factor in Blau space, and $\beta_k \ldots \beta_z$ represent the vector of k-dimensional factors of the Blau space (i.e. the rest of the additive factors).

This analysis was conducted using the R statistical computing platform, version 2.10.1. The analysis was conducted on UNC's Emerald research computing cluster. ERGM's and descriptive network measures were estimated using the Statnet package for R (Handcock et al., 2008).

Table 4.3: Freshman cohort ties and total ties by week

Week	Observations	Cohort Ties	Total Ties
1	3,087	96,345	144,319
2	3,177	112,014	167,847
3	3,229	129,427	198,749
4	3,205	137,917	218,652
5	3,280	157,010	245,974
6	3,304	168,149	265,925
7	3,325	173,929	275,093
8	3,331	182,830	293,559
9	3,331	188,136	302,960
10	3,349	191,545	310,407
11	3,356	201,343	328,369
12	3,361	206,021	337,600
13	3,368	212,722	348,917
14	3,366	214,599	354,034
15	3,365	219,674	364,287
16	3,363	224,343	373,651

Raw counts of the number of ties articulated by members of the data set. Cohort ties represent freshman to freshman dyadic ties within the data set. Total ties represent the total number of friendships reported on Facebook pages of data set members.

4.2.7 Findings

This analysis was conducted within the bounded network of articulated ties among the freshman class. A description of the network data set is presented in Table 4.3, which catalogs both ties within the freshman cohort, and all reported friendships on the freshman Facebook profiles. Roughly, within-cohort ties account for 60-85% of total ties reported by freshmen over the course of data collection.

In the following section, I present findings from a longitudinal analysis of factors of association. The presentation of the findings is grouped according to the three factor types specified: preference factors, socio-demographic factors, and configuration factors. Within each grouping, I provide results of the ERGM in tabular form for each variable, and then I plot the odds ratios (exponentiated coefficient, with a 95%

confidence interval) for each variable across the fall semester. This allows a visual analysis of the dynamic importance of the specified factors over time.

Preference factors: political affiliation

Table 4.4: Political affiliation as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	2,290	0.371905	0.011374	0.0000	****
2	2,332	0.385324	0.010610	0.0000	****
3	2,405	0.372139	0.009903	0.0000	****
4	2,368	0.359571	0.009637	0.0000	****
5	2,425	0.358858	0.009122	0.0000	****
6	2,440	0.351942	0.008876	0.0000	****
7	2,267	0.341659	0.009179	0.0000	****
8	2,427	0.354260	0.008551	0.0000	****
9	2,461	0.340487	0.008426	0.0000	****
10	2,443	0.336730	0.008409	0.0000	****
11	2,499	0.335057	0.008111	0.0000	****
12	2,504	0.337058	0.008009	0.0000	****
13	2,511	0.331708	0.007900	0.0000	****
14	2,507	0.326638	0.007880	0.0000	****
15	2,515	0.323770	0.007785	0.0000	****
16	2,516	0.322869	0.007695	0.0000	****

*Political affiliation estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

An individual's political affiliation is a strong statement of social identity, and is often studied in the context of association (Kandel, 1978; Kossinets and Watts, 2009; McPherson, Smith-Lovin, and Cook, 2001). The sharing of political opinions stands to bring people together ideologically, and physically through organized collective action (e.g. Drury and Reicher, 2000). In the context of a transition, the sharing of political affiliation may facilitate the common-grounding process in relational establishment (Clark, 1996). Estimates of the effects of shared political affiliation are presented in Table 4.3.

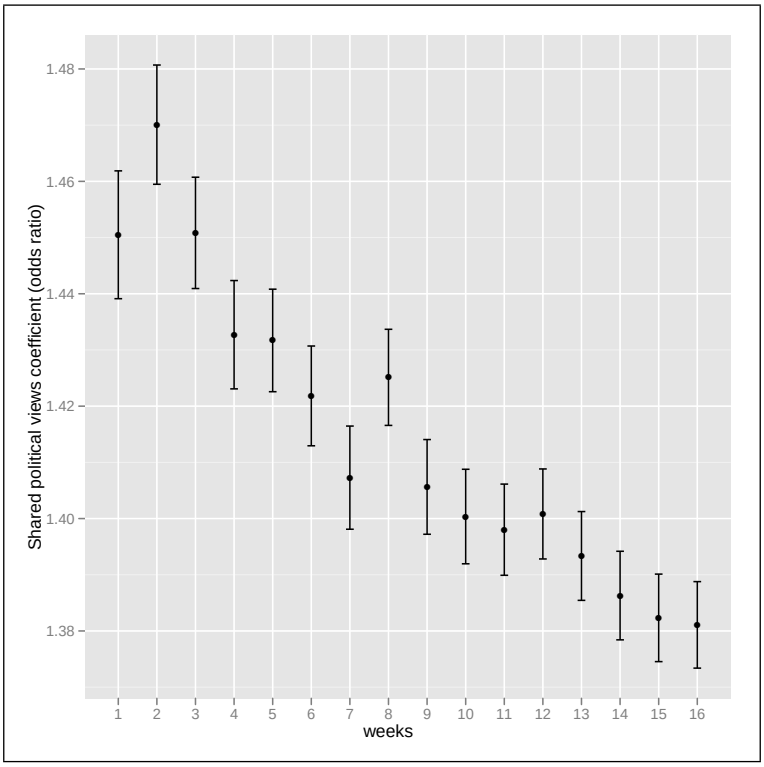


Figure 4.3: Political affiliation as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

The analysis shows that for all sixteen weeks, shared political affiliation is a significant, positive factor associated with the creation of socio-technical ties. For the population studied, the networks are shaped toward political homophily, which may have implications for the types of information available within the network. On inspection of Figure 4.3, I observe that the influence of shared political affiliation decreases over time. At the beginning of week one, individuals with shared political views are 1.45 times as likely to be connected, compared to individuals of different views. This effect drops significantly over the course of the semester. One possible explanation is that during early stages of transition, individuals are drawn to politically self-similar individuals based on a shared social identity, a common cause, and ease of the common-grounding process. As discussed in Chapter 5, students commonly draw inference based on profile

material in early-stage transition, political affiliation being an informational disclosure. As the student is exposed to the campus, hallmates with a diversity of viewpoints, and other moderating factors, the importance of political homogeneity may decrease.

Preference factors: academic major

Table 4.5: Primary academic major as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	2,352	0.486734	0.019067	0.0000	****
2	2,412	0.472975	0.017872	0.0000	****
3	2,477	0.452297	0.016740	0.0000	****
4	2,421	0.466779	0.016339	0.0000	****
5	2,515	0.463943	0.015295	0.0000	****
6	2,523	0.456768	0.014986	0.0000	****
7	2,341	0.442179	0.015913	0.0000	****
8	2,503	0.43062	0.01484	0.0000	****
9	2,523	0.431094	0.014686	0.0000	****
10	2,505	0.428066	0.014726	0.0000	****
11	2,552	0.424454	0.014312	0.0000	****
12	2,554	0.428067	0.014196	0.0000	****
13	2,560	0.416201	0.014070	0.0000	****
14	2,564	0.401862	0.014069	0.0000	****
15	2,566	0.401056	0.013918	0.0000	****
16	2,546	0.402561	0.013800	0.0000	****

*Academic major estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

Similar to political preference, the shared academic major affords both physical and ideological connective opportunity. The academic major is a strong statement of social identity and provides an ideological context for the common-grounding process of relational establishment. The academic major may, in some cases, also signal lifestyle choices, which furthers the potential for connection. As each major has a prescribed academic course, it is likely that individuals with shared majors will be in physical

proximity of each other. This proximity may be the result of shared classes, departmental clubs and meetings, and the fact that many majors are "housed" in a single building. Therefore, I expect shared major status to positively influence the potential for tie formation. Estimates of the effect of shared academic major are presented in Table 4.5.

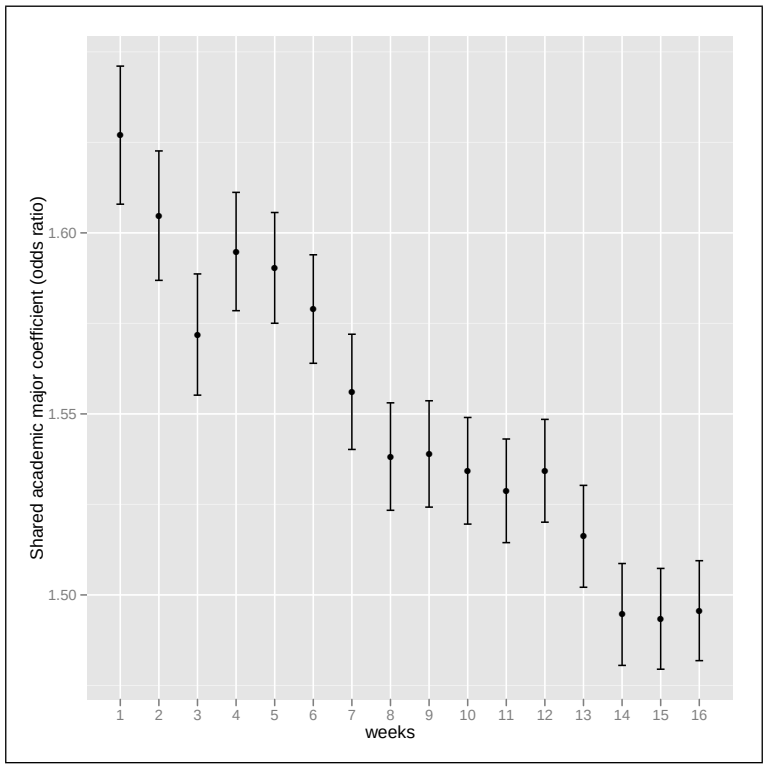


Figure 4.4: Primary academic major as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

The analysis shows that for all sixteen weeks, shared academic major is a significant, positive factor associated with the creation of socio-technical ties. At the beginning of week one, individuals with the same primary major are 1.625 times as likely to be connected, compared to individuals with differing primary majors. On inspection of Figure 4.4, I observe that the influence of shared academic major decreases significantly over time, with shared-major friendships being 1.49 times as likely than the non-shared

major friendships at the end of the semester. Similar to the effect of political affiliation, the decreasing importance of preference factors over the course of the transition may indicate the initial importance of major as a "sorting" Blau factor. Over time, however, the student is exposed to a wider range of contacts, which inherently decreases the importance of the initial sorting.

Socio-demographic factors: shared gender

Table 4.6: Gender as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	3,055	-0.036689	0.009029	0.000	****
2	3,122	-0.005980	0.008380	0.475	
3	3,201	0.030027	0.007854	0.000132	****
4	3,141	0.073496	0.007560	0.000	****
5	3,264	0.090082	0.007156	0.000	****
6	3,266	0.098614	0.006922	0.000	****
7	3,044	0.093611	0.006719	0.000	****
8	3,240	0.096149	0.006586	0.000	****
9	3,279	0.090471	0.006535	0.000	****
10	3,259	0.094465	0.006428	0.000	****
11	3,318	0.103262	0.006330	0.000	****
12	3,322	0.104591	0.006253	0.000	****
13	3,324	0.099021	0.006156	0.000	****
14	3,320	0.101437	0.006127	0.000	****
15	3,313	0.096678	0.006052	0.000	****
16	3,311	0.095063	0.005989	0.000	****

*Gender estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

Throughout the life course, and especially during childhood, gender is a primary social category organizing relationships (Crosnoe, 2000). By the time children reach school-age, they demonstrate strong preference towards same-gender activities (Crosnoe, 2000), and their social worlds are structured towards same-gender interaction

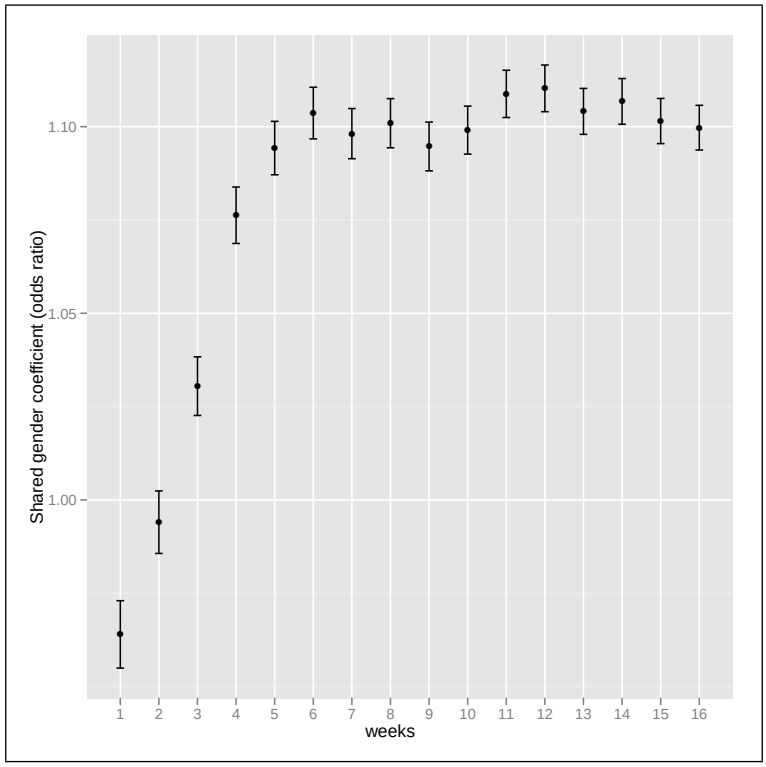


Figure 4.5: Gender as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

(Fehr, 1996). In youth, the structuring of same-gender relationships is both a combination of internal preferences and societal pressure. During the period of time between when an individual reaches adulthood, but before marriage, individuals are increasingly open to cross-gender friendship pairings (McPherson, Smith-Lovin, and Cook, 2001). Therefore, I expect to find weak support for same-gender pairing as an associative factor. Estimates of the effects of shared gender on dyadic pairings are presented in Table 4.6.

Over the course of the semester, I first observe a negative effect of gender; at week one, same-sex pairings are slightly, yet significantly, less likely than cross-sex pairs. Between weeks two and six I see this effect reverse, and from weeks seven through thirteen I see the positive effect stabilize, with same-sex pairings being approximately

Table 4.7: "Interested in" as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	2,498	0.098195	0.009385	0.0000	****
2	2,563	0.113868	0.008701	0.0000	****
3	2,641	0.136336	0.008091	0.0000	****
4	2,619	0.161831	0.007765	0.0000	****
5	2,714	0.171572	0.007302	0.0000	****
6	2,732	0.181732	0.007061	0.0000	****
7	2,557	0.163537	0.007058	0.0000	****
8	2,718	0.169210	0.006769	0.0000	****
9	2,755	0.161234	0.006688	0.0000	****
10	2,744	0.160756	0.006608	0.0000	****
11	2,792	0.172152	0.006455	0.0000	****
12	2,799	0.174107	0.006375	0.0000	****
13	2,810	0.174421	0.006275	0.0000	****
14	2,806	0.173482	0.006249	0.0000	****
15	2,808	0.168724	0.006176	0.0000	****
16	2,800	0.157236	0.006123	0.0000	****

*"Interested in" estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

1.1 times as likely as cross-sex pairings (Figure 4.5). In her book on friendship, Fehr (1996) devotes much time to the concept of friendships being structured by social networks and social processes. Although young adults may wish to increase cross-sex integration, what I may be observing is social structure in action: individuals are more likely to exist within same-sex networks, and are thus more likely to exhibit same-sex pairings.

Socio-demographic factors: "interested in"

In a Facebook profile, an individual can designate genders which they are "interested in." For example, a man can express interest in a woman, a woman can express interest in a woman, and so on. This unique and somewhat invasive question is often interpreted to reflect sexual orientation. While shared sexual orientation is an associative factor,

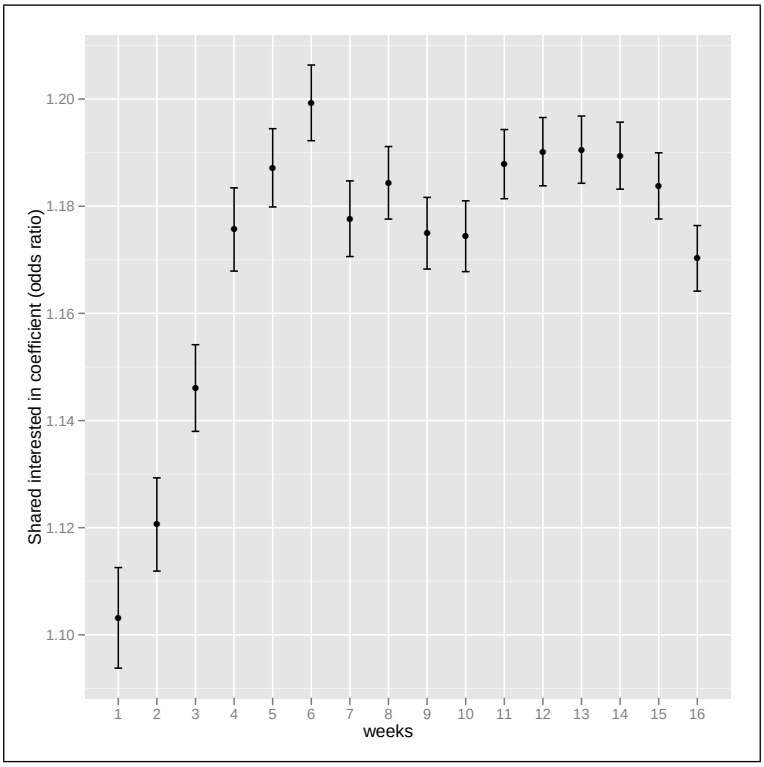


Figure 4.6: "Interested in" as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

I operationalize the concept of "interested in" as a self-fulfilling prophecy. That is, individuals with shared interests will find a common bond that may increase likelihood that they will achieve their stated goal (e.g. Ren, Kraut, and Kiesler, 2007; Sassenberg, 2002). I expect, and do observe, that the effects of "interested in" as self-fulfilling prophecy increase over time (Table 4.7).

Similar to the analysis of gender, I observe increases in the effect of this factor over the first six weeks, followed by plateauing in weeks seven through sixteen (Figure 4.6). During the plateau phase, individuals that share the "interested in" factor are approximately 1.19 times as likely to exhibit dyadic ties than individuals of differing "interested in" factors. As with the effect of gender, I believe I am observing social structure in action. During the first weeks of the transition, individuals are likely to

associate with those who share common interests. Once these allies are located, a period of stability is likely to follow.

Socio-demographic factors: North Carolina residency

Table 4.8: North Carolina residency as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	2,884	0.420989	0.009561	0.0000	****
2	2,957	0.387412	0.008811	0.0000	****
3	3,033	0.380389	0.008303	0.0000	****
4	2,977	0.353140	0.007889	0.0000	****
5	3,085	0.338632	0.007506	0.0000	****
6	3,107	0.326641	0.007257	0.0000	****
7	2,902	0.281443	0.006753	0.0000	****
8	3,082	0.300173	0.006813	0.0000	****
9	3,122	0.291389	0.006792	0.0000	****
10	3,105	0.280722	0.006629	0.0000	****
11	3,160	0.294188	0.006586	0.0000	****
12	3,167	0.295273	0.006506	0.0000	****
13	3,170	0.284481	0.006392	0.0000	****
14	3,173	0.283835	0.006363	0.0000	****
15	3,171	0.275071	0.006279	0.0000	****
16	3,170	0.275718	0.006212	0.0000	****

*North Carolina residency estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

The University of North Carolina is a state school, with 82% of undergraduate students originating from North Carolina. In the context of transition, North Carolina residents may be more likely to know people on campus or have friends from high school on campus. Therefore, I expect that North Carolina residency is a strong socio-demographic factor structuring the development of relationships (Table 4.8).

Observing the effects of shared North Carolina residency over the transitional semester, I find that at week one, North Carolina residents are approximately 1.525 times as likely to have a dyadic tie than cross-residency pairs (Figure 4.7). Rather than this effect

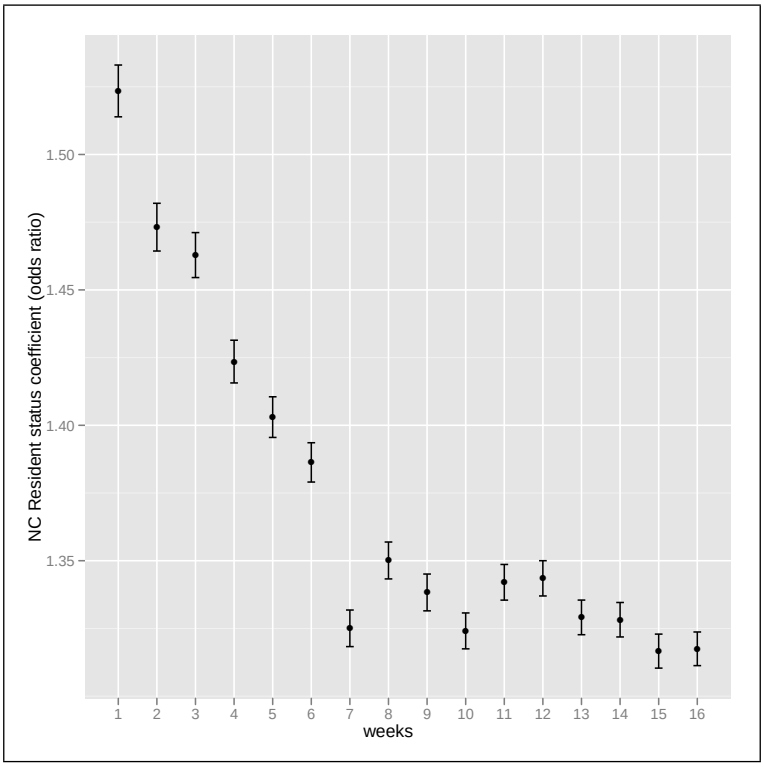


Figure 4.7: North Carolina residency as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

getting stronger over time, I observe a significant dropoff of the effect of North Carolina residency between weeks two and seven. The effect stabilizes between weeks eight and sixteen, with North Carolina residents being approximately 1.325 times as likely as non-residents to have established dyadic ties. Much like the preference factors, North Carolina residency is a social identity and means for potential physical interaction. As students integrate into campus, however, the effects of these factors decrease. I propose the following two explanations: First, with regards to the physical and informational benefits of shared-residency ties, I believe they may be maximized at week one. That is, shared resident ties have been articulated before campus mixing. Second, as students mix with peers, the social identity effects of shared residency are outweighed by stronger social forces on campus.

Configuration factors: residence hall

Table 4.9: Residence hall as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	2,906	1.460887	0.010682	0.0000	****
2	2,975	1.538088	0.009796	0.0000	****
3	3,060	1.567888	0.009100	0.0000	****
4	3,009	1.580886	0.008796	0.0000	****
5	3,108	1.573874	0.008306	0.0000	****
6	3,121	1.574469	0.008072	0.0000	****
7	2,913	1.555403	0.008236	0.0000	****
8	3,092	1.572985	0.007784	0.0000	****
9	3,131	1.572719	0.007686	0.0000	****
10	3,102	1.573008	0.007623	0.0000	****
11	3,158	1.587281	0.007426	0.0000	****
12	3,164	1.584592	0.007346	0.0000	****
13	3,169	1.582637	0.007246	0.0000	****
14	3,173	1.583280	0.007209	0.0000	****
15	3,171	1.579894	0.007139	0.0000	****
16	3,162	1.581711	0.007082	0.0000	****

*Residence hall estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

I now turn to configuration factors of association, which I describe as reflecting the placement of an individual into a k-dimension by an external deterministic process. Configuration factors reflect the agency of outside parties. The first configuration factor is shared residence hall status. When a freshman is placed into a residence hall, an important component of the individual's transitional trajectory is set. Relational formation is heavily influenced by geographic proximity, and the placement into the residence hall creates a spatial trajectory for relationships (Fehr, 1996). Furthermore, as the residence hall is often an important aspect of the social identity, students may seek within-hall friends to strengthen the bond to the identity (Bettencourt et al., 1999). Table 4.9 demonstrates the strong, significant effect of shared residence halls on dyadic tie formation.

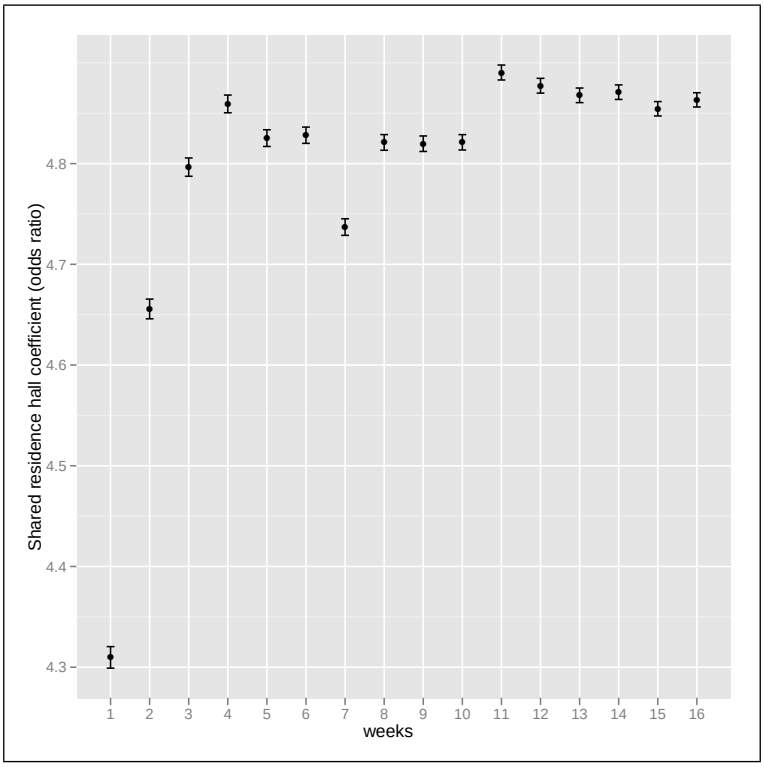


Figure 4.8: Residence hall as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

Demonstrated in Figure 4.8, I observe the very strong, positive effect of same residence hall on the formation of dyadic pairs. At week one, individuals that share a residence hall are approximately 4.3 times as likely as individuals from different residence halls to have a dyadic tie. This effect quickly increases to 4.8 times within the first three weeks, and then remains relatively stable for the rest of the semester. Clearly, the sharing of a residence hall plots a very strong trajectory for tie formation.

Configuration factors: relationship status

An individual's relationships status (single, dating, etc.) often involves the agency of others, and it influences the trajectory of tie formation (Fehr, 1996; McPherson, Smith-Lovin, and Cook, 2001). Because I view relational construction as more than simple

Table 4.10: Relationship status as associative factor, weeks 1-16

Week	n	Estimate	Std. Err.	p-value	Sig.
1	2,486	0.110977	0.009256	0.0000	****
2	2,546	0.114375	0.008633	0.0000	****
3	2,642	0.079814	0.008085	0.0000	****
4	2,616	0.104741	0.007793	0.0000	****
5	2,709	0.090561	0.007367	0.0000	****
6	2,722	0.089618	0.007179	0.0000	****
7	2,530	0.080455	0.007291	0.0000	****
8	2,710	0.081549	0.006960	0.0000	****
9	2,734	0.060061	0.006940	0.0000	****
10	2,714	0.058972	0.006889	0.0000	****
11	2,766	0.054935	0.006755	0.0000	****
12	2,763	0.039653	0.006708	0.0000	****
13	2,775	0.026690	0.006663	0.0000	****
14	2,756	0.032424	0.006636	0.0000	****
15	2,774	0.028400	0.006566	0.0000	****
16	2,770	0.017571	0.006527	0.0071	***

*Relationship status estimates provided as raw coefficients. Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

preference (dating requires a willing partner, while being affiliated with a political party does not), I have classified it as a configuration factor. Estimates are presented in Table 4.10.

Figure 4.9 plots the effect of shared relationship status over the course of the semester. At week one, the effect is small, with individuals with shared relationship status 1.12 times as likely to have dyadic ties. Over the course of the semester, this effect gradually falls to almost nothing. On consideration, the concept of shared relationship status is divergent. Individuals that are dating may tend to partner with other dating couples, and individuals that are single may have very different tie formation trajectories. Therefore, I re-ran the analysis looking for effects at each level of relationship status. As one might assume, individuals that are single are much more likely to form dyadic ties, whereas individuals that are dating are less likely to form

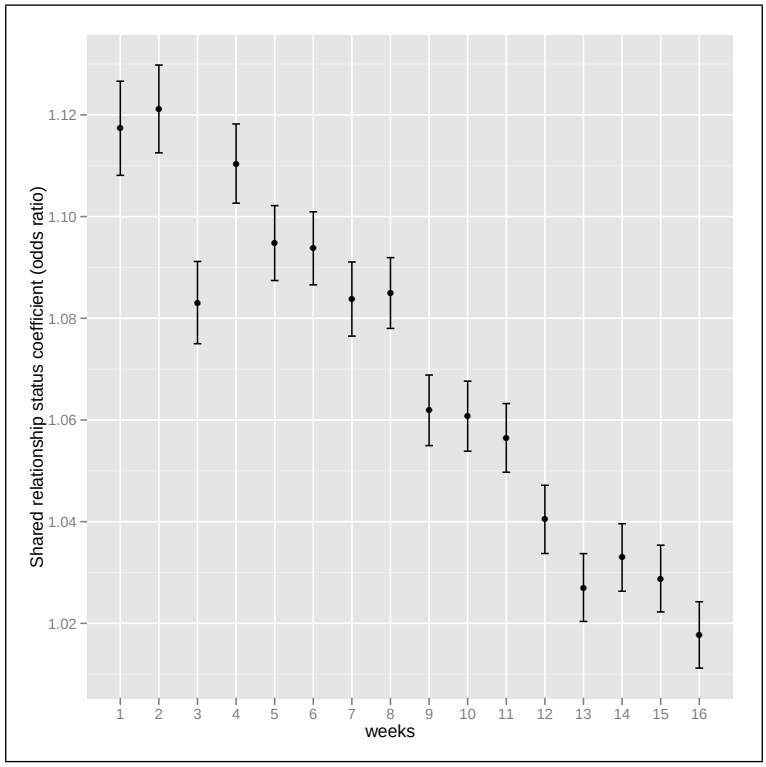


Figure 4.9: Relationship status as associative factor, weeks 1-16
Estimates presented as odds ratios. Standard errors represented by brackets.

dyadic ties. The results are reported in Table 4.11.

In the breakout of the analysis, I observe the general trends of decreasing importance of relationship status hold, but I also see different trajectories based on relationship status. As one might expect, individuals that are single are more likely to have dyadic ties with other single people. Individuals in dating relationships, on the other hand, are less likely to have dyadic relationships with others in dating relationships.

Evaluation and additive model

The previous sections report the results of an analysis exploring the role preference, socio-demographic, and configuration factors play in the structuring of socio-technical networks during transition. I now briefly summarize the findings.

Table 4.11: Single and dating status as associative factor, weeks 1-16

Week	n	**Single**	Std. Err.	p-value	**Dating**	Std. Err.	p-value
1	2,486	0.136786	0.009568	0.0000	-0.111012	0.023799	0.0000
2	2,546	0.14510	0.00893	0.0000	-0.14922	0.02244	0.0000
3	2,642	0.107018	0.008400	0.0000	-0.151886	0.020112	0.0000
4	2,616	0.137582	0.008081	0.0000	-0.194455	0.020183	0.0000
5	2,709	0.119463	0.007662	0.0000	-0.170227	0.018502	0.0000
6	2,722	0.117308	0.007494	0.0000	-0.171014	0.017978	0.0000
7	2,530	0.107229	0.007666	0.0000	-0.175896	0.018620	0.0000
8	2,710	0.109627	0.007333	0.0000	-0.168772	0.016811	0.0000
9	2,734	0.086689	0.007370	0.0000	-0.166351	0.015992	0.0000
10	2,714	0.085080	0.007312	0.0000	-0.179916	0.016293	0.0000
11	2,766	0.076238	0.007210	0.0000	-0.180227	0.015707	0.0000
12	2,763	0.063585	0.007170	0.0000	-0.195774	0.015512	0.0000
13	2,775	0.044074	0.007186	0.0000	-0.190006	0.015004	0.0000
14	2,756	0.053772	0.007146	0.0000	-0.185858	0.014912	0.0000
15	2,774	0.046422	0.007104	0.0000	-0.178155	0.014529	0.0000
16	2,770	0.036287	0.007071	0.0000	-0.184216	0.014402	0.0000

Estimates provided as raw coefficients. Results of "In an open relationship" and "Married" category not reported for space reasons.

Preference Factors

1. **Political Views**: Shared political views were strongly predictive of association, with effects decreasing over the semester.

2. **Academic Major**: Shared academic major was strongly predictive of association, with effects decreasing over the semester.

Socio-Demographic Factors

1. **Gender**: At the beginning of the semester, shared gender was negatively associated with dyadic ties. By week three, gender was positively and weakly predictive, where it plateaued for the rest of the semester.

2. **Interested In**: Shared "interested in" status was weakly predictive of association, with effects increasing over the semester.

3. **North Carolina Residency**: Shared North Carolina residency (being in-state) was strongly predictive of association, with effects decreasing over the semester.

Configuration Factors

1. **Residence Hall**: Shared residence hall was far and away the strongest predictor of association, with effects *increasing* over the semester.

2. **Relationship Status**: Shared relationship status was weakly predictive of association, with effects decreasing over the semester.

As Blau space is k-dimensional, I am also interested in the simultaneous effect of factors of association. To this point, the ERGMs have been run with a single predictor (e.g. the proposed factor). To test the robustness of the predictors, I ran the evaluation simultaneously, running an ERGM with each of the seven predictive factors included. The results, which are reported in Appendix B to save space, indicate that the single factor solutions are generally robust, with significance and effect direction remaining stable in the multiple ERGM. Figure 4.10 graphs the dynamics of the predictive factors over the course of the semester. To produce this graph, I ran the simultaneous ERGM with the seven predictive factors and plotted the coefficients. To cut down on clutter, I present the trend lines from the raw coefficients; standard errors and p-values are available in the appendix.

Comparisons between the predictive capacity of the seven Blau factor models and the simultaneous solution can be accomplished with Akaike's Information Criterion (AIC). The AIC is a measure of goodness of fit, where the model with the lowest AIC is best fitting. A graph of the AIC for the eight models over the course of the 16 weeks

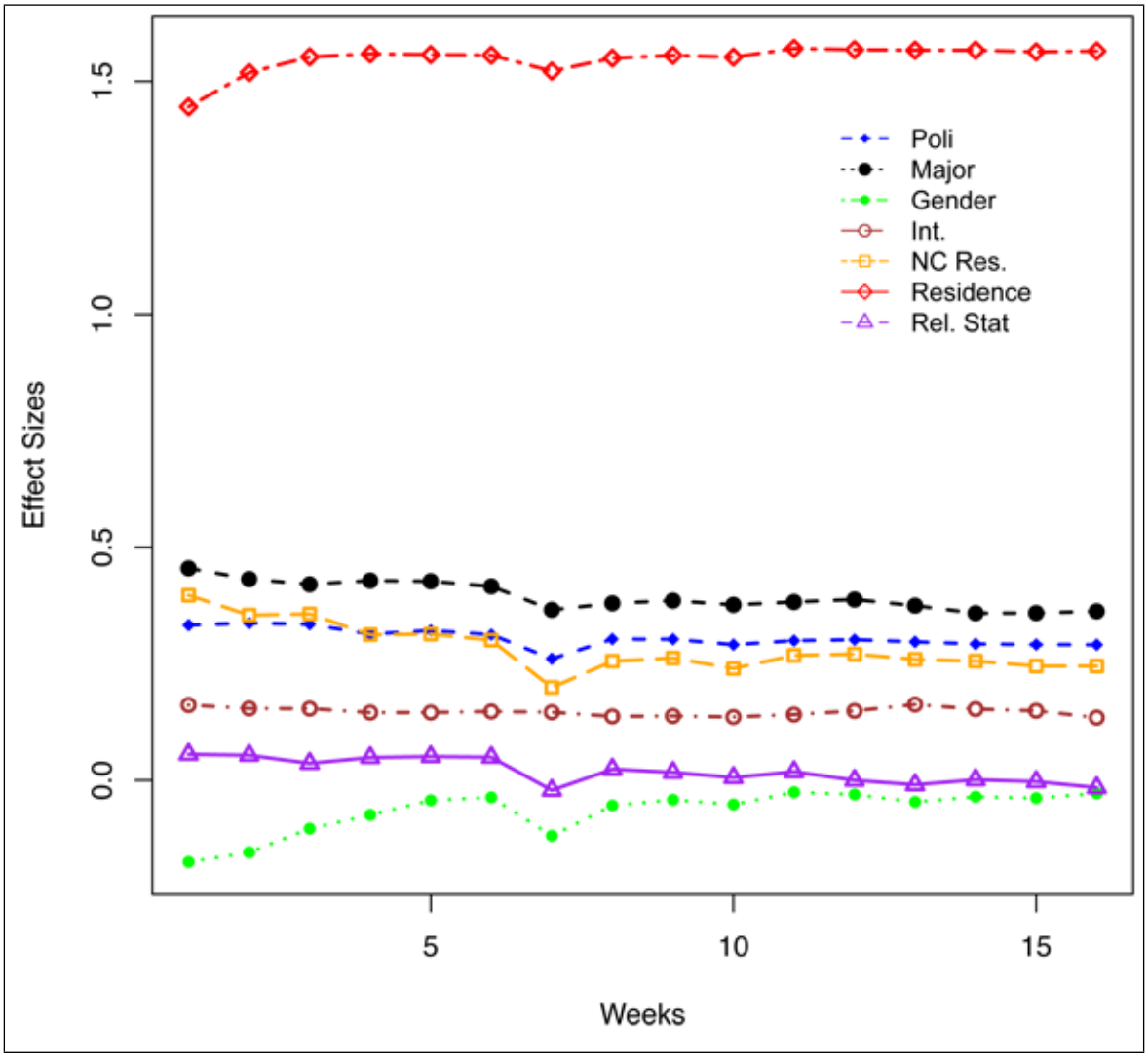


Figure 4.10: Comparison of predictors in multiple ERGM solution, weeks 1-16
Effect sizes reported as raw coefficients.

is presented in Figure 4.11. In this chart I demonstrate that most of the Blau factors perform similarly, with shared residence hall being the best preforming single factor. The simultaneous solution, which couples all seven factors, is the best overall model. Please note that with many degrees of freedom in these large network models, the AIC's are uniformly high. In practice, a reduction of 10 AIC points or more between models is considered a large improvement. Growth in the AIC over time corresponds to network

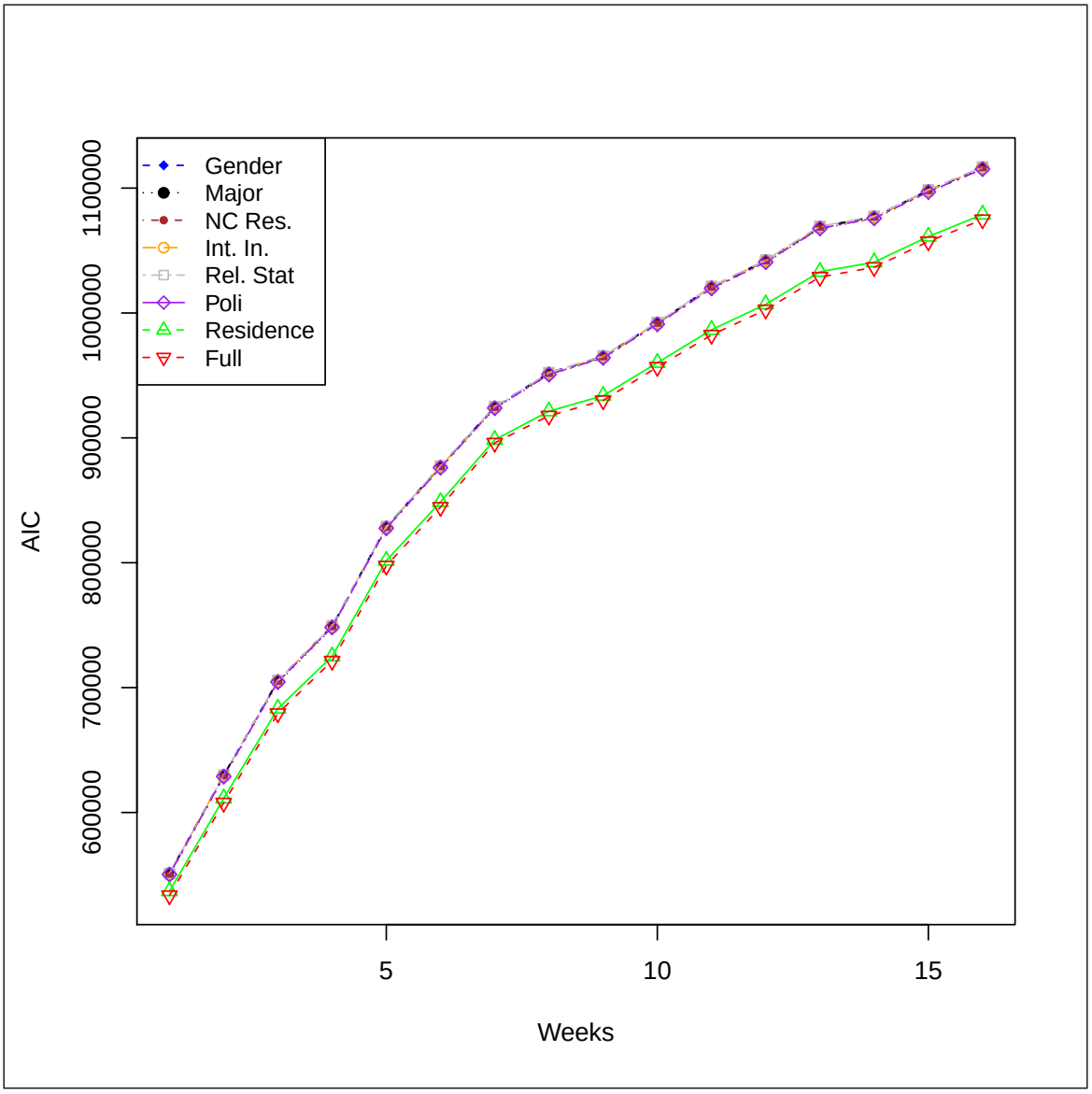


Figure 4.11: Comparison of AIC between ERGM solution, weeks 1-16
AIC = Akaike Information Criterion.

expansion and resultant increase in degrees of freedom.

Graph Dynamics

To this point, the evaluation has focused on the role of preference, socio-demographic, and configuration factors in the creation of ties. In my analysis, I have identified

the role individual factors play in the creation of ties in the socio-technical network, and I have observed change in the effects of these factors over time. I observed a consistent dynamic pattern for a number of factors, particularly residence hall, gender, NC residence, and "interested in." In this pattern, the effect size shifted rapidly within the first few weeks (generally, the first six), and then plateaued for the remainder of the semester.

During the transition to college, the first few weeks on campus are marked by a period of intense socialization and creation of ties within the cohort. The ties made very early on, during the period of rapid connection, stand to shape the individual's social trajectory over the next four years of college. Using descriptive measures of network structure, we can observe general graph dynamics over time. I present four such graph measures, defined in Wasserman and Faust (1994), and estimated using the Statnet SNA package. It is important to note that "graph-level" network measures differ from individual-level measures; I now describe the graph measures.

- **Graph Betweenness Centrality**: Graph betweenness centrality measures the variation in the possible betweenness centrality (e.g. proportion of dyadic ties compared to possible dyadic ties) scores of actors in the network. Graph betweenness centrality falls as variation in the range of observed centrality scores falls, indicating network equanimity and "integration."

- **Graph Degree Centrality**: Graph degree centrality is a measure of variation in the connections established by nodes in the network. Graph degree centrality falls as variation in the range of observed connections falls, indicating network "integration."

- **Graph Transitivity**: Graph transitivity is a structural measure that explores the probability that neighbors of a node in a network are connected. Weakly

transitive networks are characterized by the concept that "friends of friends are friends," and as transitivity decreases the likelihood of neighboring ties sharing connections increases.

- **Graph Density**: Graph density measures the proportion of total connections relative to the available connections in the graph. As graph density increases, we observe the group "coming together" by establishing a higher proportion of connections relative to the total potential connections.

Network dynamics during transition

Visual inspection of Figure 4.12 indicates a high level of activity in the network in the first three weeks of the transition. Graph betweenness and degree centrality, which broadly measure "integration" into the network, fall sharply in weeks one through three. Declines in this measure indicate overall variation is falling as individuals quickly articulate friend networks. Graph transitivity, which measures the likelihood that "friends of friends" are connected, also decreases quickly in the first four weeks[5]. Finally, I observe that overall measures of graph density increase steadily from weeks one to sixteen. As with the estimates of the associative factors, these graph-level measures indicate a very high level of activity in the first few weeks of the transition, with continued large-scale integration over the course of the semester. In essence, I observe the cohort deepening their shared connections.

[5]Because of the way these graph measures are constructed to measure variance, decreasing levels actually indicate higher amounts of "integration." This can be somewhat confusing during interpretation.

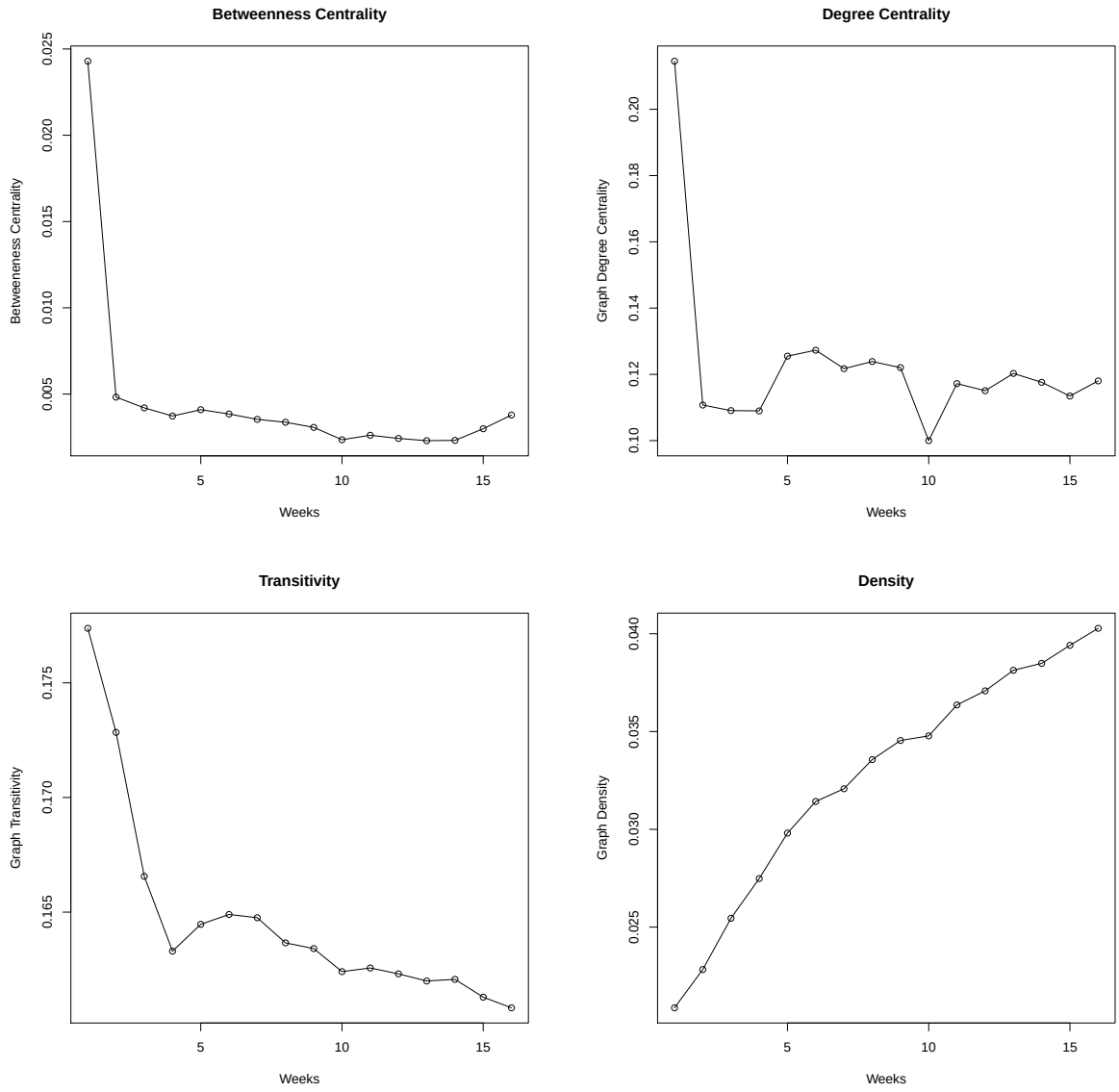


Figure 4.12: Graph betweenness centrality, degree centrality, transitivity and density, weeks 1-16

Measures are on differing Y-axes.

4.2.8 Discussion

In conclusion of this analysis of socio-technical network structure during the transition to college, I draw on three basic themes. In the case of the studied population, it is clear that social and structural forces exert a strong influence on the socio-technical network.

Within the "virtual" realm, where individuals can connect across social structure and geography, I observe that tie formation is still strongly influenced by structural, social, and personal factors. For this reason, the amount of information and support that can be procured from the socio-technical network is constrained in Blau space by these structural trajectories.

Drawing on the strong effect of preference factors (political views, major), I observe the outsize role of demonstrated preference during the information-poor early stages of transition. This highlights the importance of pre-existing knowledge (e.g. schema) in transitional sensemaking. In these data I believe I see individuals drawing on preestablished schema to make information-impoverished decisions about the many individuals they are meeting. Individuals with shared preferences present ready common ground, as well as the potential for action (i.e. going to a rally, attending a class together).

Finally, the analysis of network structure empirically demonstrates the connection-intensive nature of early-stage transition. The first few weeks of the transition are characterized by establishing ties within the cohort, a process that both increases ties available to an individual and makes the global network "smaller." It is in these crucial weeks that the trajectories and constraints of the socio-technical network are solidified, with factors such as preference and residence hall exerting a large amount of influence on individual network makeup.

Having explored the structural dynamics of the transitional network, I now turn to complementary questions regarding the dynamics of network growth, and factors associated with growth trajectories of socio-technical networks during transition.

4.3 Modeling Network Growth

Within the study of social support in networks, the two primary hypotheses regarding the relationship between networks and support are the *buffering hypotheses* and the

main effect hypothesis (Cohen and Wills, 1985, see also Section 2.3-2.5). The buffering hypothesis explores the role that supportive networks play during times of need, whereas the main effect hypothesis explores the effects of support across all periods of life, and not just those in times of need.

The two hypotheses are similar in many ways. For example, larger support networks are consistently shown to be more useful for those in need. In the buffering hypothesis, larger networks are useful because they provide a larger set of potential alters one could call on in need. In the main effect hypothesis, simply having a larger set of alters in our life improves our lives through a variety of mechanisms: the network looks out for us, provides us with activity and support, and is also there in times of need.

The modern study of social support implicitly brings technology into the explanatory framework, regardless of the hypotheses espoused. Studies of support buffering explore how many people one could connect to through technology in times of need, for instance (e.g. Braithwaite, Waldron, and Finn, 1999). Until the advent of the Internet, communication through technology required directed action, such as making a phone call, and had variable cost structure. The Internet, and social media, has changed the nature of socio-technical interaction in ways that have meaningful implications for the support hypotheses. Aside from the fixed cost of an Internet connection, there are no variable costs (other than time) in sending a lengthy email or having a Skype chat with someone in need of support. More importantly, the "pull" nature of social media news feeds reduce the need for directed action in communication. Rather than calling ten people to find a ride to the store, an individual may simply post a message to a news feed knowing that it will be distributed to potential supporters.

The Internet's reduced transaction costs and a move from push- to pull-centric communication have important implications for support networks (Wellman et al., 2001; Wellman, Boase, and Chen, 2002). This change leads us to reconsider the mechanisms

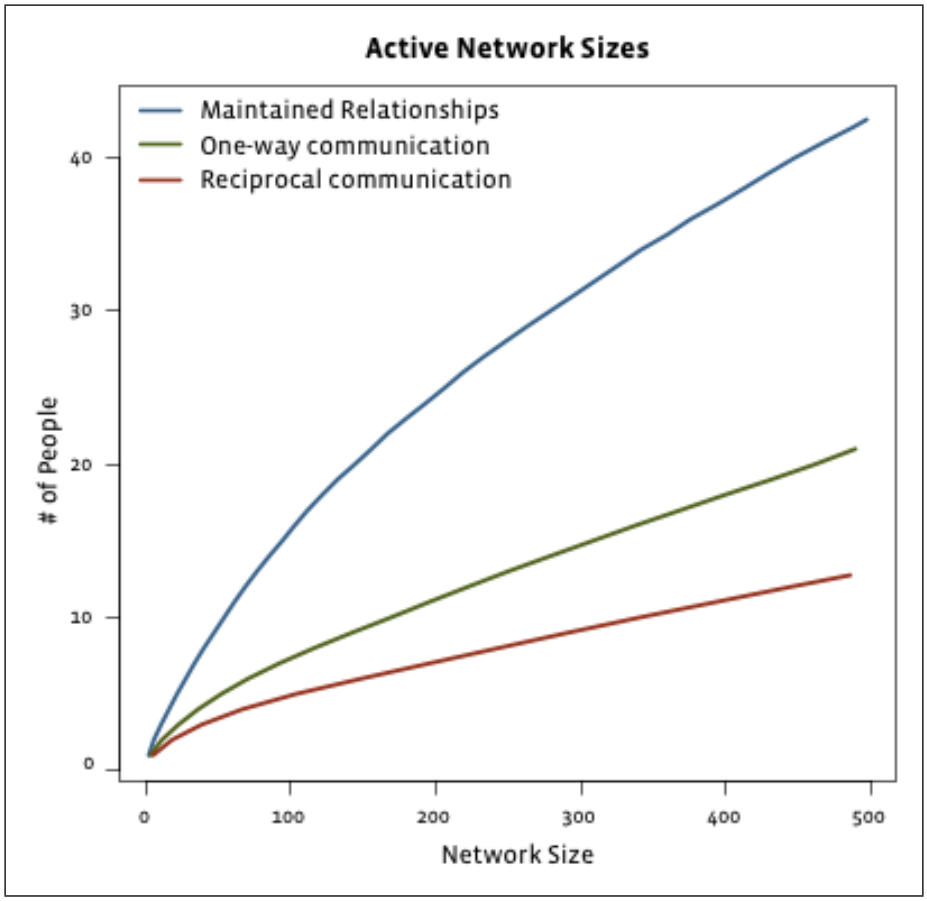


Figure 4.13: Linear relationship between Facebook network size and communication, adapted from Marlow (2009)

This diagram plots the relationship between network size and interactive communication in Facebook. While the slopes differ, they are all positive, indicating that more Facebook contacts is associated with greater interaction.

of main effect support. With social media, we are able to keep hundreds of contacts "at hand." Furthermore, we are exposed to the diversity of content created in these networks. In times of need, we have potentially larger networks that we can call upon. Assuming that social network sites eventually intelligently filter content, having a larger social network site contact list seems to be increasingly important for social support. For example, Marlow (2009) has identified a positive linear relationship between network size and communicative interaction and surveillance in Facebook (Figure 4.13), indicating that larger social network site contact networks are associated with greater

amounts of supportive communication.

4.3.1 Analytic framework

The following component of the study explores network growth during transition. Using data extracted from Facebook profiles, I identify use and disclosure practices that are associated with network growth. Understanding network growth is important for a number of reasons. First, adaptation to transition is a function of the support networks an individual articulates in the transitional environment. Second, there is much we do not know about friendship formation in socio-technical networks during transition. Are more technically astute or active users rewarded with more friends, which may have important long-term support implications? Third, in attempting to map the dynamics of a transitional space, network growth is a necessary concomitant to the analysis of network structure as articulated in the first section of this chapter. For these reasons, the study of network growth during transition represents a meaningful research question.

Previous research has explored factors associated with network size in social network sites. Lampe, Ellison, and Steinfield's (2007) paper "A Familiar Face(book): Profile Elements as Signals in an Online Social Network" used a cross-sectional snapshot of the Michigan State University Facebook network to explore the relationship between profile activity and the acquisition of friends in Facebook. The work by Lampe and colleagues, which explores the profiles of students, faculty, and staff, found that gender, student status, length of membership, recency of profile update, and the sharing of certain types of information were significantly associated with network size. The work of Lampe and colleagues provides the framework for this analysis, described in the following section.

Data set

This component of the study uses the same Facebook profile data set as described in Section 4.2.2. The data were extracted from a set of freshman Facebook profiles collected at one-week intervals during the 2005 fall semester. The data is structured as a longitudinal panel with sixteen panel observations. The analysis of panel data is heavily dependent on the structure of the panel. The following considerations are appropriate:

- **Balance:** Panel data is either balanced, where every individual is observed at each time period, or unbalanced, where individuals may be missing at certain time periods. As is common in panel studies of populations (and demonstrated in Table 4.2), these data are unbalanced.

- **Shape**: Panel data is generally described as either being *wide and short* or *long and narrow*. This panel is wide and short, as the number of cross-sectional observations exceeds number of time periods (Kennedy, 2003).

The balance and shape of the data influence the selection of proper modeling technique. "Wide" data is the norm in panel analysis, but unbalanced data require special consideration. These factors, among others, have influenced my choice of econometric modeling techniques. Finally, while the panel has very high coverage among the analytical population and is closer to a census than a sample, I have chosen to present this analysis with standard errors, similar to Lampe, Ellison, and Steinfield's presentation.

4.3.2 Research questions

This research explores the factors associated with socio-technical network growth during the transition to college. The theoretical impetus for the study of network growth has been described in Sections 2.3-2.5 and sections 4-4.1 in this chapter. Using data sourced

from Facebook profiles, I wish to identify social, structural, and demographic factors that are associated with network growth.

This work builds on the earlier paper of Lampe, Ellison, and Steinfield (2007) that explores the association between profile elements and the growth of Facebook networks. The analysis by Lampe and colleagues employed regression analysis, using three custom profile-use indices as independent variables, and demographic and system use variables as controls. The indices created by Lampe were constructed from counts of profile utilization. If a social network site user shared certain types of information on their profile, counts within the indices were incremented up by one for each information type. More technically, the indices represent the count of positive effects codes for each category of profile use, where sharing is the expected case (e.g. awarded a "1") and the contingent case is not awarded a count.

In constructing the independent variables, Lampe, Ellison, and Steinfield (2007) drew on theories of common ground, signaling, and transaction cost reduction. The three indices are:

1. **Referents Index**: The referents index counts when individuals share their hometown, high school, residence, or major. Using Clarke's theory of common-grounding in communication (Clark, 1996), these elements "allow the profile creator and user to find common ground, and share narratives" (Lampe, Ellison, and Steinfield, 2007, p. 439).

2. **Interests Index**: The interests index counts when individuals share information in the "about me," interests, favorite music, favorite movies, favorite TV shows, favorite books, favorite quotes, and political views profile elements. Lampe and colleagues describe these interests as conventional signals (e.g. Donath and boyd, 2004; Donath, 2007) that foster impression formation and management in the

eyes of others[6].

3. **Contact Index**: The contact index counts when individuals share information about their relationship status, who they are looking for, their website, address, birthday, instant messenger, and email profile elements. Following theories of uncertainty reduction and transaction costs (e.g. Reid and Hogg, 2005), this type of information both indicates a "willingness to share off-site connections with others" and potentially eases the connection process through the sharing of contact information (Lampe, Ellison, and Steinfield, 2007, p. 439-440)[7].

My analysis includes the three indices created by Lampe, Ellison, and Steinfield (2007), employing the same theoretical framework of *common ground, signaling* and *transaction cost*. In addition to using these three indices as predictors, I add a fourth predictor that measures profile change. Following Erving Goffman's (1959) theories of self-presentation, I explore if profile maintenance and profile change (i.e. front-stage maintenance) is associated with network growth.

The research questions I address in this component of the study are as follows:

1. What profile elements are significantly associated with network growth, and at what magnitude?

2. Are dorm-level differences present? As demonstrated in the first section of Chapter 4, dorms exert strong influence on network structure. Therefore, do the regression coefficients change when the association between profile elements and network growth is modeled within the dormitory structure?

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[6]In my construction of the contact index, I was not able to include favorite TV shows due to a data collection issue.

[7]In my data collection I was not able to collect email information. I was, however, able to collect and add telephone information to the contact index.

4.3.3 Evaluation strategy

Following the basic structure of the Lampe, Ellison, and Steinfield (2007) paper, this research uses multiple regression analysis to explore the relationship between the predictive indices, control variables, and the dependent variable, local network size. I utilize three hierarchical multiple regressions to:

1. Replicate the analysis by Lampe and colleagues in a longitudinal data set. This is termed the "Lampe" model.

2. Add novel predictors and controls to the regression model in attempt to identify other important variables. This is termed the "novel" model.

3. Estimate and compare the effects of the novel model using multi-level modeling, which accounts for effects at the residence level.

The estimation of panel data is not without complexities (Kennedy, 2003, pp. 309-314). A primary concern is the autoregressive nature of the dependent variable, local network size. In a panel, autoregression occurs when the dependent variable at time *t* is a function of the dependent variable at time *t-1*. The Wooldridge (2002) test for serial autocorrelation in panel data was administered, and the null hypothesis of no first order autocorrelation was rejected (F 1, 3395 = 8595.683, $p <$ F = 0.0000). Therefore, I must account for autocorrelation in modeling. A secondary concern is the nature of the effects in the panel. Random effects models assume that the regression slope of each panel case is unique. Using the Hausman (1978) test of specification, I reject the null hypothesis that differences between the random effects model and fixed effects model are not systematic ($\chi^2(4) = 22.29, p < \chi^2 = 0.0002$). Therefore, the modeling techniques employed will account for fixed effects in the analysis of the panel data.

To address these concerns, the first two regression models are estimated using the Arellano-Bond (1991) linear dynamic panel estimator, used commonly in econometric

evaluation of dynamic panels. The Arellano-Bond estimator employs a generalized method of moments estimator to account for the serial correlation between panel level effects and the lagged dependent variable. The Arellano-Bond estimator also accounts for fixed and random effects and is robust to unbalanced panel structures, as is the case in these data. The final regression is estimated using multi-level modeling, in which both residence hall and time are modeled as random effects, and individuals are modeled as fixed effects within residences. In the final regression, the lagged dependent variable is included to account for autocorrelation. This fairly complicated[8] modeling is necessary to account for the structure of panel data and panel error. The coefficients (β) produced by these models, however, can be interpreted similarly to how one would interpret an ordinary or multiple least squares regression.

4.3.4 Findings

The findings are presented as follows:

1. Descriptive statistics for the dependent variable.
2. Descriptive statistics for the control variables.
3. Descriptive statistics for the independent variables.
4. Presentation of the correlation matrix.
5. Panel regression analysis.
    - Lampe model
    - Novel model
    - Multi-level model

[8] As compared to longitudinal linear regression, for example.

6. Predicted estimates and comparisons.

Dependent variable

The dependent variable in each of the following three regressions is the total count of a freshman's friends at UNC as reported in Facebook. Because this variable is skewed, I employ a log transformation to approximate normality. Descriptive statistics for the variable are reported in Table 4.12, and a histogram and growth trend for the arithmetic mean of log-transformed variable is presented in Figure 4.14. The log transformation exhibits a slight negative skew attributable to the panel nature of the data.

Table 4.12: Descriptive statistics for local network friends

	Count	Mean	S.D.	Min	Max
Number of Friends at UNC	51945	86.99998	59.8905	2	849
Log UNC Friends	51945	4.21099	.782851	.6931472	6.744059

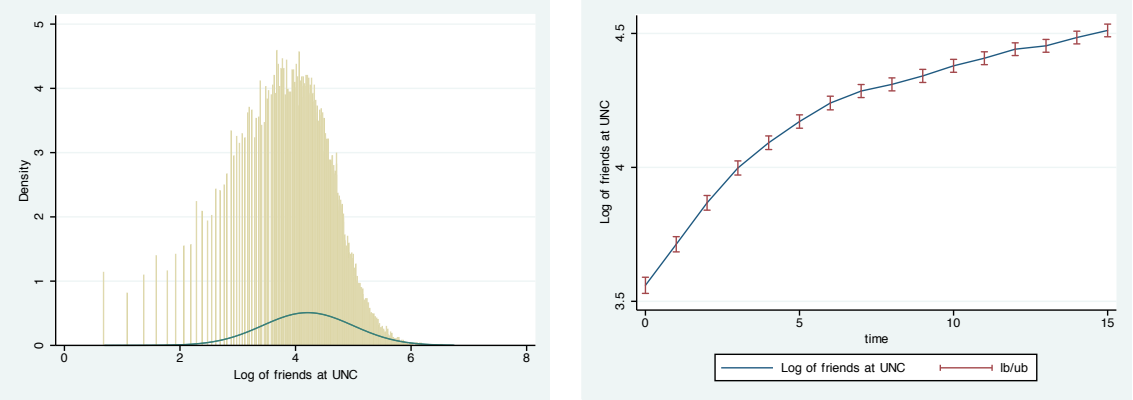


Figure 4.14: Histogram, panel growth trend for dependent variable
Using the log transformation of number of friends at UNC.

Control variables

I employ six control variables in the models, as described in Table 4.13. Three control variables — gender, last update, and length of membership — were employed in the Lampe model, and are replicated in this study. The remaining control variables are new, and employed in the novel model. The control variables, and their logic, follow:

- **Gender**: Gender is employed as a control as UNC has a higher proportion of females than males. Gender is also linked to differential patterns in relationships and network structure. (*Effects coded, Female = 1, Male = 0*).

- **Last Update**: At the time, Facebook reported when an individual last updated his or her profile. This measure reasonably captures intensity of use. In the analysis, the measure is a count of the difference between the crawl date, and the date of last update, e.g. $\delta(t_{crawl}, t_{lastupdate})$.

- **Length of Membership**: Individuals that have used Facebook for longer time periods have likely had more opportunities to increase their network size. In the analysis, the measure is a count of the difference between the crawl date, and the date of which the individual joined Facebook, e.g. $\delta(t_{crawl}, t_{datejoined})$.

- **Out of State**: As UNC is a state school, it draws a high proportion of students from North Carolina. These students may be more likely to have pre-articulated networks on campus. (*Effects coded, Out of State = 1, NC Resident = 0*).

- **Groups**: At the time, Facebook's group feature was a popular way to connect with friends. Individuals with higher group participation may have more opportunities to establish ties. This measure is a count of group memberships as reported on individual Facebook profiles.

Table 4.13: Descriptive statistics for control variables

	Count	Mean	S.D.	Min	Max
Gender	51762	.602469	.4893922	0	1
Last Update	52320	13.11139	19.38801	0	380
Mem. Length	52320	117.2311	58.7069	0	595
Out of State	49265	.2270577	.4189345	0	1
Groups	52797	20.31543	14.74847	0	49
Ext. Friends	52797	111.5532	75.26927	0	1906

- **External Friends**: Individuals may demonstrate preference towards past networks (e.g. high school friends) over the transitional network. This measure represents a count of Facebook friends that are not at UNC.

Two variables — gender and out of state status — are fixed within the respondent. The other four variables are dynamic over the course of the panel. Figure 4.15 plots the arithmetic mean of the control variables over the panel. Notably, the average "last updated" date on Facebook profiles grows over the course of the semester, indicating that students update their profiles more during the early stage of transition.

Independent variables

I employ four independent variables in the models. The four variables are the referents, interests, contact, and change indices. As the logical and theoretical foundation of the indices were discussed in Section 4.3.2, this section focuses primarily on describing the makeup of the indices. The referents, interests, and contact index were employed in the Lampe model, and are replicated in the study. The change index is a new variable, and is employed in the novel model.

1. **Referents Index**: The referents index counts when individuals share their hometown, high school, residence, or major.

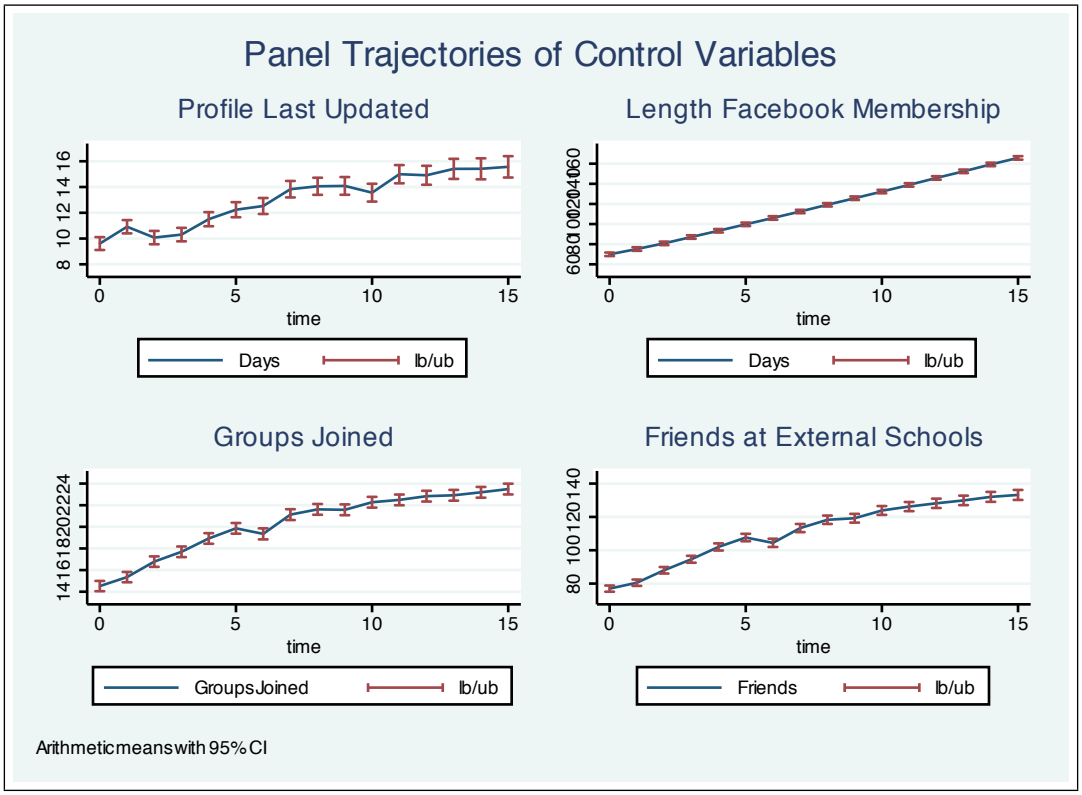


Figure 4.15: Panel trajectory for control variables

This figure plots the panel trajectory for the four dynamic control variables. The arithmetic mean of last update, membership length, groups, and external friends are reported. The error bars represent 95% confidence intervals.

2. **Interests Index**: The interests index counts when individuals share information in the "about me," interests, favorite music, favorite movies, favorite books, favorite quotes, and political views profile elements.

3. **Contact Index**: The contact index counts when individuals share information about their relationship status, who they are looking for, their website, address, birthday, instant messenger, and telephone profile elements.

The indices were created by effects coding (1 = Yes, 0 = No) if the individual shared the profile element, and then summing across the items. For time periods $t_1 \ldots t_{16}$, each index can generally be described by the following equation:

Table 4.14: Descriptive statistics for referents, interests and contacts index

	Count	Mean
Referents Index		
Home Town	52797	.9331023
High School	52797	.8672462
Residence	52797	.9359244
Major	52797	.7563309
Interests Index		
About Me	52797	.5473038
Interests	52797	.812906
Favorite Music	52797	.8728526
Favorite Movies	52797	.8469421
Favorite Books	52797	.7726007
Favorite Quotes	52797	.7550618
Political Views	52797	.7369737
Contacts Index		
Relationship Status	52797	.8146864
Looking For	52797	.5347274
Website	52797	.1238896
Address	52797	.8761104
Birthday	52797	.9074
Instant Messenger	52797	.1956929
Phone (*LL or Mobile*)	52797	.2458094

Means reflect the average proportion of respondents sharing the item over the course of the panel.

$$Index_i = \sum_{n=1}^{n} i_n, \tag{4.4}$$

where n is the total number of potential items in the index and i_n is 0 or 1 based on the effect code. Descriptive statistics for the average panel response for the three Lampe predictors are presented in Table 4.14.

Table 4.15: Descriptive statistics for change index

	Count	Mean	S.D.	Min	Max
Change Index ($t_2 - t_{16}$)	33733	1.621469	6.424201	0	284

Because the change index requires lag for comparison, it covers periods 2-16.

Change index

In estimating the novel model, I add one new predictor, the change index. The change index is a weekly measure of profile change, and reflects week-to-week impression management in Facebook. The change index compares an individual's profile at time t to time *t-1*, and looks for differences between the stated interests, favorite music, favorite books, and favorite movies. The general form of the change index can be described as follows:

$$Change_t = \sum_{i=1}^{4} |\delta(interests_{it}, interests_{it-1})|, \tag{4.5}$$

where t is the time period, i represents the four "interests" that comprise the index, and the estimator sums over the absolute value of change between time t and time *t-1*. For example, imagine a student adding one book to their profile while deleting another. This represents one positive change (an addition) and one negative change (a subtraction). The change index for books is therefore two, as the change index uses absolute values. Using the absolute value costs directionality in the measurement, but it accounts for cases where negative and positive change would cancel out. The change index is therefore a measure of week-to-week profile management, in which the individual "shapes" him or herself in the eyes of the socio-technical network. Descriptive statistics for the change index are reported in Table 4.15, and a visualization of the panel trajectory of the four novel predictors is presented in Figure 4.16

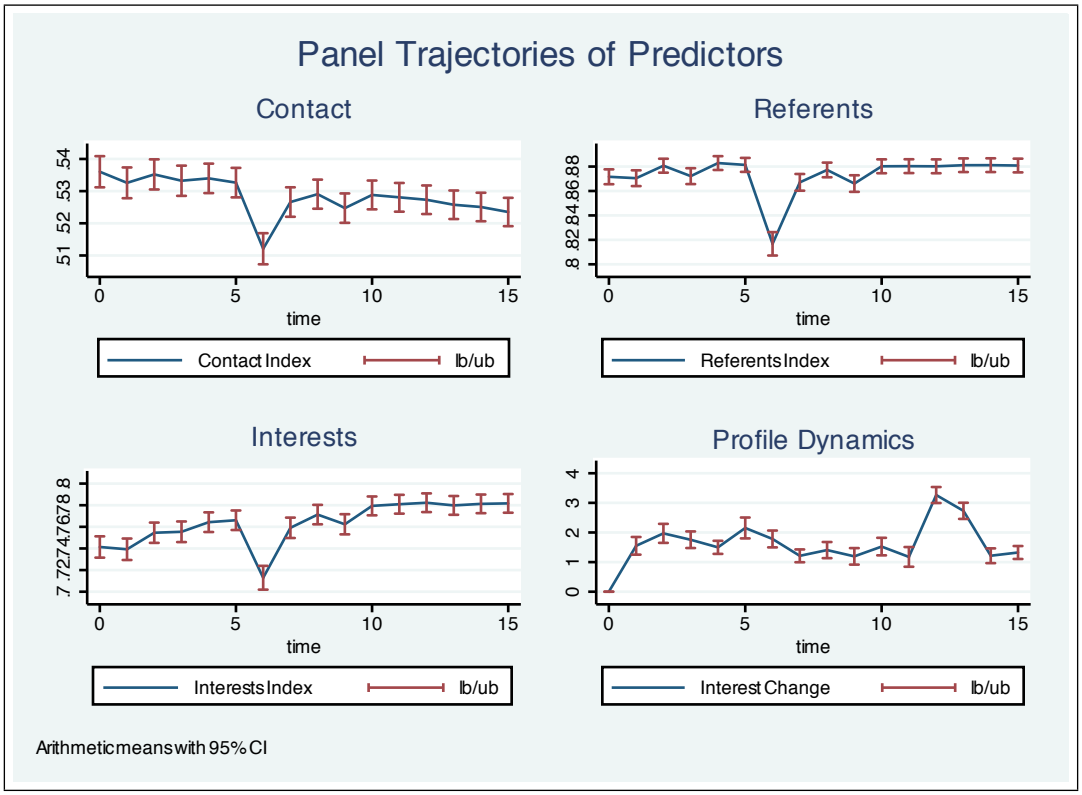


Figure 4.16: Panel trajectory for predictor variables

This figure plots the panel trajectory for the four dynamic predictor indices. The arithmetic mean of the contact, referents, interests and profile dynamics (change) indices are reported. The error bars represent 95% confidence intervals. Note: Slight dip in week 7 is attributable to a data collection issue.

Correlation matrix

A panel-level correlation matrix of the analytic variables is reported in Table 4.16

Regression analysis

I now report the results of three regression models estimating the relationship between the independent variables, control variables, and the dependent measure of local network size. As described in Section 4.3.3, I utilize three hierarchical (e.g. additive) regressions to:

1. Replicate the analysis by Lampe and colleagues in a longitudinal data set. This

Table 4.16: Panel level correlation matrix

	UNC Friends	Gender	Update	Mem. Length	Con. Index	Ref. Index	Int. Index	Groups	Out State	Ext. Friends	Change Index.
UNC Friends	1										
Gender	0.0799***	1									
Update	-0.132***	-0.105***	1								
Mem. Length	0.451***	0.0450***	0.0706***	1							
Con. Index	-0.0220***	-0.0679***	-0.0419***	-0.0414***	1						
Ref. Index	0.119***	0.0143**	-0.0669***	0.0126**	0.0982***	1					
Int. Index	0.170***	0.00752	-0.235***	0.0982***	0.214***	0.170***	1				
Groups	0.406***	0.162***	-0.196***	0.245***	0.134***	0.181***	0.336***	1			
Out State	-0.0385***	-0.0380***	-0.0513***	-0.0141**	-0.0250***	-0.0360***	0.000782	-0.0149**	1		
Ext. Friends	0.629***	0.0767***	-0.100***	0.310***	-0.0245***	0.0812***	0.0955***	0.268***	0.143***	1	
Change Index	0.0462***	0.0228***	-0.105***	0.0276***	0.0108*	0.0171***	0.121***	0.0922***	0.0157***	0.0351***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

is termed the "Lampe" model.

2. Add novel predictors and controls to the regression model in attempt to identify other important variables. This is termed the "novel" model.

3. Estimate and compare the effects of the novel model using multi-level modeling, which accounts for dorm-level effects. This is termed the "dorm" model.

The Lampe and novel models are estimated as dynamic panels using the Arellano-Bond estimator. The dorm model is estimated using multi-level modeling, with individuals nested within residence, and time nested within individuals.

Lampe model

Lampe, Ellison, and Steinfield (2007) used a cross-sectional census of the Michigan State University Facebook network to explore the relationship between profile elements and friend network size. The researchers found that gender, student status, membership length, recency of last update, and three indices — reference, interests, and contact — were significantly associated with network size. My "replication" is different on a number of levels. First, I use panel data, as opposed to cross-sectional data. Second, all of the individuals in my panel are first-year students, whereas the Lampe analysis included all students, faculty, and staff. Finally, the precise makeup of the predictive indices vary on two elements. The purpose of this replication, therefore, is to explore the efficacy of the predictors in the panel context. To conduct this analysis, I use a step-wise hierarchical regression and enter the predictors one at a time, to evaluate the individual impact. The results of the regression are presented in Table 4.17.

Employing the Arellano-Bond estimator for panel waves 2-16 to predict the log of a freshman's UNC network, I find that the only predictor that is significant is the *interests index*. Individuals that share more about themselves on their Facebook profiles may

Table 4.17: Replication regression estimated with Arellano-Bond

	(1)	(2)	(3)
	lnfr_unc	lnfr_unc	lnfr_unc
Lagged UNC Friends	0.691***	0.691***	0.689***
(t-1)	(264.89)	(263.86)	(259.73)
Gender	0.0199	0.0200	0.0255
(Female=1)	(0.61)	(0.62)	(0.79)
Last Update	-0.000769***	-0.000767***	-0.000755***
	(-16.65)	(-16.61)	(-16.33)
Membership Length	0.00116***	0.00116***	0.00117***
	(42.95)	(42.97)	(43.12)
Contact Index	0.0160	0.0154	0.00884
	(1.18)	(1.13)	(0.65)
Referents Index		0.0279	0.0197
		(1.62)	(1.14)
Interest Index			0.0383***
			(4.27)
Constant	1.219***	1.196***	1.181***
	(54.20)	(44.98)	(44.10)
N	43488	43488	43488

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Predicting the log of freshman's UNC Facebook network size. Analysis covers waves 2-16 due to lagged dependent variable.

accumulate larger networks, over time. As expected, I observe that *last update* and *membership length* are significant controls. Interestingly, the coefficient for last update is negative, indicating that frequent updating of the profile is associated with slightly smaller networks. Gender is not significant in the panel model. In this "replication" of the Lampe model with panel data, only one predictor has remained significant, indicating that sharing interest information in the profile is associated with weak but significant growth of the socio-technical network.

Novel model

The novel model extends the Lampe model with the addition of three controls and one predictor. The controls are number of groups joined, NC resident status (coded here as "Out of State"), and number of external friends. The added predictor is the change index. The theoretical justification and practical construction of these variables has been described previously in Section 4.3.4.

Like the Lampe model, I employed a step-wise hierarchical regression, employing the Arellano-Bond estimator for panel waves 2-16 to predict the log of a freshman's UNC network size. In this formulation of the model, I observe that the results of the Lampe model are robust, with last update, membership length, and the interest index remaining significant. Of the three controls, number of groups and number of external friends exert a significant, positive influence on the dependent variable. As I expected, joining more Facebook groups is associated with increased in-network friendships. Interestingly, the relationship between external friends and in-network friends is positive, indicating that there is no "tradeoff" between external friendships and campus friendships. In Facebook, where the connection establishment process is trivial, perhaps this should come as no surprise that individuals that are more social (e.g. more connective) demonstrate higher levels of connection inside and outside their local network. The results of this model are presented in Table 4.18.

The novel predictor, the *change* index, was significant and positive in the model. This can be interpreted as meaning increased change in profile content is associated with growth of the campus network. This finding is important in light of the significant, negative effect of the "last update" variable. We may interpret this as meaning that simply being an active user of Facebook is not enough to grow the network in the period of transition. Active maintenance of the identity, through the reshaping of the profile, does appear to be associated with larger networks.

Table 4.18: Novel regression estimated with Arellano-Bond

	(1) lnfr_unc	(2) lnfr_unc	(3) lnfr_unc	(4) lnfr_unc
Lagged UNC Friends (t-1)	0.667*** (230.10)	0.662*** (224.02)	0.644*** (210.09)	0.644*** (210.20)
Gender (Female = 1)	0.0225 (0.71)	0.0183 (0.48)	0.0159 (0.42)	0.0156 (0.41)
Last Update	-0.000729*** (-16.02)	-0.000712*** (-15.22)	-0.000670*** (-14.49)	-0.000643*** (-13.89)
Membership Length	0.00111*** (41.52)	0.00115*** (42.00)	0.000757*** (24.00)	0.000755*** (23.94)
Contact Index	0.00679 (0.51)	0.00819 (0.59)	0.00931 (0.68)	0.0105 (0.77)
Referents Index	0.0114 (0.67)	0.00418 (0.21)	0.0110 (0.56)	0.0110 (0.56)
Interest Index	0.0281** (3.18)	0.0268** (2.94)	0.0284** (3.16)	0.0279** (3.11)
Number of Groups	0.00340*** (18.41)	0.00331*** (17.55)	0.00282*** (15.06)	0.00282*** (15.03)
Out of State (Out of State = 1)		-0.00512 (-0.36)	-0.00560 (-0.39)	-0.00634 (-0.45)
External Friends			0.00105*** (21.89)	0.00105*** (21.92)
Change Index				0.000444*** (5.62)
Constant	1.227*** (46.35)	1.256*** (39.56)	1.258*** (40.16)	1.257*** (40.17)
N	43488	41104	41104	41104

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Multi-level model

The analysis of network structure in the first section of this chapter indicated that residence halls strongly configure transitional networks. Both offline and online, the residence hall is a primary point of clustering within the network. For this reason, we may assume that different practices and norms of friendship network structure emerge between residence halls. For example, a freshman can be randomly placed into a "freshman" dorm or an "upper-class" dorm. The freshman dorms are large, with hundreds of same-cohort residents. I expect that individuals that are placed in the freshman dorm will have a different experience than a freshman placed in the upper-class dorm, where the transitional cohort is a minority.

Multi-level modeling is a statistical technique that accounts for unit-level clustering, treating the effects of meaningful levels as fixed. Multi-level modeling is commonly applied in education, where different schools (units) within a school district will perform differently based on geographic location or pupil composition. Because the units vary, multi-level modeling is able to account for unit-level effects and produce precise and efficient estimates about the individuals within the units (e.g. Bryk and Raudenbush, 2002).

Dorms are meaningful units that shape the trajectory of an individual's transitional network structure. To produce precise estimates of the effects of Facebook profile sharing on network size, I do the following. First, I treat dorms as a random effect at level two. I then nest individuals within dorms as a fixed effect. Finally, I nest time within individuals as a random effect, making the analysis longitudinal in nature. This formulation allows an estimate of the random slope of local network trajectory within individuals in dorms over time.

Estimates are presented in table 4.19. The analysis follows the same logic as in estimation of the novel model. I employed a step-wise hierarchical regression, using a

Table 4.19: Results of the multi-level model

	(1) lnfr_unc	(2) lnfr_unc	(3) lnfr_unc	(4) lnfr_unc	(5) lnfr_unc
Lagged UNC Fr.	0.664*** (372.48)	0.664*** (371.51)	0.661*** (367.33)	0.623*** (305.48)	0.624*** (305.68)
Gender *(F = 1)*	0.0262*** (3.47)	0.0263*** (3.47)	0.0264*** (3.48)	0.0159* (2.07)	0.0158* (2.05)
Last Update	-0.000566*** (-17.23)	-0.000564*** (-17.18)	-0.000540*** (-16.42)	-0.000508*** (-14.89)	-0.000492*** (-14.40)
Member Length	0.00142*** (55.58)	0.00143*** (55.63)	0.00143*** (55.66)	0.00113*** (38.24)	0.00113*** (38.12)
Contact Index	0.00937 (1.11)	0.00855 (1.01)	-0.00219 (-0.26)	-0.00147 (-0.17)	-0.00141 (-0.16)
Referents Index		0.0375*** (3.37)	0.0268* (2.39)	0.0182 (1.40)	0.0182 (1.40)
Interests Index			0.0540*** (9.95)	0.0412*** (7.31)	0.0407*** (7.22)
Number Groups				0.00234*** (21.20)	0.00234*** (21.21)
Out of State (Out = 1)				-0.0194** (-2.96)	-0.0198** (-3.02)
External Friends				0.000878*** (29.01)	0.000878*** (29.01)
Change Index					0.000444*** (6.14)
Constant	1.287*** (101.51)	1.255*** (79.11)	1.238*** (76.70)	1.312*** (74.83)	1.311*** (74.78)
N	44916	44916	44916	42742	42742

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

maximum likelihood estimator for panel waves 2-16 to predict the log of a freshman's UNC network size. For the penultimate model (e.g. step 5), the intra-class correlation (ICC) coefficient for the 49 dorms is $\rho = .0481833$ and 15 time intervals is $\rho = .0071299$. Residual ICC is $\rho = .0717919$.

Compared to the novel model estimated using the Arellano-Bond estimator, I observe that estimates are fairly consistent for coefficient size, and completely consistent in effect direction. When I account for variance due to the dorm's random effect, I observe that two new variables attain significance. The first is gender, in which I observe that being female is associated with having a larger on-campus Facebook network during the transition. The second is out-of-state status. Individuals that are not North Carolina residents are likely to have smaller on-campus Facebook networks during the transitional period[9]. Both of these findings are in-line with general theoretical expectation, and further demonstrate the effect of Blau-dimensional social structure within the socio-technical network.

4.3.5 Predicted trajectories

To this point, I have explored the relationship between Facebook profiles, demographic factors, and the size of socio-technical networks during transition. Employing the estimates predicted in the penultimate multi-level model, figure 4.17 shows the predicted mean network trajectories of the significant regression variables. In the top left of the figure, I display the trajectory of predicted local network size by gender. The trajectories of the interest index and group participation were dichotomized by median split. Finally, the trajectory of NC residency is naturally coded. These visualizations are

[9]The model was also run with a out-of-state status by external friends interaction, which was significant and negative ($\beta = -.0002826, \sigma = .000045, z = -6.27$). This indicates that out-of-state students are likely to have slightly smaller external networks in addition to smaller networks in the transitional cohort.

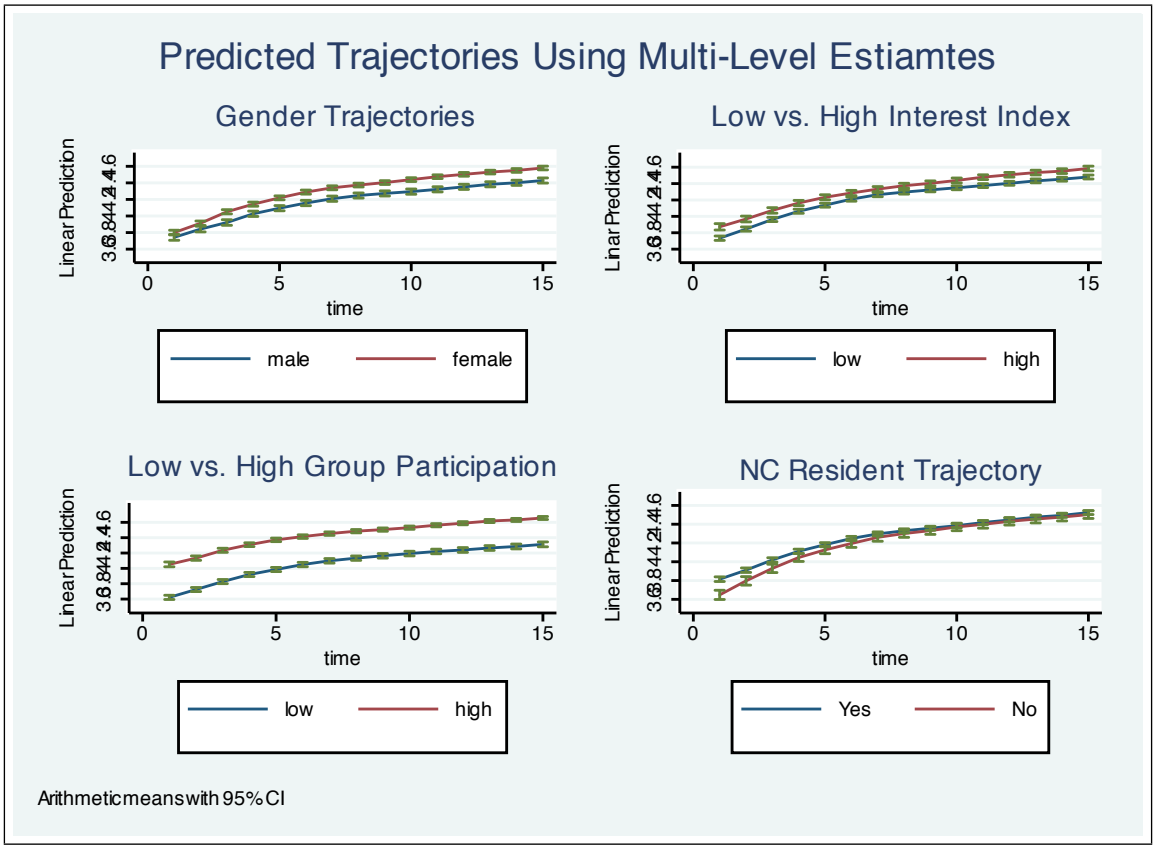


Figure 4.17: Panel trajectories using multi-level estimates

This figure plots the predicted trajectory of Facebook network size base on four significant variables in the penultimate multi-level model. Gender and NC residency are naturally dichotomous; interest index and group participation employ median splits.

provided primarily as a reference for the shape of each variable's trajectory over time.

Figure 4.18 presents a visualization of network trajectory based on amount of profile change in a week. Employing a median split, I show that individuals with greater amounts of profile change accumulate more friends during the last ten weeks of the transition. It is important to note that this visualization does not take into account individuals that have not changed their profiles, and is therefore a subsample of 26,341 profile observations.

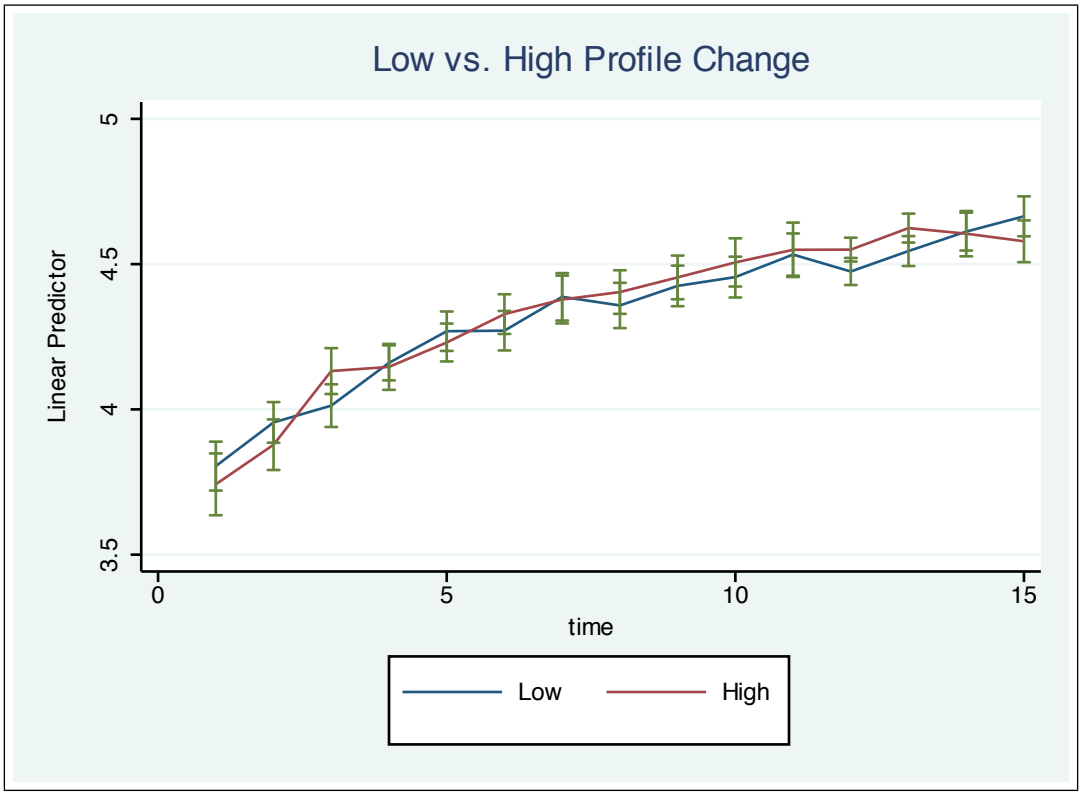


Figure 4.18: Panel trajectory based on change index

This figure plots the predicted trajectory of Facebook network size base on the change index. This graph was created using median splits of weekly changes (profiles that did not change are excluded).

4.4 Discussion and Conclusion

This chapter has explored the dynamics of a socio-technical network during the transition to college. In the first section, I explored factors associated with network structure, demonstrating that Blau-dimensions such as preference factors, socio-demographic factors, and configuration factors such as residence hall location exert dynamic influence on the shape of transitional networks. The second and complementary component of this analysis examined the growth trajectory of transitional socio-technical networks. In it, I demonstrated that Blau-dimensions, and profile sharing and changing activity were significantly associated with the size of an individual's socio-technical network.

This analysis highlights the importance of structural and behavioral factors in the growth and development of the virtual network in transition. It is because the virtual network is so deeply embedded in the everyday network that I see expected and replicated offline patterns in the online space. From this analysis, I am able to extract and identify factors of importance that, when acted upon through intervention or preventative action (e.g. education, mixing), could significantly shape the trajectory of an incoming freshman's network. Of course, I do not claim that any of these processes are purely deterministic. An outgoing student placed in a upper-class dorm could easily have a larger and more diverse network than an introverted student in the freshman dorm. These findings, when contextualized, help us to understand the process of transition and identify relevant associative factors in the socio-technical networks of students in transition.

In conclusion of this chapter, I must point out some limitations. First and foremost, the data employed in this analysis are from 2005, and are therefore not particularly recent in Internet time. That said, this analysis has focused on macro-social processes, which change slowly over time. The variables employed in this study — network configuration, levels of disclosure, amount of change, preferences, and views — are all robust to the current setting and will likely remain robust for quite some time.

Within the data set, the comparison is limited in the following ways: First, there is inherent missingness in the data attributable to privacy settings and data collection error. Individuals with privacy settings may demonstrate different network behaviors than individuals with public profiles. Errors attributed to data collection are considered to be "missing completely at random" (MCAR). Second, the comparison between the two sections of this study is limited by a slight difference in the networks used in the outcome measure. In the first section of the analysis, the network explored is the

freshman-only cohort, whereas the second network involves all potential UNC connections. At the time, the majority of connections established by freshmen on the UNC campus were to other freshman, so the difference between the two networks is minimal.

Chapter 5

Supportive Properties of Social Network Sites

5.1 Introduction

The primary challenge faced by an individual in transition is to adapt to the transition (Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989). This challenge is uniform across the setting, temporal nature, status, and structural environment of the transition. Adaptation is a complex process requiring the management of stress associated with the transition, and general integration into the transitional environment. In the following chapter, I explore how the use of social network sites during transition can facilitate adaptation to the transition.

The first challenge of adaptation to transition is the management of transitional stress. Stress is a construction referring to "any environmental, social, or internal demand which requires the individual to readjust his/her usual behavior pattern" (Thoits, 1995, p. 54). Reaction to transition can be quantified through measurement of stress associated with the transitional period. Between disciplines, stress is a flexible concept that is variably studied in relation to mood, psychological status, health outcomes, or

social interaction. Individuals with higher levels of stress generally report depressive mood, poor health outcomes, and reduced social well being when compared to individuals with lower levels of stress. In the course of a transition, the management of stress plays a critical role in adaptation.

Over the last thirty-five years, research across a range of disciplines has focused on the relationship between social support and stress. The work of Cobb (1976) and Cassel (1976) established the first major hypothesis regarding social support: that social support was valuable as buffer against stress. Individuals with higher levels of social support reported lower stress levels — a finding that has been robust across outcome, situation, and empirical method. Research has identified the relationship between transition and stress, and the positive effects of social support during transition (Sarason, Sarason, and Pierce, 1990, cf. Sections 2.3.2-2.3.4). As social network sites provide a persistent socio-technical connection to an individual's supportive network, they represent a novel location for the transmission of social support.

The second challenge of adaptation is integration into the transitional environment (Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989). Integration is a multi-dimensional construct, and researchers generally agree that integration has three primary concepts. First, transitions are normative, governed by structural rules and expectations. In this understanding, successful adaptation to transition involves learning to play the new role acquired during transition. Second, transitions pose informational challenges. Transitioning individuals must learn to navigate the new worlds that they occupy, functionally and informationally. Third, transitions require the development of a supportive network before and after the transition. This is particularly necessary in the case of residential transition. Integration to transition requires an individual to understand the challenges of the transition, prepare for the new role they will play during and after transition, and adjust to the setting of the transition.

A social network site represents a unique setting where individuals in transition could gather information and allies that may facilitate integration to transition.

Social network sites, and Facebook in particular, primarily act as a connective infrastructure within extant social networks. They appear well suited to address the needs of individuals in transition, affording potential receipt and transmission of social support. Furthermore, social network sites serve as a valuable repository for information required for integration to the transitional environment. Because social network sites afford novel solutions to the two primary challenges of transition — support and integration — the study of social network site use in adaptation to transition is worthwhile.

The following chapter explores the relationship between social network site use and adaptation to transition using quantitative and qualitative data collected during the spring of 2010. The first component of this chapter draws on a survey of UNC's fall 2009 freshman class (i.e. "class of 2013") to explore the relationship between social network site use, social and informational support, and adaptation to transition. The second component of this chapter uses qualitative data to explore how and when individuals turn to social network sites during transition, identifying common themes and critical events during the process of transition.

5.2 Processes of Adaptation

Schlossberg's general model of adaptation to transition (Figure 5.1) specifies that transitions are mediated by the perception of the transition, the characteristics of the transitional environment, and individual characteristics. These three mediating components are now discussed in depth:

- **Perception of the particular transition**: Perception is dependent on the

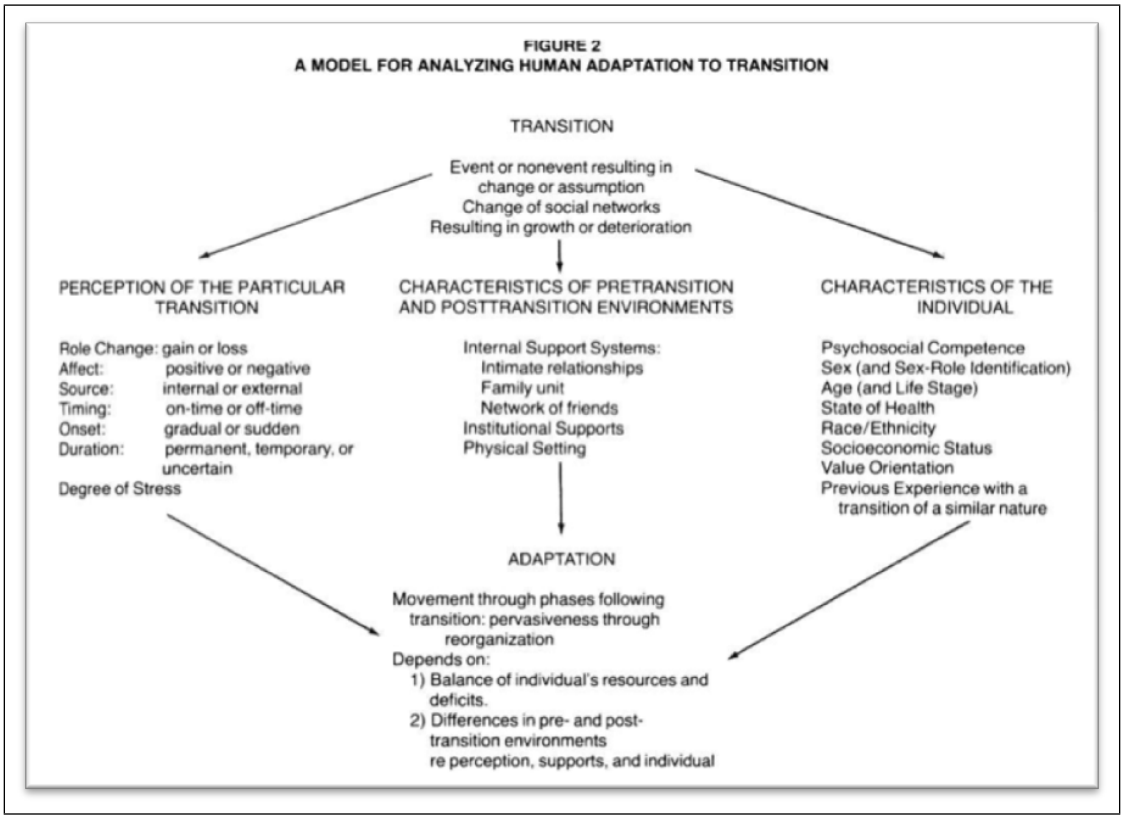


Figure 5.1: Schlossberg's general model of adaptation to transition

role change, affect, source, timing, onset, duration, and degree of stress of the transition.

- **Characteristics of the pre- and post-transition environments**: The characteristics of the transitional environment are shaped by support systems during transition. These systems include social, institutional, and physical support infrastructures.

- **Individual characteristics**: Individual characteristics are composed of sociodemographic factors, psychosocial competence, and previous experience with the transition.

Schlossberg's three predicted mediators of transition are strongly in line with the predicted mediators described in Sections 2.3.2-2.3.4. Perceptions of transition, the first mediator, strongly lines up with the projected challenge of integration into the transitional environment. By learning about roles, the transitional environment, the transitional process, and the challenge of transition, individuals are able to adapt their self-concept when in transition.

Schlossberg's second mediator, characteristics of the environment, is primarily concerned with the support structures available to individuals in transition. In general, the study of transition has focused on the role of supportive infrastructure and intervention during transition. The social network site, a modern example of a supportive infrastructure, affords unique opportunities for providing and receiving support.

Schlossberg's final mediator involves individual characteristics, with a focus on "psychosocial" and demographic factors. Controlling for perceptions and characteristics of the transition, individuals will have different experiences of transition based on their mood, anxiety, and other psychosocial factors relevant to the transition.

Employing Schlossberg's model, I am able to analyze, and potentially predict, the effects of transition at four discrete levels. I now describe these levels and each level's components:

- **Environmental Level**: The environmental level explores the transitional environment and the physical setting.
- **Individual Level**: The individual level is measured at the socio-demographic and psychosocial level.
- **Support Level**: The support level explores both local network support and institutional support.
- **Informational Level**: The informational level explores role change and changing

information needs during transition.

This classification of effects provides a general outline for how I approach modeling transition. Because environmental factors of the transitional population I study are homogenous (all have transitioned to UNC), my analysis primarily focuses on the individual, informational, and supportive factors. Particularly, I explore the role social network sites play in social and informational processes during transition.

In the following section, I use quantitative analysis to explore the relationship between the use of social network sites for support and integration during transition and overall adaptation to transition. The generative component of this work involves the creation of measurement scales for supportive and integrative uses of social network sites during transition. The following section describes the theoretical foundation for the construction of instruments that measure use of social network sites for support (i.e. social support) and social-information processes (i.e. integration) during transition. After describing the creation of the scales, I evaluate the effect of transitional uses of social network sites on adaptation to transition.

5.2.1 Social support processes

The first scale I created for the study measures the use of social network sites for support during transition. It is generally argued that social support mediates the stress of transition through either a buffering or direct effect (Cohen and Wills, 1985). As the buffering effect is primarily psychological, it is argued that our perception of the ability to call on supportive alters reduces stress. The direct effects of support, on the other hand, are interactional and network dependent. That is, the direct-effect process occurs through interaction (e.g. help, supportive messages, etc.) within ego's personal network.

The two levels at which social support mediates stress are the perceived and received

levels (Sarason, Sarason, and Pierce, 1990). Perceived social support corresponds to the psychological sense of social support, and received social support corresponds to social support produced through interaction. I believe that in a social network site, individuals are exposed to perceived and received support through site affordances and user practices. Viewing a news feed and seeing that there are others going through the same challenges during a transitional period would be an example of perceived support. Received support is tangible, where an individual could directly or indirectly call on others for support. In a social network site, received support might be a response to a message sent in the system or an individual liking a post or a picture.

Social support is a multi-dimensional construct, with differing researchers proposing varying definitions of the construct. In this research, I have decided to employ the Cutrona, Suhr, and MacFarlane (1990) four-level definition of social support as a basis for the construct I create. Cutrona's four components of social support are emotional support, informational support, esteem support, and tangible support. Following the Cutrona, Suhr, and MacFarlane (1990, p. 39, Table 2.2) scheme, the components of social support have the following dimensions:

- **Information support**: Suggestions/advice, referral, clarification, situation appraisal, teaching.
- **Tangible support**: Leave alone, loan, direct task, indirect task, active participation, tension reduction.
- **Emotional support**: Willingness, relationship, physical affection, confidentiality, sympathy, listening, understanding, encouragement, prayer.
- **Esteem support**: Compliment, validation, relief of blame, reassurance.

To evaluate the use of social network sites for support during transition, I measure informational, tangible, and emotional support processes in social network sites with

an original scale titled the Social Network Site Support (SNS-S) scale. Following the multi-factor definition of support, the scale features three sub-scales. The informational support sub-scale measures the extent to which the individual uses the social network site for informational support. The tangible support sub-scale measures the extent to which the individual successfully finds tangible support through the social network site. Finally, the emotional support sub-scale measures the extent to which the individual draws emotional support from the social network site. Based on subjective overlap and a need for economy in scale construction, I have collapsed the esteem and emotional support factors into a single measure. The actual questions that comprise the scale are described in the analytic component of this chapter (Table 5.15), and the psychometric properties of the scale are described in full in Appendix E.4.

5.2.2 Social-informational processes

The second scale I created for the study measures the use of social network sites to address social and informational challenges during transition. Theories of transition (e.g. Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989) often cite integration as the central challenge of transition. Although each transition is unique, process modeling of transition provides evidence of uniformity. First, transitions are normative, governed by rules and expectations. In this sense, successfully adapting to transition is learning to play the new role one occupies. Second, transitions pose informational challenges. Transitioning individuals must learn to functionally navigate their new lifeworlds. Third, most transitions require the development of a supportive network. This is particularly common in the case of residential relocation during transition. I hypothesize that individual use of social network sites to address the three key social-informational challenges of integration during transition may facilitate the adaptation process, resulting in better outcomes. The three social-informational challenges

of transition are:

- **Role and identity management**: Learning and enacting new transitional roles and identities.
- **Information seeking and encountering**: Navigating the informational space during transition.
- **Social network augmentation**: Building a personal network in the transitional environment.

I have developed an original construct, the Social Network Site Social-Informational Processes (SNS-SIP) scale to measure the use of social network sites in addressing social-informational challenges of transition. Like the support scale, the social-informational processes scale has three factors. The first factor, role and identity management, explores the extent to which the individual uses the social network site for acculturation during transition. The second factor, information seeking and encountering, explores the extent to which the individual uses the social network site to find and encounter information about the transitional lifeworld. The third factor, social network augmentation, measures the extent to which the social network site is used to deepen relationships in the transitional setting. The actual questions that comprise the scale are described in the analytic component of this chapter (Table 5.14), and the psychometric properties of the scale are described in full in Appendix E.1.

5.2.3 Support, information, and transitional outcomes

In my review of the literature, social support consistently emerged as a key factor mediating the relationship between the stress of transition and adaptation to transition. Managing the stress of transition to college may result in better social, health, and educational outcomes during transition (Crandall, Preisler, and Aussprung, 1992; Thoits,

1995). Social support has been demonstrated to be a primary process mediating stress (e.g. Cohen, Kamarck, and Mermelstein, 1983; Sarason, Sarason, and Pierce, 1990; Sarason and Sarason, 2009). Use of social network sites (and online communities) has been associationally and causally linked to increased social support and social capital (Bambina, 2007; Eichhorn, 2008; Liu and LaRose, 2008; Steinfield, Ellison, and Lampe, 2008). Based on my review of the literature, I predict that use of the social network site for support and social-information seeking during transition will increase social support, which in turn increases adaptation to transition.

5.3 Social Network Site Use During Transition

I now describe a sample survey conducted in the spring of 2010 that explored the use of social network sites during the transition to college. This work is directly informed by earlier work on social capital in social network sites (e.g. Ellison, Steinfield, and Lampe, 2007; Steinfield, Ellison, and Lampe, 2008), as well as work that has explored the supportive properties of information and communication technology (ICT) use during transitional periods (Cummings, Lee, and Kraut, 2006; Handel, 2007). My goal in completing this research is to provide an up-to-date assessment of social network site use during the transition to college, and to identify the value of supportive and social-informational uses of social network sites during transition. This research extends and updates the prior work on which it is based. I present the following:

1. A description of the study, solicitation, and response to the study.

2. Descriptive statistics.

3. Description of the relevant variables.

4. Multiple regression exploring the relationship between supportive and social-informational uses of social network sites during transition and experienced social support.

5. Multiple regression exploring the relationship between supportive and social-informational uses of social network sites during transition and overall adaptation.

6. Structural equation model testing hypothesized paths identified in the analytic model.

5.3.1 Study outline

The data for this study were collected via web survey. The study's sampling frame was a list of all freshmen (N=3918) at UNC-Chapel Hill provided by the university registrar. Between April 22, 2010, and April 29, 2010, I sent up to three emails to all UNC freshmen requesting their participation in the study (solicitation information available in Appendix C). A raffle was incentive for participation; participants had the opportunity to win one of thirty $10.00 gift cards (to Amazon.com, iTunes, or a local cafe), or the grand prize, an iPod touch, which had a $200.00 value. The survey solicitation and survey instrument were constructed using the tailored design method (Dillman, Smyth, and Christian, 2009). The tailored design method attempts to increase survey response through the following techniques:

- **Establishment of Trust**: Trust was established through the prominent use of university and school logos, as well as text that identified the importance of the study.

- **Increased Benefit of Participation**: Participants were informed about how their responses may benefit future freshmen, and the value of their response was affirmed.

- **Decrease Cost of Participation**: The survey was designed to incur relatively low burden, with web response and average completion time of less than 20 minutes.

The tailored design method was employed to both increase response and increase quality of response. Declining response rate is an industry-wide problem in research (Cook, Heath, and Thompson, 2000; Vicente and Reis, 2010), with response to web surveys commonly in the single digits. Based on sample size calculations, the goal for this survey was completion by 600 respondents, a response rate of approximately 15%.

5.3.2 Descriptive statistics

The following section provides descriptive statistics about the response to the study, and the characteristics of the population studied.

Study Response

Participants were initially solicited into the study on April 22, 2010. Followup solicitations were sent on April 26, 2010 and April 29, 2010 to individuals that had not previously responded. The survey was live from April 22, 2010 until May 15, 2010. During these three weeks, 1,198 respondents started the survey. Following AAPOR standard definition two of the response rate (AAPOR, 2008), the study's response rate was 30.57%. Response by time and overall completion is presented in Table 5.2.

Of respondents, 70% (n=839) completed the entire instrument, and an additional 136 respondents (11%) completed at least 90% of the survey. Based on visual inspection of the survey report (Table 5.2) and analysis of patterns of missingness using statistical software, respondents who completed less than 90% of the survey were excluded from the sample. Therefore, the base analytic sample size for the study is 975. Analysis of

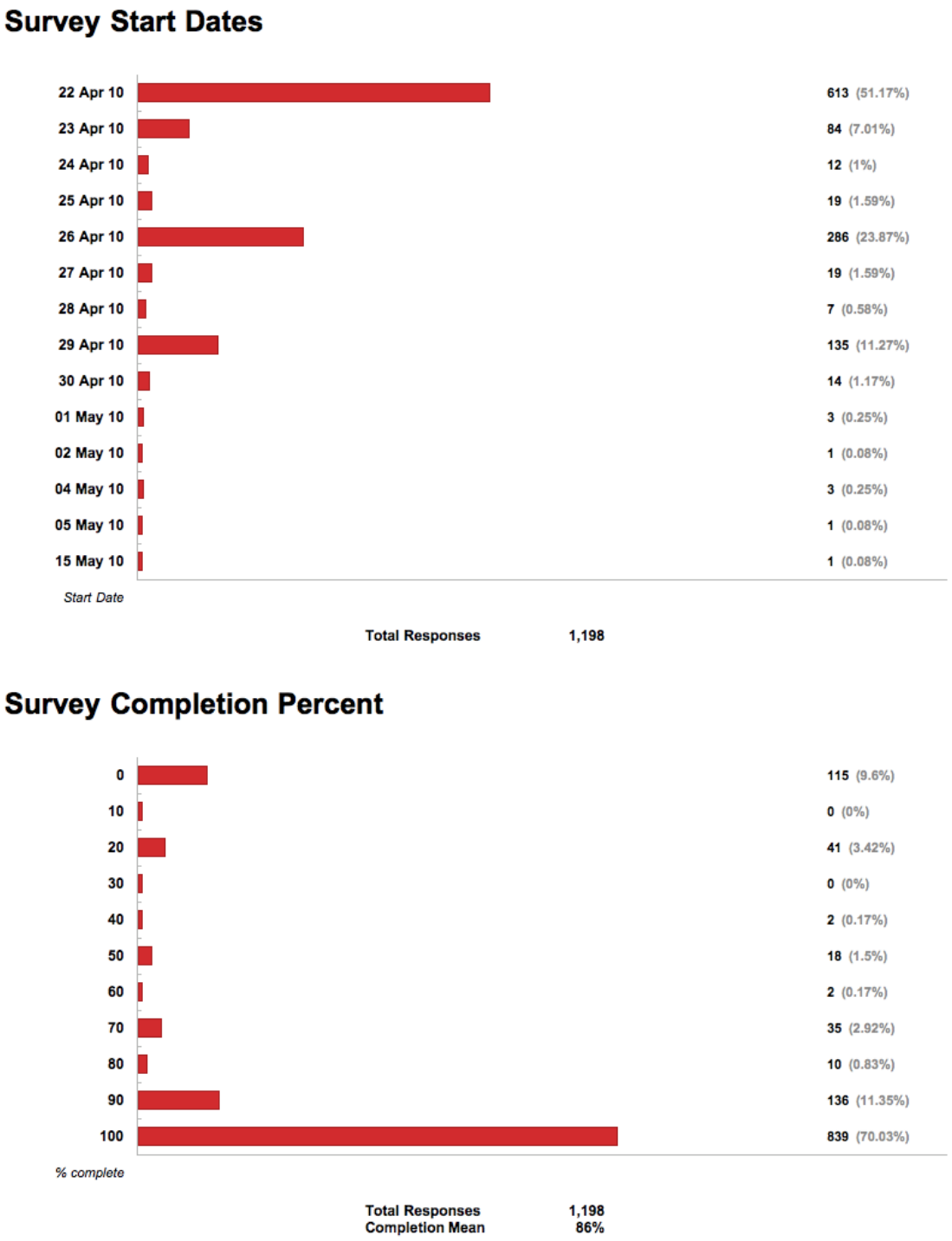


Figure 5.2: Survey start dates and completion report from Qualtrics

response time (Table 5.2) shows high visual correlation with solicitation date. The IRB limited this study to three solicitations so as not to burden participants.

A nonresponse analysis was conducted to identify possible sources of bias in the survey response. Nonresponse analysis compares the survey response population to the expected population based on the sampling frame (Bose, 2001; Groves and Peytcheva, 2008). The comparison variables I employed were gender and out-of-state status. In the sampling frame, I know that approximately 60% of first year students are female, and approximately 18% of first year students are out-of-state[1]. Approximately 67% of respondents to the study are female, which is significantly ($p = 0.000$, one-sample t-test) higher than what I would expect from the population. It is common that males "under-report" in sample surveys; the 7% difference between the observed population and the expected population, while significant, is not alarming. Next I explored differences based on in-state status. Among respondents, 81% indicated they were from North Carolina, which does not differ significantly from expectation ($p = 0.4346$, one-sample t-test). Prior literature does not suggest differential response based on in-state status; that the difference is not significant is a positive sign. While all sample surveys have the potential to contain bias, it appears that this sample reasonably approximates what I would expect from a robust survey of the population.

Descriptive statistics

I now present descriptive statistics from the population. Respondents were asked their gender, age, ethnicity, and in-state status. While my research is broadly concerned with social network sites, the population I studied primarily uses Facebook. Therefore, the questions in my survey specifically asked about Facebook. Respondents were asked about Facebook use, their use of Facebook with family members, and their use of

[1]Based on estimates provided by UNC registrar. Out of state enrollment is limited by state law.

privacy settings in Facebook. Some of these variables are employed in the multivariate analysis, and others are reported primarily for context. Respondent gender is reported in Table 5.1, age is reported in Table 5.2, residency status is reported in Table 5.3, and ethnicity is reported in Table 5.4.

Table 5.1: Respondent gender

	n	Percent	Cumulative
Male	319	32.45168	32.45168
Female	664	67.54832	100
Total	983	100	
Observations	983		

Table 5.2: Respondent age

	n	Percent	Cumulative
18	393	40.02037	40.02037
19	568	57.84114	97.86151
20	19	1.934827	99.79633
21	1	.101833	99.89817
23	1	.101833	100
Total	982	100	
Observations	982		

Table 5.3: Respondent residency status

	n	Percent	Cumulative
NC Resident	794	81.02041	81.02041
Out-of-State	186	18.97959	100
Total	980	100	
Observations	980		

Respondents were then asked about specific behaviors in Facebook, reporting that they generally spent 1 hour and 20 minutes a day on Facebook, and they had an average of 582 friends. Recent growth in popularity of Facebook among older populations (e.g.

Table 5.4: Respondent ethnicity

	n	Percent	N
Student indicates ethnicity is Caucasian	777	.7896341	984
Student indicates ethnicity is African American	90	.0914634	984
Student indicates ethnicity is Asian	102	.1036585	984
Student indicates ethnicity is Hispanic	58	.0589431	984
Student indicates ethnicity is Native American	18	.0182927	984
Observations	984		

Students were allowed to choose more than one category.

Table 5.5: Facebook connections to family members

	Yes	No	Not Applicable
Are you Facebook friends with your parent(s)?	468 (47.7%)	360 (36.69%)	153 (15.59%)
Are you Facebook friends with your grandparents(s)?	144 (14.67%)	527 (53.72%)	310 (31.6%)
Are you Facebook friends with aunt(s) or uncle(s)?	609 (62.14%)	288 (29.38%)	83 (8.46%)
Observations	981		

109 students (11.12%) reported Facebook friendships with parents, grandparents, and aunts or uncles.

Lenhart, 2009) indicates it is likely that some students have Facebook connections with family members. Students were asked if they had established Facebook friendships with parents, grandparents, and aunts or uncles (Table 5.6). 48% of respondents indicated a Facebook friendship with parents, 62% indicated a Facebook friendship with aunts or uncles, and 15% indicated Facebook friendship with grandparents.

As close family members are often called upon during times of need, the presence of family members on Facebook likely has implications for support. A chi-square test indicated that females are more likely to have Facebook friendships with parents (p=0.000, $\chi^2 = 13.7284$) and aunts or uncles (p=0.000, $\chi^2 = 12.9917$). Facebook friendships with

Table 5.6: Respondent use of Facebook privacy

	Yes	No	Not Applicable
Do you use any Facebook privacy features?	903 (92.14%)	58 (5.91%)	19 (1.93%)
Do you have a friends-only Facebook profile?	689 (70.31%)	263 (26.84%)	28 (2.85%)
Do you use Facebook's limited profile?	677 (69.1%)	259 (26.42%)	44 (4.48%)
Observations	980		

grandparents did not significantly differ (p=0.112, $\chi^2 = 2.5195$) by gender.

Finally, respondents were asked about their use of privacy settings in Facebook (Table 5.6). The majority of the population used privacy settings in one way or another, with 70% reporting use of a friends-only profile, and 69% reporting use of the limited profile settings. A chi-square test indicated that females are more likely to use any privacy (p=0.000, $\chi^2 = 35.9130$), friends-only profiles (p=0.000, $\chi^2 = 44.6342$) and limited profiles (p=0.000, $\chi^2 = 44.6342$). Based on the population size (N=3918) and sample size (n $\sim$ 980) the margin of error for all reported means is plus or minus 2.71%.

5.4 Evaluating Adaptation

The following section describes the variables employed in the analysis. The logic of the evaluation is as follows.

- First, I explore the relationship between supportive and social-informational uses of the social network site during transition and received social support. This is the *validation* model.

- Second, I explore the relationship between supportive and social-informational uses of the social network site during transition and social adaptation to college.

This is the first *predictive* model.

- Third, I explore the relationship between supportive and social-informational uses of the social network site during transition and general attachment to college. This is the second *predictive* model.

- Drawing on the validation and predictive models, I employ a structural equation model to evaluate hypotheses regarding social network site use and adaptation to transition. This component of the analysis is in a separate section; the evaluation section leads into this analysis.

In the following sections, I describe the construction of variables employed in the analysis. Many of these variables are scales designed to measure latent constructs (e.g. DeVellis, 2003). I have completed a full psychometric report on all of the scales, including factor analysis, scree plotting, correlations, and measures of reliability. To save space, this report is included as Appendix E.

5.4.1 Dependent variables

The first dependent variable in the analytic model is social support. Social support is measured using the Barrera Jr., Sandler, and Ramsay (1981) Inventory of Socially Supportive Behaviors (ISSB). This scale is employed frequently in studies of social support, and has been subject to extensive validation (Bolger, Zuckerman, and Kessler, 2000; Sherbourne and Stewart, 1991; Vaux et al., 1986). The composition of the ISSB is reported in Table 5.7, and the psychometric report is provided in Appendix E.6. The survey measure is created by summing the scale items: a higher score on the ISSB indicates the presence of stronger social support in the individual's life. The version of the ISSB I employ has been reduced from the original 40-item construction

Table 5.7: Index of Socially Supportive Behaviors

	n	Mean	Std. Dev.	min	max
Was right there with you (physically) in a stressful situation	980	2.978571	1.198633	1	5
Did some activity together to help you get your mind off of things	976	3.364754	1.104837	1	5
Talked with you about some interests of yours	980	4.107143	.9554692	1	5
Told you that she/he would keep the things that you talk about private	978	3.025562	1.202335	1	5
Provided you with some transportation	978	2.547035	.9460019	1	5
Listened to you talk about your private feelings	979	3.227783	1.182786	1	5
Loaned or gave you something (a physical object other than money) that you needed	978	2.600204	1.036034	1	5
Told you what to expect in a situation that was about to happen	974	2.700205	1.050845	1	5
Joked and kidded to try to cheer you up	975	3.61641	1.151972	1	5
Loaned you under $25	979	1.888662	.8609122	1	5
Average Response	978	3.005306	.7317205	1	5
Observations	980				

Respondents are asked to "Think about the last month, how often was it that someone..." and provided a list of items. Responses to the question are "Not at all (1), Once or Twice, About Once a Week, Several Times a Week, About Every Day (5)."

(Barrera Jr., Sandler, and Ramsay, 1981) to save time and to increase relevance to the survey respondent. Cronbach's α for the reduced 10-item scale is high, at .8713.

The second dependent measure in the study is adaptation to college, which is assessed using the Baker and Siryk (1989) Student Adaptation to College Questionnaire (SACQ). This questionnaire has been extensively validated, and has been used in a range of similar studies of transition (e.g. Buote et al., 2007; Hurtado, Carter, and Spuler, 1996; Lanthier and Windham, 2004; Wintre and Yaffe, 2000). The SACQ is a long questionnaire, with 74 items representing four main factors: academic adjustment, social adjustment, personal-emotional adjustment, and attachment. Due to the length

of the questionnaire, I collect two of the factors: *social adjustment* and *attachment*[2].

Response to the SACQ questionnaire is presented in Table 5.8, and the psychometric report is provided in Appendix E.7. Within the SACQ battery there are two main factors, social adjustment and attachment, and six sub-factors within the main factors. The analysis presented focuses on the main factors. In the questionnaire respondents are provided a differential scale and asked "how well the question applies to you at the present time." Respondents can choose between "doesn't apply to me at all" and "applies to me very closely."

Table 5.8: Student Adaptation to College Questionnaire

	n	Mean	Std. Dev.	min	max
I feel that I fit in well as part of the college environment	980	7.106122	1.796309	1	9
I am meeting as many people, and making as many friends as I would like at	979	6.269663	2.204942	1	9
I am very involved with social activities at college	979	6.055158	2.180275	1	9
I am adjusting well to college	979	7.186925	1.760389	1	9
I have had informal, personal contact with college professors	979	5.678243	2.241468	1	9
I am pleased now about my decision to go to college	979	8.230848	1.384928	1	9
I am pleased now about my decision to attend this college in particular	978	7.758691	1.801015	1	9
I have several close social ties at college	970	6.284536	2.273704	1	9

Scale continued on next page...

[2]The SACQ *academic adjustment* and *personal-emotional* adjustment factors were dropped from data collection for three reasons. First, existing theory does not propose a link between Facebook use during transition and academic adjustment. Second, the survey contains variables that measure academic adjustment (e.g, GPA) and personal-emotional adjustment (CES-D, PSS), making the question battery redundant. Finally, the measurement of these two factors required the addition of almost forty questions to the survey, which would likely have increased survey drop-off.

Table 5.8: Student Adaptation to College Questionnaire

	n	Mean	Std. Dev.	min	max
Lonesomeness for home is a source of difficulty for me now [RC]	975	6.209231	2.350525	1	9
I enjoy living in a college dormitory (omit if not in dorm)	959	6.485923	2.061062	1	9
I am satisfied with the extracurricular activities available at college	970	7.379381	1.577835	1	9
I am getting along very well with my roommate(s) at college	914	6.888403	2.379314	1	9
I wish I were at another college or university [RC]	975	7.130256	2.26446	1	9
I feel that I have enough social skills to get along well in college	977	7.328557	1.72658	1	9
I am having difficulty feeling at ease with other people at college [RC]	978	6.208589	2.207609	1	9
I am satisfied with the extent to which I am participating in social activities	977	5.958035	2.208701	1	9
I expect to stay at college for a bachelor's degree	972	8.348765	1.299912	1	9
I have been feeling lonely a lot at college lately [RC]	977	5.918117	2.401214	1	9
I feel I have good control over my life situation at college	975	6.904615	1.789236	1	9
I feel I am very different from other students at college in ways I don't like	976	6.452869	2.225685	1	9
On balance, I would rather be home than here [RC]	978	6.936605	2.18445	1	9
Lately I have been giving a lot of thought to transferring to another college	979	7.57712	2.2133	1	9
Lately I have been giving a lot of thought to dropping out of college altogether	979	8.439224	1.436856	1	9
I find myself giving considerable thought to taking time off from college	976	8.145492	1.838991	1	9
I have some good friends or acquaintances at college with whom I can talk	977	7.55783	1.922415	1	9

Scale continued on next page...

Table 5.8: Student Adaptation to College Questionnaire

	n	Mean	Std. Dev.	min	max
I am quite satisfied with my social life at college	976	6.760246	2.067055	1	9
I feel confident that I will be able to deal in a satisfactory manner with future challenges	976	7.527664	1.522229	1	9
Social Adjustment Factor	980	6.65177	1.283166	1.842105	9
Social Adjustment, General sub-scale	980	6.668989	1.529336	1.571429	9
Social Adjustment, Other People sub-scale	980	6.504371	1.345006	1	9
Social Adjustment, Nostalgia sub-scale	980	6.352551	1.889601	1	9
Social Adjustment, Social Environments sub-scale	980	7.211735	1.401632	1.666667	9
Attachment Factor	980	7.272993	1.267875	1.928571	9
Attachment, General sub-scale	980	8.269898	1.324441	1	9
Attachment, This College sub-scale	979	7.701822	1.544943	1.5	9
Observations	980				

5.4.2 Control variables

Schlossberg's general model classifies the effects of transition at four levels:

- **Environmental Level**: The environmental level is the transitional environment and the physical setting of the transition.
- **Individual Level**: The individual level is measured at the socio-demographic and psychosocial level.
- **Support Level**: The support level covers both local network support and institutional support.

- **Informational Level**: The informational level focuses on role change and changing information needs during transition.

This research explores the socially and informationally supportive role played by social network sites during transition. It is theoretically relevant to introduce controls at the individual, environmental, and locally supportive levels (as the independent variable deals with social and informational support). The following controls are employed in this study:

- **Individual Level**: At the individual level, I control for the following demographic and psychosocial variables:
  - *Gender*: Gender is reported in Table 5.1.
  - *North Carolina Residency*: North Carolina residency is reported in Table 5.3.
  - *Stress*: An individual's level of experienced stress is measured by the Center for Epidemiologic Studies Short Depression Scale (CES-D: Table 5.9, Appendix E.8), and perceived stress is measured with the Perceived Stress Scale (PSS: Table 5.10, Appendix E.9).
- **Environmental Level**: Environmental variables measure the quality of the individual's transitional environment and control for differences in environment.
  - *Roommate quality*: Quality of relationship with roommate is a dummy variable, coded as either low or high (Table 5.11).
  - *Hallmate quality*: Quality of relationship with hallmates is a dummy variable, coded as either low or high (Table 5.11).
  - *Facebook efficacy*: Numerous studies have indicated that technical self-efficacy plays an important mediating role in ICT-based support (e.g. LaRose, Eastin,

and Gregg, 2001; Liu and LaRose, 2008). I created an original scale that measures an individual's self-efficacy in the Facebook environment (Table 5.12, Appendix E.2).

- **Support**: Support is measured at the network level.
  - *Local network*: Individuals were asked how many close friends they made during their first year at UNC-Chapel Hill. The variable was log-transformed for normality. (Table 5.13).
  - *Facebook network*: This measure is the log of respondent's Facebook network size. (Table 5.13).

Individual control measures

In this research, I measure stress at two levels: perceived and experienced. Experienced stress is measured using the Center for Epidemiologic Studies Short Depression Scale (CES-D, Radloff, 1991). The measure is described in Table 5.9 and in Appendix E.8. The scale was presented to respondents in its complete 10-item form. Cronbach's α for the 10-item scale is .8109, indicating high reliability.

Perceived stress is measured using Cohen's Perceived Stress Scale (PSS, Cohen, Kamarck, and Mermelstein, 1983). The measure is described in Table 5.10 and in Appendix E.9. The scale was presented to respondents in its complete 10-item form. Cronbach's α for the 10-item scale is .8732, indicating high reliability.

Environmental control measures

The environmental variables control for the quality of the individual's interaction in the transitional environment. Particularly, these controls focus on the individual's relationship with roommates and hallmates. Because roommate and hallmate quality

Table 5.9: Center for Epidemiologic Studies Short Depression Scale

	n	Mean	Std. Dev.	min	max
I was bothered by things that usually don't bother me	976	.6752049	.794881	0	3
I had trouble keeping my mind on what I was doing	975	1.433846	.9469952	0	3
I felt depressed	974	.6016427	.8244948	0	3
I felt that everything I did was an effort	976	1.086066	.9297204	0	3
I felt hopeful about the future	977	1.051177	.8704161	0	3
I felt fearful	972	.6512346	.8224255	0	3
My sleep was restless	975	.945641	.9176117	0	3
I was happy	976	.7418033	.742093	0	3
I felt lonely	978	.7658487	.8326619	0	3
I could not get going	974	.9425051	.8807524	0	3
Observations	978				

Respondents are asked "How often in the last week they have felt or behaved the following ways..." and provided a list of items. Responses to the question are: Rarely or none of the time (0), some or a little of the time, occasionally or a moderate amount of time, and most or all of the time (3).

stand to exert an outsize influence on perception of support and adaptation, they are included as controls in the model.

The roommate and hallmate quality variables were created by dummy-coding the response to questions that asked, how close do you feel to your roommate? and how close do you feel to your hallmates? Potential responses to the question were not close at all, somewhat unclose, somewhat close, and very close. The responses were dichotomized so that individuals in the *not close at all* and *somewhat unclose* conditions were coded as 0, and individuals in the *somewhat close* and *very close* conditions were coded as 1. Response is reported in Table 5.11.

Next, I measured individual self-efficacy in the use of social network sites. As numerous studies indicate self-efficacy plays an important mediating role in ICT-based support (LaRose, Eastin, and Gregg, 2001; Liu and LaRose, 2008), I designed this scale

Table 5.10: Perceived Stress Scale

	n	Mean	Std. Dev.	min	max
Were upset because of something that happened unexpectedly	975	2.610256	.8797852	1	5
Felt unable to control the important things in your life	977	2.662231	1.018545	1	5
Felt nervous and stressed	976	3.635246	.9819643	1	5
Felt confident about your ability to handle your personal problems [RC]	977	2.305015	.9093692	1	5
Felt that things were going your way [RC]	976	2.563525	.8805951	1	5
Found that you could not cope with all the things that you had to do	976	2.695697	1.05957	1	5
Been able to control irritations in your life [RC]	977	2.428864	.8656148	1	5
Felt that you were on top of things [RC]	974	2.604723	.8854298	1	5
Been angered because of things that were outside of your control	976	2.729508	.9427674	1	5
Felt difficulties were piling up so high that you could not overcome them	973	2.687564	1.104154	1	5
Observations	977				

Respondents are asked "how often they felt the way each item describes their feelings and thoughts in the last month" and provided a list of items. Responses to the question are: 1 being never, 2 being almost never, 3 being sometimes, 4 being fairly often, and 5 being very often.

to control for variation associated with differential experience of the virtual environment. Following previously developed technical self-efficacy scales (e.g. Beenen et al., 2004; LaRose, Eastin, and Gregg, 2001; Liu and LaRose, 2008), I created a Social Network Site (Facebook) self-efficacy scale. This measure is described in Table 5.12, and the psychometric report is provided in Appendix E.2. Cronbach's α for the 4-item scale is .9004, indicating high reliability.

Table 5.11: Closeness to roommates and hallmates

	High	Low
Closeness to Roommate(s)	796 (80.89%)	188 (19.11%)
Closeness to Hallmates	435 (44.21%)	549 (55.79%)
Observations	980	

Dummy-coded.

Table 5.12: Social network site self-efficacy

	n	Mean	Std. Dev.	min	max
I feel confident that I understand the basics of using Facebook	981	4.739042	.5813379	1	5
I feel confident that I could explain the basics of using Facebook to so	981	4.675841	.626716	1	5
I feel confident that I could post a status update to Facebook	982	4.776986	.5923053	1	5
I feel confident that I could create a group or event page in Facebook	979	4.500511	.851289	1	5
Observations	982				

Respondents are asked about level of agreement with the statements. Responses to the question are: Strongly Disagree (1), Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree (5).

Support control measures

According to the main effect hypothesis of social support, the amount of support an individual experiences is a function of network size. Therefore, I include campus and Facebook network size as controls in the model. Campus network size was measured by asking students how many close friends they made during their first year at UNC-Chapel Hill. Facebook network size was measured by asking students how many Facebook friends they had established. Both variables were log-transformed for normality, and the results are reported in Table 5.13.

Table 5.13: Reported network size, log transformed

	n	Mean	Std. Dev.	min	max
Log of Campus Friends	951	2.196889	.8717012	0	5.703783
Log of Facebook Friends	926	6.198928	.666315	.6931472	8.006368
Observations	973				

5.4.3 Independent variables

This study employs two independent variables, which measure supportive (SNS-S) and social-informational (SNS-SIP) uses of social network sites during transition. As described in the introduction, the scales are original; the items were generated through brainstorming and analysis of similar scales. In addition, the scales were tested and refined based on a preliminary pilot survey (n=22). I now provide information on the composition of the two scales.

Independent variable: social-informational processes (SNS-SIP)

In this scale, I measure the extent to which an individual turns to a social network site to address social-informational needs during transition. As the social and informational processes of transition are multi-factored, I measure three factors of this social-informational process. They are:

- **Role Factor**: Role and identity management
- **Information Factor**: Information seeking and encountering
- **Social Network Factor**: Social network growth and diversification

The first process, role and identity management, measures the extent to which the individual uses the social network site for acculturation during transition. Information seeking and encountering measures the extent to which the individual uses the social

network site to find and encounter information about the transitional lifeworld. Social network augmentation measures the extent to which the social network site is used to facilitate and deepen relationships in the transitional setting. These three sub-factors correspond directly to the theoretical provisions of transition process theory (e.g. Ashforth, 2001; Ebaugh, 1988; Erikson, 1950; Mandler, 1990; Nicholson, 1989). The instrument is reported in Table 5.14, and the psychometric properties of the scale are reported in Appendix E.1.

Reliability for the sub-scales and overall scale is assessed with Cronbach's α. The Role Factor sub-scale has an α of .7759, indicating good reliability. The Information Factor sub-scale has an α of .7597, indicating good reliability. The Social Network Factor sub-scale has an α of .7847, indicating good reliability. The overall summed scale has an α of .8948, indicating high reliability.

Independent variable: social network site support (SNS-S)

To evaluate the supportive potential of social network sites, I measure informational, tangible, and emotional (collapsing esteem into emotional) support processes in social network sites with an original scale. Following the multi-factored nature of social support, this scale is broken into three sub-factors. The informational support sub-factor scale measures the extent to which the individual uses the network for informational support during transition. The tangible support sub-factor scale measures the extent to which the individual uses the social network site for tangible support during transition. Finally, the emotional support sub-factor scale measures the extent to which the individual draws emotional support from the network during transition. The instrument is reported in Table 5.15, and the psychometric properties of the scale are reported in Appendix E.4.

Table 5.14: Social-informational processes scale (SNS-SIP)

	n	Mean	Std. Dev.	min	max
Role Factor: Keeping up with what is popular on campus	979	3.556691	1.010984	1	5
Role Factor: Learning about campus customs or traditions	980	3.235714	1.021	1	5
Role Factor: Finding campus-related news (e.g. sports, events)	980	3.79898	.9456092	1	5
Role Factor: Learning about campus fashion trends	979	2.586313	1.003805	1	5
Information Factor: Searching for information about campus-related activities	979	3.75383	.9601855	1	5
Information Factor: Finding out about campus events to attend	980	4.218367	.834196	1	5
Information Factor: Getting recommendation for things to do around campus (e.g. good movies	979	3.527068	.9907717	1	5
Information Factor: Getting academic advice (e.g. classes to take or avoid)	979	3.192033	1.020194	1	5
Social Network Factor: Learning about people you've met on campus	980	4.227551	.7933947	1	5
Social Network Factor: Discovering the interests you share with campus friends	978	3.704499	.9412639	1	5
Social Network Factor: Sharing inside jokes with campus friends	980	4.085714	.9289356	1	5
Social Network Factor: Getting in touch with people on campus that you've recently met	978	4.419223	.7544604	1	5
Role Factor Summed scale	981	3.295277	.7695092	1	5
Information Factor Summed scale	981	3.673462	.7269779	1	5
Social Network Factor Summed scale	981	4.108818	.6694577	1	5
Observations	981				

Each factor is assessed by asking "In your opinion, have you found Facebook useful for the following." Responses to the question are: Strongly Disagree (1), Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree (5).

- **Information Factor**: Use of social network site for information about transitional environment

- **Tangible Factor**: Use of social network site for requesting tangible support
- **Emotional Factor**: Use of social network site for emotional support

Reliability for the sub-scales and overall scale is assessed with Cronbach's α. The Information Factor sub-scale has an α of .8323, indicating high reliability. The Emotional Factor sub-scale has an α of .7899, indicating good reliability. The Tangible Factor sub-scale has an α of .7806, indicating good reliability. The overall summed scale has an α of .8900, indicating high reliability.

5.4.4 Analytic strategy

Using a series of regression analyses, I explore the relationship between supportive (SNS-S) and social-informational (SNS-SIP) uses of social network sites during transition and two outcome measures. The first outcome I predict is social support as measured by the ISSB. The second outcome I predict are the sub-factors of the Student Adaptation to College questionnaire. The regressions are conducted as follows:

1. Predict the Barrera ISSB Social Support Scale from the Social Network Support and Social Information Process scales, controlling for individual, environmental, and local support variables. This is the validation model.
2. Predict the SACQ Social Adjustment Scale from the Social Network Support and Social Information Process scales, controlling for individual, environmental, and local support variables. This is the first predictive model.
3. Predict the SACQ Attachment Scale from the Social Network Support and Social Information Process scales, controlling for individual, environmental, and local support variables. This is the second predictive model.

The research goals of this analysis are as follows:

Table 5.15: Social network site support (SNS-S)

	n	Mean	Std. Dev.	min	max
Information: I could use Facebook to find an answer to a question I have about UNC	976	3.413934	.9622466	1	5
Information: I could use Facebook to find an answer to a question I have about Chapel	976	3.309426	.9546396	1	5
Information: I could use Facebook to find a good class to take	976	3.237705	.9718354	1	5
Information: If I needed to complete a complex task on campus, I could find help	977	3.22825	.9990263	1	5
Tangible: If I needed a ride to somewhere near campus, I could use Facebook	978	3.480573	.979906	1	5
Tangible: If I was unable to sleep in my room for a night, I could use Facebook	978	3.340491	1.075272	1	5
Tangible: If I needed to find employment quickly, I could use Facebook to find job	978	2.530675	.874745	1	5
Tangible: If I had to borrow a car to drive to an appointment near campus, I could use Facebook to find a car	976	3.114754	1.050103	1	5
Emotional: Participating in Facebook makes me feel like I belong on campus	978	3.007157	.9719452	1	5
Emotional: Facebook has been important in my on-campus relationships	978	3.519427	.988227	1	5
Emotional: Facebook (does not) make me feel alone on campus [RC]	978	4.021472	.8880816	1	5
Emotional: I feel good when I interact with my campus friends on Facebook	978	3.812883	.7736431	1	5
Information Factor Summed scale	978	3.297461	.7866115	1	5
Tangible Factor Summed scale	978	3.117246	.7824359	1	5
Emotional Factor Summed scale	978	3.446489	.7640638	1	5
Observations	978				

Each factor is assessed by asking "Please evaluate the following statements about your use of Facebook" Responses to the question are: Strongly Disagree (1), Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree (5).

1. Validate the relationship between supportive and social-informational uses of social network sites and social support during transition.

2. Identify the supportive and social-informational uses of social network sites in social adjustment (leading to adaptation) during transition.

3. Identify the supportive and social-informational uses of social network sites in general attachment (leading to adaptation) during transition.

This analysis also informs the evaluation model that is measured with a structural equation model in Section 5.5.

5.4.5 Outcome

To this point, the theory, logic, and all variables relevant to the analytic model have been described. Prior to reporting the results of the regression analysis, I present a correlation matrix reporting full-scale level correlations. Results of the correlation are presented in Table 5.16.

The following analyses all employ standard multiple regression. Because the regressions contain many steps, they are broken across two tables. The first table reports on the control variables, entered in a stepwise hierarchical fashion. The second table reports on the independent variables with controls, also entered in a stepwise hierarchical fashion. Standardized coefficients are reported to allow comparison between predictors in the regression. The regressions can be compared to each other using the adjusted R^2, which estimates model fit.

The models were put through a standard battery of diagnostic tests to ensure the assumptions of multiple regression were not violated. They include tests for heteroskedasticity, influence, leverage, and normality of residuals. For all models, the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was significant, leading me to reject the null hypothesis of homoskedasticity. To account for heteroskedasticity, all of the following regressions employ robust standard errors. This does "cost" significance in a few occasions, but the use of robust standard errors decreases the likelihood

Table 5.16: Correlation matrix

	SACQ-SA	SACQ-A	Gender	NC Res.	Room. qual.	Hall. qual.	Num. Camp. Fr.	ISSB	CES-D	PSS	Num. FB Fr.	SNS-SE	SIP
SACQ-SA	1												
SACQ-A	0.898***	1											
Gender	-0.0567	-0.00629	1										
NC Res.	0.0475	0.0418	-0.0495	1									
Room. qual.	0.115***	0.0740*	0.0312	-0.0622	1								
Hall. qual.	0.141***	0.111***	-0.0515	-0.0161	-0.00499	1							
Camp. Fr.	0.389***	0.318***	-0.108**	0.0540	0.0458	0.170***	1						
ISSB	0.342***	0.280***	0.151***	0.0175	0.0434	0.0810*	0.229***	1					
CES-D	-0.556***	-0.544***	0.0799*	-0.0461	-0.103**	-0.0331	-0.154***	-0.0577	1				
PSS	-0.481***	-0.469***	0.189***	-0.0621	-0.0555	-0.0526	-0.148***	0.0460	0.750***	1			
Num. FB. Fr.	0.258***	0.189***	0.0427	0.0689*	0.0169	0.0828*	0.300***	0.213***	-0.0510	0.00180	1		
SNS-SE	0.167***	0.174***	0.00362	-0.00335	0.0431	0.0287	0.0728*	0.151***	-0.0533	-0.0427	0.208***	1	
SIP	0.195***	0.152***	0.103**	-0.0699*	0.0156	0.0538	0.140***	0.234***	-0.0128	-0.000330	0.265***	0.207***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

of type I error. On variable-level inspection, the primary cause of heteroskedasticity was the personal-level stress controls. This is intuitive, as the effects of stress can be multiplicative. For all other tests, including Cook's D, the Variance Inflation Factor, and normality of residuals, the results were in line with expectation.

The models rely entirely on direct observations, and therefore any item-wise missed observations results in a case-wise deletion in the regression estimate. The reader will notice that the sample size decreases as more items are added to the models. On inspection, I was able to isolate the variables that were primarily responsible for missingness, and impute them using Stata's regression-based multiple imputation. Multiple imputation increases precision of estimates by imputing missing data using Monte Carlo simulation. The results of the imputed estimates do not differ substantially from the estimates presented, therefore I present the non-imputed estimates. Regressions with imputed variables are included as Appendix D.

Model 1: social support

The first analysis explores the relationship between use of social network sites for support and information during transition, and level of received social support as measured by Barrera's ISSB. As the social network site connects the individual in transition with the network, allows for the individual to learn about others in the network, and provides a location for communication within the network, it stands to reason that use of the network for supportive and informational purposes will increase social support.

Table 5.17 reports the results of the multiple regression predicting social support, with the controls entered in a stepwise fashion. Because the scales employed in the regression have different ranges, I report standardized coefficients. The first set of controls represent individual and socio-demographic variables. The second set of controls, roommate and hallmate quality, and number of local friends, are environmental

Table 5.17: Multiple regression predicting ISSB, controls added stepwise

	(1) ISSB	(2) ISSB	(3) ISSB	(4) ISSB
Gender	0.165*** (5.03)	0.184*** (5.08)	0.170*** (4.60)	0.150*** (4.03)
NC Resident	0.020 (0.63)	0.025 (0.72)	0.024 (0.70)	0.022 (0.63)
Roommate		0.025 (0.70)	0.021 (0.60)	0.024 (0.66)
Hallmate		0.102** (2.85)	0.109** (3.07)	0.092* (2.56)
Local Friends		0.224*** (5.60)	0.225*** (5.55)	0.186*** (4.21)
CES-D			-0.116 (-1.85)	-0.126 (-1.96)
PSS			0.146* (2.56)	0.173** (2.95)
FB Friends				0.114** (3.18)
SNS-E				0.094** (3.03)
N	977	756	753	720
Adjusted R^2	0.025	0.090	0.097	0.120

Standardized beta coefficients; t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of - state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy.

and support variables. The third block contains the CES-D and PSS, the individual and psychosocial controls. The fourth block contains number of Facebook friends and the social network site efficacy scale, which describe the individual's relationship in the online social environment. These blocks were selected based on Schlossberg's general model of transition. The independent variables measure the use of social network site for social-informational processes during transition (SNS-SIP) and the amount of support in the social network site during transition (SNS-S).

In Table 5.17, I observe that gender, log number of local friends, log number of Facebook friends, and social network site efficacy are all positive predictors of received social support. The perceived stress scale (PSS) is also a significant predictor of received

Table 5.18: Multiple regression predicting ISSB from SNS-SIP and SNS-S

	(1) ISSB	(2) ISSB	(3) ISSB	(4) ISSB
Gender	0.130*** (3.46)	0.131*** (3.45)	0.133*** (3.63)	0.131*** (3.53)
NC Resident	0.030 (0.84)	0.027 (0.76)	0.032 (0.91)	0.031 (0.85)
Roommate	0.025 (0.71)	0.024 (0.68)	0.025 (0.72)	0.026 (0.75)
Hallmate	0.086* (2.42)	0.085* (2.38)	0.089* (2.50)	0.088* (2.43)
Local Friends	0.177*** (4.00)	0.176*** (3.99)	0.178*** (4.08)	0.175*** (3.99)
CES-D	-0.134* (-2.09)	-0.139* (-2.15)	-0.135* (-2.11)	-0.136* (-2.12)
PSS	0.173** (2.95)	0.171** (2.92)	0.180** (3.06)	0.178** (3.00)
FB Friends	0.092* (2.41)	0.087* (2.24)	0.085* (2.23)	0.084* (2.21)
SNS-E	0.066* (1.98)	0.054 (1.50)	0.069* (2.28)	0.066* (2.15)
SNS-SIP	0.106** (2.64)			
SNS-SIP RF		0.040 (0.76)		
SNS-SIP IF		-0.012 (-0.23)		
SNS-SIP SNA		0.107* (2.24)		
SNS-S			0.145*** (3.67)	
SNS-S IS				0.105* (2.03)
SNS-S TS				-0.013 (-0.26)
SNS-S ES				0.086 (1.95)
N	720	720	720	720
Adjusted R^2	0.128	0.129	0.138	0.140

Standardized beta coefficients; t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.

social support. This is intuitive, as individuals that perceive higher levels of stress are likely to call on those around them for support.

Table 5.18 reports the results of the multiple regression with control variables and independent variables. The independent variables (SNS-SIP, SNS-S) and their factor component sub-scales are included in four separate, non-hierarchical regressions. Column 1 of Table 5.18 shows that increasing use of the social network site for social-informational purposes is associated with higher levels of social support. Column 2 of Table 5.18 breaks the SNS-SIP scale out by factor, showing that increasing use of the social network site to augment the friend network is associated with higher levels of social support. Column 3 of Table 5.18 shows that increasing use of the social network site for socially supportive purposes is associated with higher levels of social support. Finally, Column 4 of Table 5.18 shows that increasing use of the social network site for informational purposes, such as learning about the friend network, is associated with higher levels of social support.

Comparing the models, I find that Steps 3 and 4 of the independent variable model (Table 5.18) have the highest R^2. This is within expectation and theoretical prediction. Use of the social network site for supportive purposes is related to higher levels of social support. The model shows that individuals that learn about their friends and broaden their networks with Facebook are able to draw on higher levels of social support. This relationship is intuitive. During the transition to college, individuals meet many people. The social network site provides a location for collecting information about these people, and potentially finding who to call on in a time of need (cf. Section 5.6.3). The purpose of this analysis was to explore the relationship between social network site use during transition and social support, and I have found robust support for this relationship. In the remaining models, I include social support (ISSB) as a control variable.

Model 2: social adjustment

The second model explores the relationship between social-informational (SNS-SIP) and supportive (SNS-S) uses of social network sites during transition and social adjustment to college. The dependent variable in this model is the social adjustment sub-scale in the Student Adjustment to College Questionnaire (Baker and Siryk, 1989). According to the developers of the questionnaire, the social adjustment sub-scale "measures a student's success in coping with the interpersonal-societal demands inherent in the college experience." According to Baker and Siryk (1989), students that score lower on this sub-scale exhibit behaviors associated with:

> Less participation in social activities in college; being viewed by independent evaluators a less qualified in terms of social skills; less success in separating from home ties and establishing social autonomy greater sense of loneliness, greater social avoidance and social distress, and less social self-confidence and social self-concept less success in coping with life changes; less perceived social support; and perceptions of little opportunity for involvement in social activities. (p.15)

It is hypothesized that use of the social network site aids in transition by addressing social-informational and supportive needs, and therefore individuals that use social network sites for these purposes will exhibit greater adjustment to college.

Table 5.19 reports the results of the multiple regression predicting social adjustment to college, with the controls entered in a stepwise fashion. The first set of controls represent individual and socio-demographic variables. The second set of controls, roommate and hallmate quality, and number of local friends, are environmental and support variables. The third block contains the ISSB, CES-D, and PSS, the individual and psychosocial variables. The fourth block contains the number of Facebook friends

Table 5.19: Multiple regression predicting SACQ-SA, controls added stepwise

	(1) SACS-SA	(2) SACS-SA	(3) SACS-SA	(4) SACS-SA
Gender	-0.033 (-1.04)	0.005 (0.15)	0.017 (0.60)	0.000 (0.01)
NC Resident	0.044 (1.40)	0.035 (1.09)	0.006 (0.22)	0.001 (0.02)
Roommate		0.110*** (3.31)	0.049 (1.87)	0.039 (1.48)
Hallmate		0.119*** (3.68)	0.076** (2.91)	0.071** (2.75)
Local Friends		0.382*** (10.30)	0.238*** (8.01)	0.212*** (6.75)
ISSB			0.243*** (8.69)	0.229*** (7.82)
CES-D			-0.371*** (-8.93)	-0.361*** (-8.72)
PSS			-0.186*** (-4.55)	-0.189*** (-4.52)
FB Friends				0.104*** (3.59)
SNS-E				0.061* (1.97)
N	977	756	753	720
Adjusted R^2	0.001	0.190	0.499	0.517

Standardized beta coefficients; t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.

and the social network site efficacy scale, which describe the individual's relationship in the online social environment. The independent variables measure the use of the social network site for social-informational purposes during transition (SNS-SIP) and the amount of support in the social network site during transition (SNS-S).

In Table 5.19, I observe that hallmate quality, log number of local friends, ISSB, log number of Facebook friends, and social network site efficacy are all positive predictors of social adjustment to college. The stress scales (PSS and CES-D) are significant

Table 5.20: Multiple regression predicting SACQ-SA from SNS-SIP and SNS-S

	(1) SACS-SA	(2) SACS-SA	(3) SACS-SA	(4) SACS-SA
Gender	-0.005 (-0.18)	-0.000 (-0.02)	-0.007 (-0.26)	-0.005 (-0.19)
NC Resident	0.003 (0.12)	0.005 (0.18)	0.007 (0.27)	0.008 (0.30)
Roommate	0.040 (1.49)	0.039 (1.47)	0.040 (1.54)	0.042 (1.60)
Hallmate	0.070** (2.69)	0.070** (2.72)	0.071** (2.73)	0.071** (2.75)
Local Friends	0.210*** (6.67)	0.208*** (6.60)	0.210*** (6.65)	0.208*** (6.60)
ISSB	0.226*** (7.70)	0.226*** (7.73)	0.216*** (7.38)	0.214*** (7.34)
CES-D	-0.364*** (-8.78)	-0.367*** (-8.93)	-0.368*** (-8.95)	-0.372*** (-8.94)
PSS	-0.188*** (-4.52)	-0.187*** (-4.51)	-0.183*** (-4.43)	-0.178*** (-4.20)
FB Friends	0.098** (3.28)	0.105*** (3.46)	0.088** (3.08)	0.090** (3.10)
SNS-E	0.053 (1.66)	0.041 (1.24)	0.048 (1.58)	0.049 (1.62)
SNS-SIP	0.031 (1.12)			
SNS-SIP RF		-0.070 (-1.76)		
SNS-SIP IF		0.085* (2.08)		
SNS-SIP SNA		0.022 (0.55)		
SNS-S			0.085** (2.95)	
SNS-S IS				0.084* (2.28)
SNS-S TS				-0.004 (-0.11)
SNS-S ES				0.017 (0.52)
N	720	720	720	720
Adjusted R^2	0.517	0.519	0.522	0.522

Standardized beta coefficients; t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of - state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.

negative predictors of social adjustment. Comparing the estimate sizes, I observe that personal-level factors are strongly predictive (ISSB, PSS, CES-D), and physical and virtual network sizes also contribute significantly. Notably, gender, in-state status and roommate quality are not significant in this model. The adjusted R^2 for the control model is .517, indicating I have explained a little more than half of the variance in social adjustment.

Table 5.20 reports the results of the multiple regression with control variables and independent variables. The independent variables (SNS-SIP, SNS-S) and their factor component sub-scales are included in four separate regressions. Column 1 of Table 5.20 shows that overall use of the social network site for social-informational purposes is not associated with higher levels of social adjustment. This is somewhat surprising, but as I show in Column 2 of Table 5.20, increasing use of the social network site for informational purposes (information factor) is associated with higher levels of social adjustment. Column 3 of Table 5.20 shows that increasing use of the social network site for socially supportive purposes is associated with higher levels of social adjustment. Finally, Column 4 of Table 5.20 shows that increasing use of the social network site for informational purposes, such as learning about the friend network, is associated with higher levels of social adjustment.

Comparing the models, I observe that Steps 3 and 4 of the independent variable model (Table 5.20) have the highest R^2. While it was surprising that the overall SNS-SIP scale was not a significant predictor, that fact that both informational sub-scales within the SNS-SIP and SNS-S scales were significant is interesting. Just as in the first analysis, I observe the important informational role of the social network site in transition. In drawing on the network to extract information about others going through the same transition, individuals appear to be able to translate this information into overall social adjustment. A range of studies have identified pre- and post-transition

social information as a factor in transition success (e.g. Hurtado, Carter, and Spuler, 1996; Lapsley and Edgerton, 2002). In learning about the transitional environment and other cohort members, the adjustment process may be facilitated uniquely by the social network site.

Model 3: general attachment

The third model explores the relationship between social-informational (SNS-SIP) and supportive (SNS-S) uses of social network sites during transition and attachment to college. The dependent variable in this model is the attachment sub-scale in the Student Adjustment to College Questionnaire (Baker and Siryk, 1989). According to the developers of the questionnaire, the attachment sub-scale "measures a student's degree of attachment to the particular institution the student is attending, especially the quality of the relationship or bond that is established between the student and the institution." Students that score lower on this sub-scale exhibit behaviors associated with "greater likelihood of discontinuance of enrollment and less overall satisfaction with the college experience" (Baker and Siryk, 1989, p. 15). It is hypothesized that use of the social network site for social-informational and supportive purposes in transition increases the individual's attachment to their school and transitional cohort.

Table 5.21 reports the results of the multiple regression predicting attachment to college, with the controls entered in a hierarchical fashion. The first set of controls represent individual and socio-demographic variables. The second set of controls, roommate and hallmate quality, and number of local friends, are environmental and support variables. The third block contains the ISSB, CES-D, and PSS, the individual and psychosocial variables. The fourth block contains the number of Facebook friends and the social network site efficacy scale, which describe the individual's relationship in

Table 5.21: Multiple regression predicting SACQ-A, controls added stepwise

	(1) SACQ-A	(2) SACQ-A	(3) SACQ-A	(4) SACQ-A
Gender	0.020 (0.60)	0.045 (1.30)	0.064* (2.10)	0.051 (1.67)
NC Resident	0.042 (1.37)	0.054 (1.65)	0.027 (0.99)	0.020 (0.75)
Roommate		0.070* (2.01)	0.010 (0.36)	0.001 (0.03)
Hallmate		0.083* (2.48)	0.043 (1.58)	0.039 (1.44)
Local Friends		0.328*** (8.19)	0.193*** (5.76)	0.176*** (4.88)
ISSB			0.198*** (6.16)	0.179*** (5.41)
CES-D			-0.381*** (-7.97)	-0.376*** (-7.87)
PSS			-0.181*** (-4.11)	-0.182*** (-4.06)
FB Friends				0.063 (1.53)
SNS-E				0.088** (2.61)
N	977	756	753	720
Adjusted R^2	0.000	0.129	0.425	0.440

Standardized beta coefficients; t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.

the online social environment. The independent variables measure the use of the social network site for social-informational purposes during transition (SNS-SIP) and the amount of support in the social network site during transition (SNS-S).

In Table 5.21, I show that log number of local friends, ISSB, and social network site efficacy are all positive predictors of attachment to college. The stress scales (PSS and CES-D) are significant negative predictors of attachment to college. Comparing the estimate sizes, I observe that personal-level factors are strongly predictive (ISSB, PSS,

Table 5.22: Multiple regression predicting SACQ-A from SNS-SIP and SNS-S

	(1) SACQ-A	(2) SACQ-A	(3) SACQ-A	(4) SACQ-A
Gender	0.051 (1.61)	0.059 (1.87)	0.045 (1.48)	0.044 (1.41)
NC Resident	0.021 (0.75)	0.020 (0.73)	0.025 (0.93)	0.024 (0.89)
Roommate	0.001 (0.03)	-0.001 (-0.05)	0.002 (0.06)	0.002 (0.09)
Hallmate	0.039 (1.44)	0.039 (1.43)	0.039 (1.43)	0.038 (1.39)
Local Friends	0.175*** (4.85)	0.172*** (4.76)	0.174*** (4.82)	0.172*** (4.76)
ISSB	0.179*** (5.41)	0.176*** (5.35)	0.170*** (5.10)	0.166*** (5.02)
CES-D	-0.376*** (-7.85)	-0.386*** (-8.14)	-0.381*** (-7.98)	-0.383*** (-7.91)
PSS	-0.182*** (-4.06)	-0.183*** (-4.14)	-0.178*** (-3.96)	-0.178*** (-3.87)
FB Friends	0.063 (1.53)	0.067 (1.70)	0.051 (1.27)	0.051 (1.27)
SNS-E	0.087* (2.50)	0.058 (1.60)	0.078* (2.32)	0.076* (2.25)
SNS-SIP	0.002 (0.07)			
SNS-SIP RF		-0.117** (-2.81)		
SNS-SIP IF		0.043 (1.01)		
SNS-SIP SNA		0.091* (2.13)		
SNS-S			0.065* (2.07)	
SNS-S IS				0.064 (1.60)
SNS-S TS				-0.032 (-0.85)
SNS-S ES				0.050 (1.48)
N	720	720	720	720
Adjusted R^2	0.440	0.447	0.443	0.444

Standardized beta coefficients; t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of - state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.

CES-D). Log number of local friendships is also strongly predictive. The adjusted R^2 for the model is .440, indicating I have explained a little less than half of the variance in attachment to college.

Table 5.22 reports the results of the multiple regression with control variables and independent variables. The independent variables (SNS-SIP, SNS-S) and their factor component sub-scales are included in four separate regressions. Column 1 of Table 5.22 shows that overall use of the social network site for social-informational purposes is not associated with higher levels of attachment to college. This is somewhat surprising, but as Column 2 of Table 5.22 shows, increasing use of the social network site for social network augmentation purposes (SNA Factor) is associated with higher levels of attachment to college. Use of the social network site for role identification (Role Factor) is negatively associated with attachment to college. Column 3 of Table 5.22 shows that increasing use of the social network site for socially supportive purposes is associated with higher levels of attachment to college. Finally, Column 4 of Table 5.22 does not report any of the sub-scale elements of SNS-S as significant predictors.

Comparing the models, I find that Step 3 of the independent variable model (Table 5.22) has the highest R^2. Considering the effects observed in the controls, particularly the effects of local friends, I observe evidence of a relationship between one's transitional social network and their attachment to place. Viewed through this lens, perhaps simple measures of social network site use may be more successful in predicting attachment to college. Seeing that the social network augmentative uses of the software emerge as a significant predictor also lends support to this theory.

Conclusion

These regressions have explored the role social network sites play in adaptation to the transition to college, revealing a number of promising findings. I first observed that

social network site use, for both social-information (SNS-SIP) and supportive (SNS-S) purposes, was significantly associated with experienced social support as measured by Barrera's ISSB. As social support is one of the primary theorized buffers to stress and correlates of successful transition, this is a notable finding. In terms of social adjustment to college, I observed that the use of the social network site for supportive (SNS-S), supportive-informational (SNS-S IS) and overall informational (SNS-SIP IF) purposes was significantly associated with adjustment. This finding points towards the powerful use of a social network site as a directory (Joinson, 2008) or space for social monitoring (Lampe, Ellison, and Steinfield, 2006) that increases cohesion and social adjustment. Finally, I observed that supportive (SNS-S) and network augmentative (SNS-SIP SNA) uses of social network sites were associated with greater attachment to college. These findings point to the value of the social network site in augmenting physical and virtual personal networks in the transition to college. This analysis also revealed an unexpected negative finding — that increasing use of the social network site for role-related purposes is associated with lower levels of attachment. Perhaps individuals that feel the need to turn to the social network site for role information feel particularly unattached, and the direction of the effect actually extends causally from the dependent variable to the independent variable.

To explore the nature of the relationships observed in these regressions, I employ structural equation modeling (SEM). SEM allows for the simultaneous evaluation of the relationship between social network site use, social support, and the SACQ adjustment and attachment measures. Because SEM is confirmatory, I am also able to specify directionality in the regression paths. Based on the theoretical review and results of the data analysis, I now explore how social support mediates the role between social network site use and adaptation to college.

5.5 Structural Equation Model

The previous section employed a series of regressions to test the effect of supportive and social-informational uses of social network sites on outcomes related to transition. While these models present a general picture of the effects of social network site use during transition, they do not account for the multi-level nature of support, or the specific relationship between social network site use and individual level controls. Structural equation modeling allows for the simultaneous evaluation of these relationships, and is therefore applied as the final evaluation of the analytic model.

5.5.1 Technical overview

Structural equation modeling (SEM) is a general term used to describe a range of multivariate analytic models. In the context of this research, the structural equation model I use employs confirmatory factor analysis (CFA) and multiple regression. The structural equation model evaluates the strength of the latent constructs (the scales described in the previous section) and evaluates a series of regressions which allow for hypothesis tests of predicted paths[3]. Measures of model fit, or identification, provide a general estimate of overall model quality, and allow inference about the quality of the findings. For a more technical discussion of SEM, see Raykov and Marcoulides (2006) or Schumacker and Lomax (1996).

Because the structural equation model employs the same variables of the multiple regressions, described in Sections 5.4.1-5.4.3, I am able to proceed quickly to hypothesis specification and testing. The analysis is presented in the following order:

1. Description of the variables

2. Specification of the hypotheses

[3]The paths being arbitrary directional regressors specified between variables.

3. Model identification

4. Model evaluation

   (a) Correlation between latent constructs

   (b) Model quality estimates

   (c) Evaluation of hypotheses

5. Discussion

Variables were selected for inclusion in the structural equation model based on performance in the multiple regression models described in Section 5.4.5. All latent variables (i.e. scales) are preserved in the SEM, and some observed variables are dropped due to poor performance.

5.5.2 Variables

Figure 5.3 provides an overview of the variables employed in the SEM. In an SEM diagram, round or oval shapes correspond to latent constructs (i.e. scales), and boxes correspond to observed variables (i.e. those directly recordable). Straight arrows correspond to hypothesized effects (i.e. regressors), whereas curved arrows specify covariance that is modeled in the structural equation.

Presented in Figure 5.3, the SEM I run involves seven latent variables and three observed variables. The logic of the SEM model follows the logic of the previous multiple regression models. The predictor variables are the social network site support (SNS-S) and social-informational processes (SNS-SIP) scale. Social network site efficacy is included as a first-level control. The control variables in the model are social support (ISSB) and the stress scales (PSS, CES-D). The outcome measure is adaptation as measured by the combined Student Adaptation to College Questionnaire (SACQ).

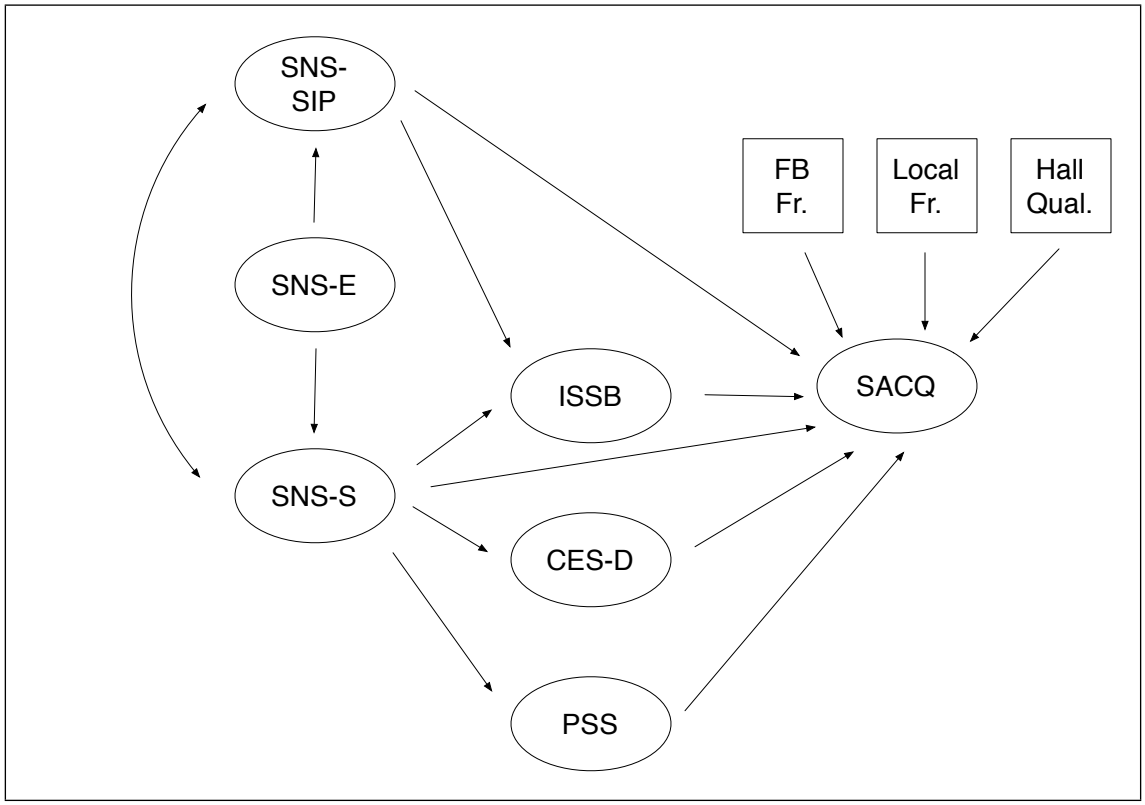


Figure 5.3: Overview of the structural equation model

Number of local and Facebook friends, and hallmate quality are retained as observed controls based on their performance in the multiple regression models.

There is one important difference between the SEM and the multiple regressions. In the multiple regressions, the SACQ sub-scales were split across two regressions (e.g. the first regression estimated social adjustment, SACQ SA, and the second estimated attachment, SACQ A). In the SEM, both of these factors (SACQ SA and A) are included in the overall SACQ scale. The SACQ outcome measures both social adjustment and attachment.

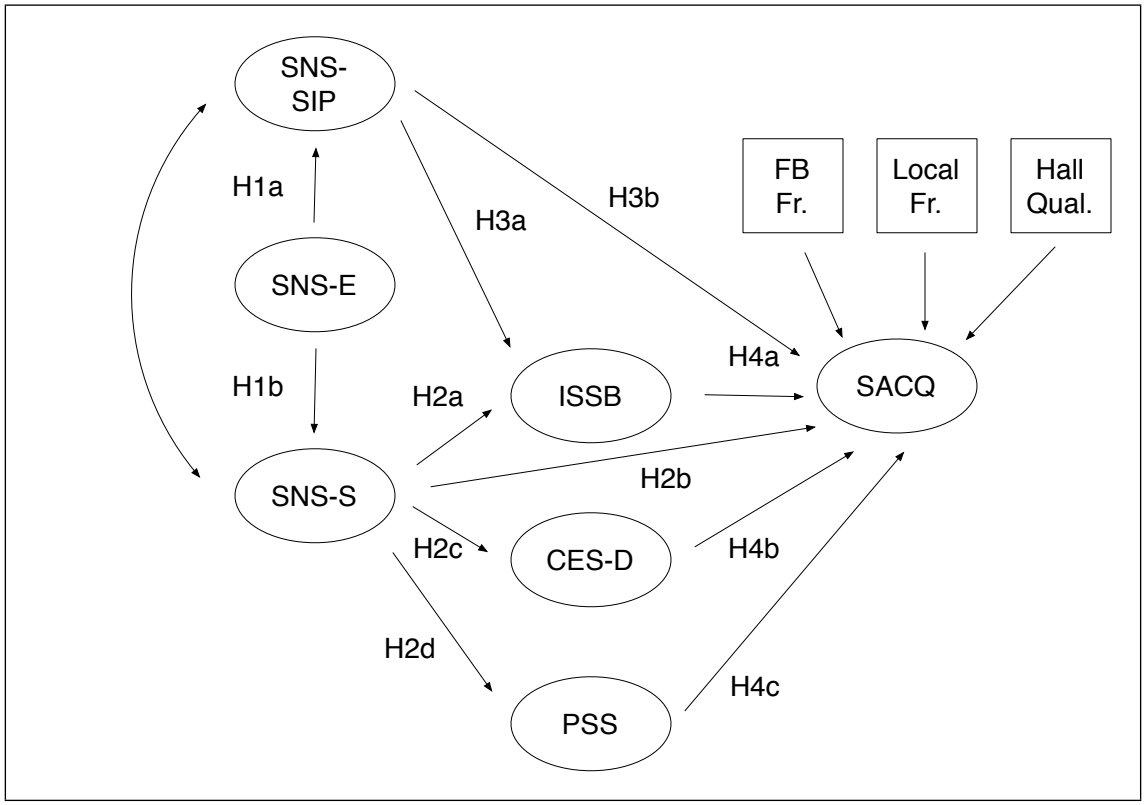


Figure 5.4: Structural equation model with hypotheses

5.5.3 Hypotheses

Four main hypotheses are specified in the SEM, each drawing on the theoretical background that informed the multiple regression models. I now briefly specify the theoretical linkage governing each hypothesis; a labeled model is provided in Table 5.4.

Hypothesis 1: social network site efficacy and social network site use

Previous research has linked efficacy of ICT use to outcomes of ICT use (e.g. LaRose, Eastin, and Gregg, 2001; Liu and LaRose, 2008; Parks and Floyd, 1996). Therefore, I expect that individuals that use the social network site with greater facility will find more supportive and social-informational uses for social network sites.

- **H1a**: Social network site efficacy will increase social-informational use of social

network sites during transition.

- **H1b**: Social network site efficacy will increase supportive use of social network sites during transition.

Hypothesis 2: social network site support

The use of social network sites has been tied to outcomes such as social capital (Ellison, Steinfield, and Lampe, 2007) and increased social participation (Park, Kee, and Valenzuela, 2009). Therefore, I expect that use of the social network site can produce tangible benefits. Studies in a variety of settings have demonstrated the supportive potential of ICTs, and particularly social media (e.g. Bambina, 2007; Mesch, 2005; Quan-Haase, 2007). I hypothesize that supportive uses of social network sites will increase social support and act as a buffer to experienced and perceived stress (Cohen, Kamarck, and Mermelstein, 1983). Following the main effect hypotheses (Cohen and Wills, 1985), I expect that supportive uses of social network sites will exert a direct positive effect on adaptation that is not completely mediated by experienced support.

- **H2a**: Social network site support will increase received social support.
- **H2b**: Social network site support will increase adaptation to transition.
- **H2c**: Social network site support will decrease experienced stress.
- **H2d**: Social network site support will decrease perceived stress.

Hypothesis 3: social network site social-informational processes

The individual in transition is challenged to learn about his or her new environment and role, and build a supportive network (e.g. Ashforth, 2001). By facilitating connections to peers and enabling social surveillance (Joinson, 2008; Lampe, Ellison, and Steinfield,

2006), the social network site supports these transitional needs. Therefore, I expect that social-informational uses of the social network site will lead to increased social support, and increased adaptation to transition.

- **H3a**: Social-informational social network site use will increase received social support.
- **H3b**: Social-informational social network site use will increase adaptation to transition.

Hypothesis 4: support and stress during transition

While I expect to see a positive effect of social network site use on the individual transitional factors, I do not expect the relationship to be fully mediated (i.e. controls rendered non-significant). Therefore, I expect to see that social support continues to exert a positive effect on adaptation to transition, and stress continues to exert a negative effect on adaptation to transition.

- **H4a**: Social support increases adaptation to transition.
- **H4b**: Experienced stress decreases adaptation to transition.
- **H4c**: Perceived stress decreases adaptation to transition.

5.5.4 Model evaluation

Model fit

The SEM was evaluated with the Mplus 6.0 software, employing the maximum likelihood estimator used in general modeling. The model's sample size was 789, with 57 dependent variables, 3 observed independent variables, and 7 continuous latent variables. On estimation, the model converged properly; indexes of model fit are presented

in Table 5.23. The primary indices of model fit are the χ^2 test of the one factor model, and the Root Mean Square Error of Approximation (RMSEA). These are the most commonly applied indices of model fit in SEM (others include the CFI, TLI, AIC, BIC, IFI, GFI, etc.). The χ^2 test explores if the data fits a single factor solution, with the null hypothesis a single factor fit, which is rejected at the p=0.000 level. Because the χ^2 test is extremely sensitive to sample size and violations of normality, researchers often draw on the RMSEA as a flexible indicator of model fit. Hu and Bentler (1999) argue that RMSEA values below .06 indicate satisfactory fit, and RMSEA below .10 indicate acceptable fit. The RMSEA of the model, .056, strongly indicates satisfactory fit. The rejection of the null hypothesis in the χ^2 test appears to be driven by sample size.

Table 5.23: Indexes of model fit

	Estimate	Note
RMSEA	0.056	*90% CI:* 0.055/0.058
χ^2 Test of Model Fit	p = 0.000	*Value:* 5910.574
CFI	0.799	
TLI	0.790	
AIC	110162.586	191 Free Parameters
BIC	111054.703	191 Free Parameters
SRMR	0.099	
Observations	789	

Model results

The results of the SEM are reported in Figure 5.5 and Table 5.24. Of the eleven specified hypotheses, eight were supported. First, I observed that social network site efficacy increases supportive and social-informational uses of social network sites. Individuals with greater mastery and self-efficacy in the sites appear to get more out of the sites. Second, I observed that social network site support (SNS-S) increases received social

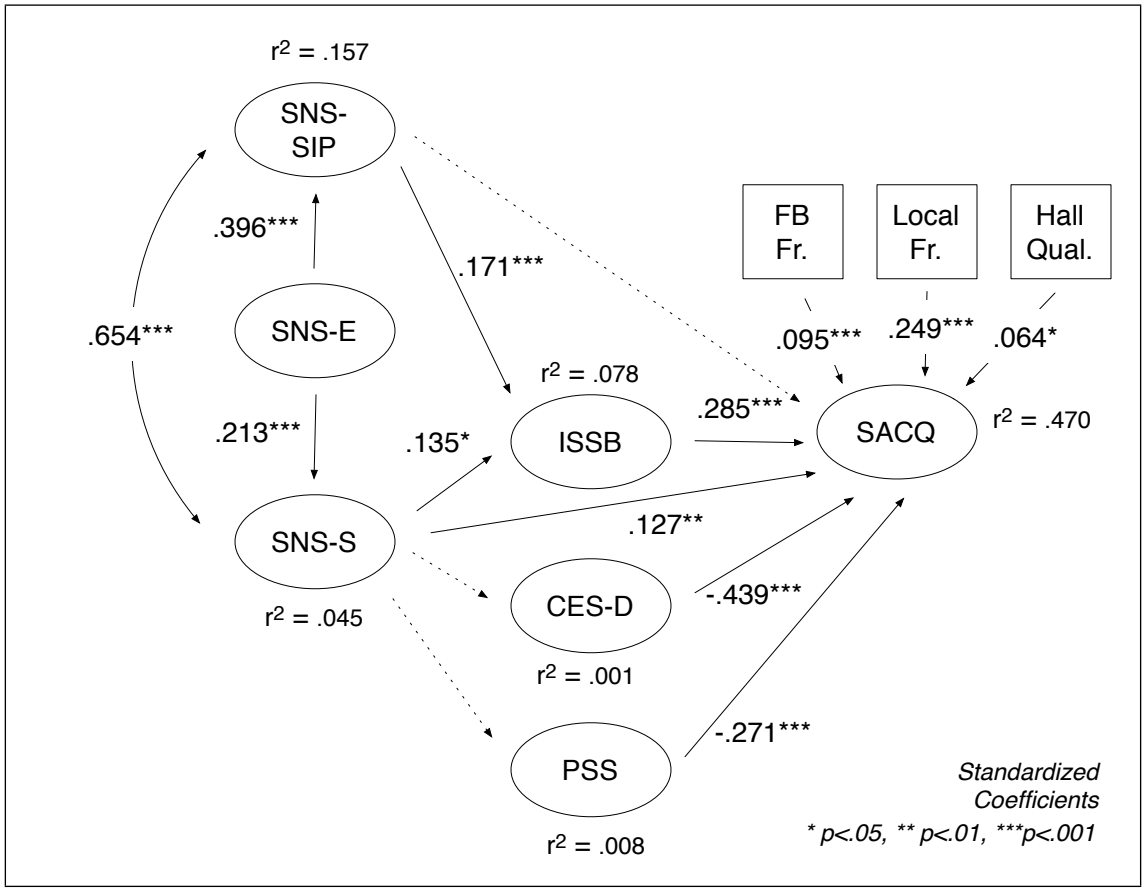


Figure 5.5: Evaluated structural equation model

support (ISSB), and increases adaptation to college (SACQ). Consistent with the main effect and buffering effect hypotheses, I observe both a main (SNS-S → SACQ) and mediated (SNS-S → ISSB → SACQ) effect of social network site support. A main effect of social network site support on stress (PSS and CES-D) was not found.

The third hypotheses specified a relationship between social-informational processes in social network sites (SNS-SIP) and social support (ISSB), which was supported. A relationship between SNS-SIP and overall adaptation was not found, indicating that social support mediates this relationship. Finally, the relationship between the controls and adaptation was tested, and all hypotheses were supported. Social support increases adaptation, while stress reduces adaptation.

Table 5.24: Estimates of the structural equation model

Hypothesis	Path	β	Std. Err.	z	$p>z$	Outcome
H1a	SNS-E → SNS-SIP	0.396	0.034	11.591	0.000***	Supported
H1b	SNS-E → SNS-S	0.213	0.034	11.591	0.000***	Supported
H2a	SNS-S → ISSB	0.135	0.058	2.341	0.019*	Supported
H2b	SNS-S → SACQ	0.127	0.049	2.601	0.009**	Supported
H2c	SNS-S → CES-D	0.028	0.044	0.646	0.518	Not Supported
H2d	SNS-S → PSS	-0.003	0.042	-0.080	0.936	Not Supported
H3a	SNS-SIP → ISSB	0.171	0.058	2.945	0.003**	Supported
H3b	SNS-SIP → SACQ	0.003	0.050	0.065	0.948	Not Supported
H4a	ISSB → SACQ	0.285	0.036	7.952	0.000***	Supported
H4b	CES-D → SACQ	-0.439	0.048	-9.212	0.000***	Supported
H4c	PSS → SACQ	-0.271	0.050	-5.443	0.000***	Supported
Obs.	789					

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion

Across disciplines and methodologies, researchers have consistently found that adaptation to transition is facilitated by the presence of support. Support can come in many forms; simply having a supportive network, or being able to call on others for help are common examples. Therefore, it should come as no surprise that an inherently connective technology, such as a social network site, would provide means for the acquisition of support facilitating transition.

The model, as described in Figure 5.5, is largely in line with theoretical prediction. I predicted that supportive and social-informational uses of social network sites would be associated with higher levels of social support. Indeed, as an individual reaches out to his or her network on a social network site, their experienced support rises, as does their overall adaptation to transition.

In three cases, hypotheses were not supported. First, there was no main effect of social-informational uses of social network sites during transition on adaptation. Social-informational uses facilitate one's understanding of their environment, roles, and networks. Once individuals understand their environment, they are better able to call on others for support, thus the highly significant relationship between SNS-SIP and received social support.

In the other two cases of hypotheses that were not supported, a main effect of social network site support was not found on stress measures CES-D and PSS. This indicates that social network site support alone does not reduce the stress of transition. In future formulations of the model, it may make sense to re-instrument the model so that ISSB acts on CES-D and PSS. Perhaps in that formulation I may find paths between supportive uses of social network sites and reduced stress. It should also be noted that in the multiple regressions, a positive relationship between perceived stress and the social-informational role factor was identified. It seems possible that some participation in social network sites might actually increase stress.

Employing multiple regression and structural equation modeling, I have demonstrated that use of social network sites during transition, for supportive and social-informational purposes, is associated with increased social support. Supportive uses of social network sites are also shown to exert a positive, direct effect on adaptation to transition. While these findings are associational in nature (inherent in cross-sectional modeling), they support the concept that online support fosters received support, which

in turn furthers adaptation to transition. Along with the other supportive structures (e.g. institutions, groups) employed during the transition, the social network site appears to be a useful place to turn to address needs in transition. In doing so, individuals are able to find support that facilitates their adaptation to transition.

5.6 Qualitative Analysis

To understand the role of social network site use during the transition to college, I conducted semi-structured interviews with freshmen that had recently completed a transition to college[4]. The purpose of the interviews was threefold. First, I wished to understand the transitional population's use of social network sites and their attitudes towards disclosure and privacy. Second, I wanted to elaborate processes of transitional support in social network sites. This work both contextualized the processes of support I have modeled and allowed me to reflect on of the ecological validity of my findings. Finally, I wished to explore how students draw on social network sites as information resources during transition. This research perspective is guided by everyday life information seeking (e.g. McKenzie, 2001; Savolainen, 1995) theories of information behavior.

5.6.1 Questions and method

As described in the introduction, the goals of the qualitative analysis were to understand the population's use of social network sites, to understand support processes in social network sites, and to understand how students integrated social network sites into their everyday information seeking during transition. To address these research questions, I conducted semi-structured interviews; the script for the interviews is presented in

[4]In this case, transition is understood as the first year of college.

Appendix C.

The interviews, which lasted approximately 50 minutes, were broken down into six topical blocks. These blocks were:

1. General experience
2. Audience and motivations
3. Stress and support
4. Transitional uses
5. Privacy
6. Information and attributes

In the spring of 2010, I interviewed freshmen from the University of North Carolina class of 2013 that were active Facebook users. Participants were solicited through campus mass-mailing, and by personal invitation to previous survey participants that indicated willingness to participate in future research. 15 students were interviewed; the sample is composed of nine females and six males. The interview procedure was as follows: I began with an overview of the study, and then I informed the participant of their rights and gained consent. Participants were then interviewed. At the end of the interview participants were debriefed, and were paid $15.00. In the following analysis, participants are referred to by their identifier (P1-P15) and, where appropriate, their gender. In some cases, quotes have been edited to preserve anonymity.

Upon completion of data collection, the interviews were transcribed, and the data were analyzed following the grounded theoretical approach described in Charmaz (2006). This particular analysis draws on blocks 3, 4 and 6 (Stress and Support, Transitional Uses, Information and Attributes) of the interviews; analysis was conducted with Atlas.Ti 6.0 software. The analysis process first involved open coding the relevant sections

of the interviews. Once the coding scheme iteratively stabilized, codes were primarily assigned from the codebook. Following this refinement of the coding scheme, axial coding was applied to cross-cutting codes. Finally, the axial codes were analyzed to identify themes in the data set.

The refined coding scheme is presented in Table 5.25. The codes are organized into three primary themes. The first theme, *Pre-Transition*, reflects the emergent uses of social network sites in preparation for transition. Notable pre-transition information behavior include joining the "Class of 2013 Group" and reaching out to upperclassmen through Facebook with questions about the transition to college. The second theme, *Social-Adaptation*, reflects the use of the social network site for the coordination of social activities and relations during transition. Examples include the use of the social network site to extend the friendship circle, obtain information about those recently met, and coordinate social outings with peers. The third theme, *Academic-Adaptation,* reflects the use of the social network site as an academic support. Examples of academic uses include the coordination of study groups through Facebook, and the use of Facebook as a tool to gain information about desirable classes. Challenges to academic success, particularly those related to time management, also emerge in this theme.

The following analysis explores each of these themes, presenting evidence of how Facebook was employed by students during their transition to college. While the data were analyzed using grounded methods, I do not claim the development of theory from this analysis. The goal of this analysis is to provide context for the other findings of the study. Because I worked with a limited sample and did not focus on theoretical saturation, theory building as defined by Glaser and Strauss (1967) is inherently limited.

With these caveats, I found the interviews to be informative regarding the general process of integrating Facebook into the transitional information world. In addition to the three main themes, I uncovered a critical incident, the "Facebook Roommate

Table 5.25: Refined coding scheme

Code	Occurrences	Density	Axial Codes	Themes
Support	59	16	A, PM, SM, SS	SA, AA
Friending	41	10	A, PM, SM, SS, T	SA, AA
Class of 2013	37	16	D, PM, SM, SS, T	PT, SA, AA
Events	34	12	D, PM, SM, SS, T	PT, SA, AA
Questions	34	12	D, PM, SM, SS, T	PT, AA
Information	31	14	A, D, PM, SS	PT, AA
Transition	28	2	SS, T	AA
Virtual Visit	27	14	D, PM	PT
Roommate	24	8	PM, T	PT, SA
First Steps	21	6	SM, SS, T	SA, AA
Groups	19	3	D, SM, SS, T	PT, SA, AA
Time Management	18	2	A, C	AA
Identity	14	10	A, SM	SA
Social Capital	11	7	A, SM, SS	SA, AA
Trust	10	6	SS	SA
Decision	10	7	D	PT, AA

Codes with 10 or more occurrences listed. ***Density****: Number of codes connected to this code.* ***Axial Codes****: A: Academic, C: Challenges, D: Decision, PM: Prior to Move, SM: Social Management, SS: Social Support, T: Transition.* ***Themes****: AA: Academic-Adaptation, SA: Social-Adaptation, PT: Pre-Transition.*

Finder", which is explored in depth. Finally, I encountered a number of negative cases, which are used to highlight differential perspectives on themes. I now present the three themes identified in the analysis, in temporal order. They are *Pre-Transition*, *Social-Adaptation*, and *Academic-Adaptation.*

5.6.2 Theme: Pre-transitional uses of Facebook

Of the 15 students I interviewed, 14 had Facebook accounts before coming to UNC, and all had experience with social network sites in some form. Of the 14 students that had Facebook profiles, all had joined approximately in the 2006-2008 timeframe, when

Facebook opened to high school students[5]. The one student that did not have Facebook prior to coming to UNC was an active MySpace user. Therefore, all of the students I talked to were experienced users of social network sites, with large, articulated networks composed of high school classmates, friends from summer camps and extracurricular activities, the extended family, and coworkers. All of the students I talked with reported characteristically high levels of use, most checking Facebook multiple times a day.

Because social network sites were already part of the students' everyday social process, it should come as no surprise that social network sites played an important role prior to the transition to college. I now discuss three such roles that emerged in my analysis. The first role is that of the "virtual visit," in which students draw on content and commentary from current students shared in the social network site when forming their opinion of the college. The second role is "informing," in which students engage in ad hoc mediated collaboration to address the informational challenges of transition. The third role is that of "connection," in which students pre-structure their transitional environment by populating networks in preparation of the transition. The second and third roles, information and connection, were uniquely addressed through the formation of the "Class of 2013" group.

The virtual visit

The campus visit is an important part of the college selection process. When students visit campus, they see the grounds, meet students, and get a sense of the environment (Perigo and Upcraft, 1989). A virtual visit shares many of these attributes. The virtual visit consists of browsing the pictures and profiles of currently-enrolled students in order to get a realistic picture of what campus life is like (P1, P2, P5, P11, P10, P13).

> I had friends from my high school that went here. I know students at every

[5]http://techcrunch.com/2006/04/26/facebook-goes-beyond-college-high-school-markets/

> grade, or every year, from Carolina, that went to my high school. So, I would always see what they were doing, like through photo albums, and through events. And I'm: "Oh, that's cool." (P5)

A virtual visit can be interactive, where potential students connect to current students through social network sites to ask questions about the campus environment.

> I used Facebook to talk with the seniors, one class above me, and they were all going to various different colleges, like Duke, and UNC. So, I would use Facebook, and write on their walls and talk about their experiences. (P11)

The virtual visit proved meaningful to potential students as it created a realistic impression of what campus life was like. One interviewee noted that you could see "what the dorm rooms looked like, things like that" (P2). Another noted how the visit left a positive impression, "because people were posting pictures and they were having fun, it's like you get a good impression, for the most part it's like UNC's a good school in general" (P10). In fact, P10's impression of UNC was so positive from Facebook interaction, he felt comfortable attending *without* a campus visit. He notes "and that's how I kind of saw the campuses and I guess I got to know like everyone, nightlife, weekends and stuff" (P10).

A number of students (P1, P2, P9, P11, P13) noted that their virtual visit factored into their decision to attend UNC. Virtual visits influenced choice through *comparison between schools*, and through *positive reinforcement* of the student's opinions[6]. P1 describes conducting virtual visits of a number of possible schools:

> I noted that the private schools didn't really have any groups on Facebook, or fan pages and stuff like that. And UNC had a lot, and it seemed like

[6]All of the students in my sample matriculated at UNC, and therefore the outcomes of the virtual visit are primarily positive. It is likely the case that other students conducted virtual visits and chose not to attend UNC.

> they had a lot of events going on. That's one of the main things that drew me to the school. (P1)

After P11 decided to attend UNC, he would return on virtual visits and ask questions of current students. Having the ability to connect with students reinforced his choice:

> I felt a lot more comfortable about coming to UNC, when talking to other people about how positive their experiences were here. After the fact, it helped increase my confidence. (P11)

While most students conducted a virtual visit, visits varied by their *degree of interactivity*. P6, for example, "was friends with some people who had graduated and gone to UNC, but I didn't reach out to them because they were at UNC" (P6). The experience of P5 and P6 were largely consumptive in nature, using their visits as a way to collect information about the campus, but not necessarily interact with current students. Most others students I talked to reported interaction with current students, including brothers and sisters (P4, P12), high school contacts (P4, P11, P9, P12, P15) and in forums such as the Class of 2013 group.

Informing

Almost all pre-transitional uses of Facebook were fundamentally oriented around *informing*, in which the student uses Facebook to address questions of relevance to the transition. I found that students were primarily interested in information about their local cohort, organizational information about the campus, academic information, information about the setting, and information about their new set of peers. The following section elaborates these pre-transitional questions.

- **Local Cohort**: Upon acceptance to college, individuals would post their acceptances on their Facebook profiles. Students reported using this practice to identify weak-tie connections (e.g. people from summer camps, etc.) that were also planning to attend the school, which would lead to conversation and re-acquaintance (P6, P12). P12 describes this process:

  > Facebook helped with deciding where I wanted to go for college [because it] was basically notifying me about what my friends wanted to do. I mean, I find out at school from the people that I hang out with all the time. But the people that I knew from *out of the county*, I found out from Facebook. I found it kind of convenient. (P12, Emphasis added)

- **Organizational Information**: Students frequently turned to Facebook when they had functional questions about organizational aspects of college life. These types of questions include information about requirements and deadlines, particularly those pertaining to financial aid (P3, P12). Other students were interested in computing requirements (P5) and ticket policies for sporting events (P15).

- **Local Information**: Facebook proved to be a very valuable place for discovering "insider" information about campus and its setting. Students used Facebook to find out about the nightlife (P11, P12), how rush works (P13), where stores are located (P1), information about the bus system (P1), on-campus events (P2, P3), and commonly, information about life in the dorms (P2, P3, P5, P9, P11, P15).

  > I used Facebook to try to decide where to live. *Just asking a bunch of people what their dorms were, and how they liked it, and all that.* I ended up talking over Facebook with one of my other friends who was a senior, and then me, him, and two of my classmates in my same grade decided to all live in the same dorm together. (P11, Emphasis added)

Interviewer: When you talk about looking at the profiles of other people, were you looking at their pictures, looking at what the campus is like, things like that?

P2: Mm-hmm. What the dorm rooms looked like, things like that. (P2)

- **Academic Information**: A number of students used Facebook to contact current students and discuss the collegiate academic workload, and compare it to the high school workload (P9, P11, P12). I believe this discussion served two purposes: First, it helped "knock down" rampant in-group myths regarding the collegiate workload. Second, it allowed the student to prepare for eventual changes in academic workload. Students also used Facebook when preparing their schedules, finding both "good" classes and "good" professors (P6, P8, P9, P11). Students also engaged in informal counseling, particularly regarding academic major trajectories, such as finding a manageable order of pre-med requirements (P7, P12).

  I asked about how *hard the classes were versus high school* and what her favorite part about UNC was. She told me a lot about how college is different than high school, and with your time, what freedoms you have and what you don't, which you don't really not have any freedoms. (P9, Emphasis added)

  I was worried about whether or not I should take CHEM 1 or 2. I had placed out of it, but I wanted to know whether I needed it as a refresher for chemistry. The people that I talked to were the people who I knew were probably pre-med, or who were also science majors, and other people who were interested in chemistry. So, I wanted their opinion, so I asked them. (P12, Emphasis added)

- **New Peers**: Perhaps the most engaging use of Facebook during the transitional process was exploring the new set of peers. Almost all students reported using Facebook to connect with roommates, suitemates, hallmates, orientation group peers, and "interesting" people on campus. Almost universally, students reported looking at each other's pictures, examining their interests and shared friends, in order to better understand what the new cohort was like.

    > I feel like, when you're someone's friend on Facebook, you learn a lot about them, almost without even getting to meet them, just based off pictures and stuff. (P5)

A number of students counter-indicated Facebook's informational value during transition, particularly regarding organizational information (P5, P6 P8, P9, P11). P5 states "I wouldn't go to Facebook first. If it was something that I knew had a definite answer I would go find it on the actual website. Facebook was like an opinion thing" (P5). The "opinion" versus "hard fact" dichotomy was mentioned by P3, P5, P12, and P14, with students indicating the value of university websites for factual information, and Facebook for "opinion" information. Other students preferred relying on a family members (P12) or their local network (P8) when they had important questions.

Connection

In addition to learning about new peers, almost all students used Facebook to connect with fellow members of the transitional cohort, pre-populating their network in anticipation of the transition. Recalling the analysis of Section 4.1 (Factors of Association), the configuration factor of shared residence emerged as a strong and predictive factor explaining tie formation. Interviews with students provided insight into the mechanisms that may have produced early advantages for configuration factors.

Figure 5.6: Class of 2013 Facebook group

In the pre-transitional environment, students heavily relied on structural and configuration factors when articulating pre-transitional networks. The primary factors discussed in interviews were residence hall membership and orientation group. These structural factors appear to be valuable in that they preestablish a context, and they provide a searching and finding aid. Individuals may not have known each other's names, but they could search and browse by dorm, as most dorms formed Facebook groups prior to transition.

> I joined my dorm floor's Facebook group, and then my actual dorm, too. So, I got to meet them. (P9)

> After CTOPS [orientation] I did start becoming friends with people at UNC, just people I had met, but not everybody. (P6)

Class of 2013 group

The main organizational foci that structured pre-transitional activity was the Facebook *University of North Carolina Class of 2013* group (hereafter, "Class of 2013 group"; Figure 5.6). Within the group, students participated in a discussion board, in which they were able to ask, and generally have answered, all of their questions about the transition to UNC. As P8 notes, "Yeah, back in the class of 2013 group, there was discussions about, 'Are these professors good?', or 'Are these professors bad?', and it's a good way to get personal advice about that type of stuff" (P8).

Within my interviews, all students reported using the Class of 2013 group. The group was valuable for answering each of the five question types I identified: local cohort, organizational information about the campus, academic information, information about the setting, and information about their new set of peers. Students felt that the information was of high quality, due to the fact that current UNC (primarily freshmen and sophomores) students actively participated in the group as informative moderators (P1, P2, P3, P7, P8, P15).

> There were a lot of upperclassmen who I guess joined the forum. They basically kind of monitored the classes discussions like, 'Oh take [redacted] for chemistry, or don't take so-so for Econ.' You know, give good advice. They would also give advice about C-TOPS and registration. We were just completely clueless about what to do. (P1)

The discussion board within the Class of 2013 group contained 358 topics, with 10,811 posts. The average number of posts within a topic is 30.19 (σ=95.71). Nineteen topics had more than 100 posts, and the "Roommate Finder" thread was the largest, with 1,439 posts. An example of a discussion thread is presented in Figure 5.7.

According to those I spoke with, the informational value of the Class of 2013 group was significant. In addition to providing a location where transitioning students could

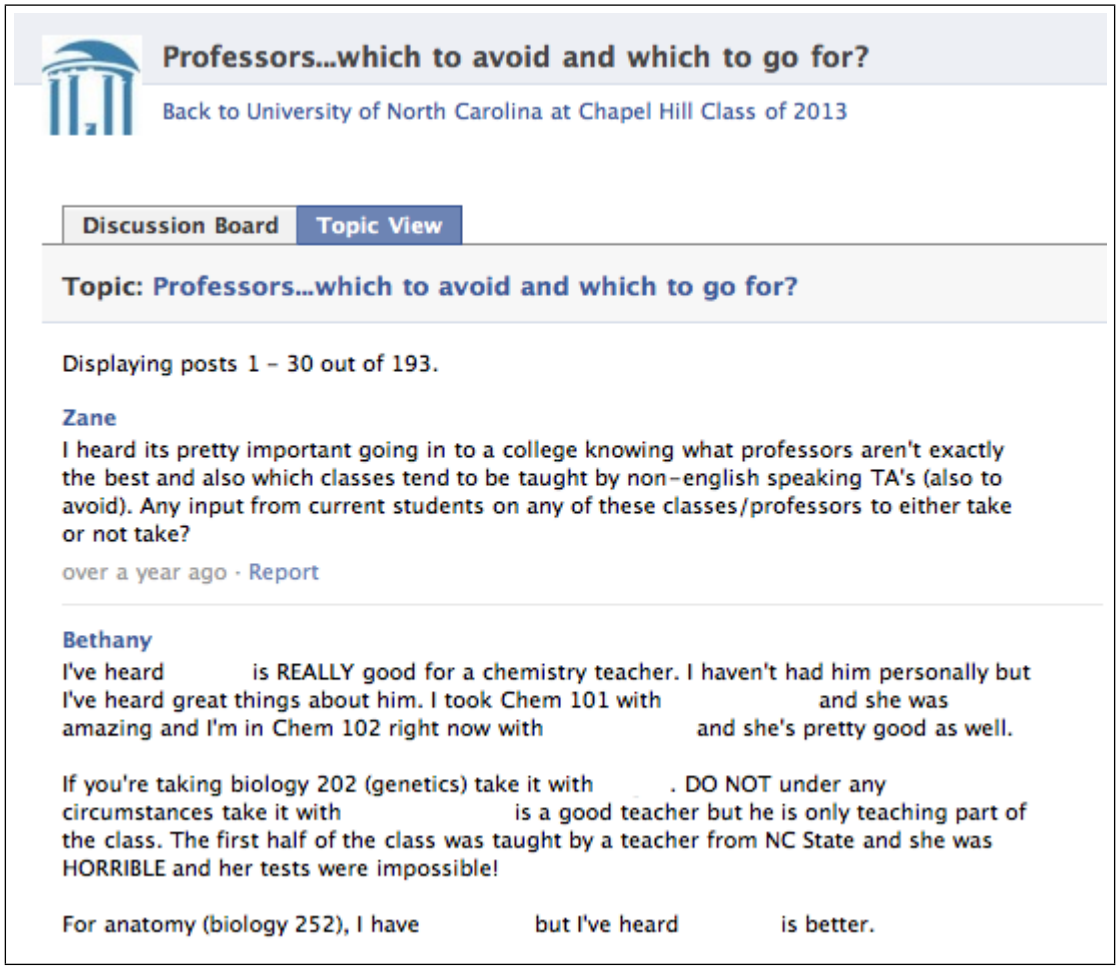


Figure 5.7: Class of 2013 Facebook group discussion thread

address their information needs, it also served as a place for individuals to connect around shared interests (P7), create Facebook friendships (P8), and locate other groups, such as those for the dorm or dorm floor (P9).

> *Interviewer*: And did you feel most of your questions that you did have, got answered?
>
> *P7*: Yeah. (P7)

Roommate finder

Within the Class of 2013 group discussion board, the most popular thread ("Roommates") was known colloquially as the "Roommate Finder." To participate in this thread, individuals filled out a 47 question survey and posted it to the public forum. The survey, described in Table 5.26, contained a list of questions about student preferences, habits, and goals. The explicit purpose of the Roommate Finder was to match a student with a potential roommate.

Of the 15 students I interviewed, six found their roommates through the Roommate Finder thread (P1, P2, P6, P8, P9, P11) and all reported positive outcomes. The process is described by P1:

> And everybody just posted a survey up and then, you know, you were given numbers according to which post you put up, and so if you saw a survey that you think would work you would contact that person, and then you would message back and forth and come to an agreement. And I think the system worked out really well. (P1)

P6 echoes P1's experience:

> There was a formatted quiz or list of questions for you to answer about yourself. And then you posted it to the thread and somebody was supposed to go scrolling through the different threads and find you and then message you. And you're supposed to start talking. And me and my roommate just sort of found out that we had a lot in common and talked for a while. And around the point where we realized we really needed to pick a roommate because we really need to apply for housing, we were like, 'you know, you're not too bad.' (P6)

P8 describes the experience:

Table 5.26: Roommate Finder questionnaire items

Name	Tolerance of others	Bad Habits
Hometown	Privacy	How important are your grades?
High School	What do you consider clean (in terms of your room)	How often do you talk on the phone?
Screen name (if you want)	Promiscuity	Does drama often follow you/do you enjoy it?
Gender	Tolerance of opposite sex in the room or staying the night	Do you know a lot of people at UNC?
Race	Level of Independence	Outgoing or shy
Sexual Preference	Snore	Active or lazy
Top Three Dorm Preferences (in order)	Morning person or stay up late	How excited are you to start in the fall?
Major	Usual bedtime	Medical condition
Religion and its importance to you	Usual time waking up	Activities you want to become involved with
Political Beliefs	Hobbies	Future Sorority sister?
Sports	Music	Reason for attending UNC
Study Habits	TV shows	Honors?
Do you drink and if not do you plan on it in college	Food	Do you have a boyfriend/girlfriend?
Smoke	Stores	Anything else?
Drugs	Organization	

47 items. Question employed the following prompt: Hey guys! I though this was a pretty comprehensive roommate survey. Add anything to it that you want! Congrats to everyone!

> 'Hey we look pretty compatible. Would you be interested in being roommates?' And so we talked for a little bit and found out we had very similar interests and so we decided to be roommates. It was kind of like online dating. (P8)

In discussing the Class of 2013 group and Roommate Finder with interviewees, a number observed that they wished they had used Roommate Finder (P5, P15). As P5

notes, "I should have done the Facebook finder in hindsight. Because everybody I know, it's like best friends, they're roommates next year again" (P5). Because of Roommate Finder, students developed an ontology to describe their roommates. Roommates were either friends, Facebook, or random. Friends identified a pre-campus relationship, and random meant that the student had not matched using the Roommate Finder. It should also be noted that the University offers a conceptually similar online matching service, but it was not nearly as popular as the Facebook thread.

The Class of 2013 group and the Roommate Finder represent novel, self-organized collective action in response to the challenges of transition. Scholars have explored the motives for such action, finding reciprocity (e.g. Kollock, 1999; Ostrom, 1998) to be a motivator of contribution (P1, P12, P14, P15). The presence of upperclassmen indicates reciprocity as a motivator; such "Class of" groups have existed for years. While reciprocity is often used to push back on rational choice explanations of community (e.g Simon, 1955), the group's use does seem to be temporally and rationally constrained. Shortly after the students transitioned to campus, the forum was no longer heavily trafficked as "physical" support networks took over.

> *P7*: I feel like after we got to UNC campus, nobody really got onto the Class of 2013 group anymore.
>
> *Interviewer:* So after people came to UNC...
>
> *P7*: I feel like everything stopped, if you look back the posts ended at August. Nothing much really happened. At least I haven't been on it that much. (P7)

5.6.3 Theme: Use of Facebook for social adaptation

The second theme that emerged in the interviews was Facebook's role in adaptation to campus, particularly in early-stage transition. The first few weeks of college are

a remarkable time for socialization, with students meeting potential friends in their hall, their classes, their jobs, clubs, and organizations. In this section, I describe how students use Facebook for social adaptation to transition. Particularly, I explore how students use Facebook to extend their circle of friends, how they use Facebook to access information about people they are meeting, and how they use Facebook to coordinate social activity.

"Friending" processes

Uniformly, students described Facebook as a critical part of their "friending" processes.

> Well I find that for probably everyone, once you meet someone, you know their name, hang out with them a few times, you go and friend them on Facebook and then you kind of check out their profile. Then you know a little bit more about them and then you start posting on walls, and then you guys hang out some more because you get each others' numbers through wall post or something and I don't know. That's happened to me a lot. (P1)

P1 describes a process in which connection is established offline, and then taken online. Previous research (e.g. Lampe, Ellison, and Steinfield, 2006) has documented the offline-to-online nature of Facebook "friending" on the college campus, and the accounts provided by my sample strongly support this assertion. Friendships are primarily oriented around shared residence (P2, P3, P7, P8, P10, P15), shared classes (P2, P3, P7, P12, P14, P15), and organizational settings such as clubs or religious services (P3, P8, P9, P10). These social contexts provide a setting for mixing, which is then taken online to deepen the bonds through reciprocal information share.

In its current iteration, Facebook's interface does not support associational "pivot points," such as classes or club listings, through which students could easily find each

other. Discovery and "friending" is either done by browsing groups (Class of 2013 group, dormitory groups - P2, P9, P10, P11) or friends' profiles (P8, P9, P11, P12), or through Facebook's search function. To employ search, students must learn each other's last name or other highly identifying information, something that generally does not come up in "getting to know you" conversation. P9 describes these dynamics:

> *P9*: When you're talking to people and you figure out their first and last name, it's like, well, when you meet someone, then you ask them where you're from or whatever, that's the basic, standard questionnaire when you meet someone, at least here. And then you don't know whether to say your hometown or your dorm. That's always a fun one.
>
> *Interviewer*: So, basically, to add that person, you have to ask them their last name?
>
> *P9*: Yeah, what their last name is and how to spell it.
>
> *Interviewer*: [laughs]
>
> *P9*: It gets weird. [laughs]
>
> *Interviewer*: I could see that as being awkward, yeah. OK.
>
> *P9*: Yeah. (P9)

Respondents also described social and technical workarounds to issues of finding an acquaintance's identifier. These include finding a highly connected individual, such as an orientation leader, that likely already has a connection with target individuals (P13, P15). P9 described how some used the campus BlackBoard service to download class rosters:

> I know people who did that and friended people in class like that. That's how I actually got a bunch of friend requests was from someone who went on the class roster and added me. (P9)

Social information

All interviewees felt that Facebook was a place they could turn to find out about the people they were meeting. Indeed, this "backgrounding" process was commonly cited as one of the most useful transitional uses of Facebook. These findings echo the Lampe, Ellison, and Steinfield (2006) finding that "social searching" was a primary use of Facebook among college students. The information presented on a Facebook profile serves many purposes. I now discuss two uses of the information that emerged in the interviews: connection and social comparison.

The Facebook profile is a connective infrastructure, through which conversation can be extended and friendship can be deepened. Connection can occur through the Facebook profile (e.g. direct message, wall post) and with identifiers shared on the Facebook profile, such as the mobile phone number. In the progression towards friendship, a Facebook friendship was a first of many steps towards a "friendship" relationship. In line with media multiplexity (e.g. Haythornthwaite, 2001; Hogan, 2009), the students I talked to indicated that stronger friendships commonly employed more forms of communication, and that social worlds were segmented by technologies (P2, P9, P11, P13, P15).

> My good friends, not only do I talk to them on Facebook, but I usually talk to them on the phone, or through text as well, which are more immediate means of communication. (P11)

When asked about differences between Facebook profiles and texts, the most common answer was that texting was used for proximal and immediate coordination with closer or established friends:

> I have one friend with whom I use Facebook a lot, for coordinating lunch. But, for the most part, I use texts, because it's more immediate. You know?

(P11)

As students move from being acquaintances to friends during the course of the transition, the profile served as a point for "social comparison." Students compared their experience in interpersonal interaction with an individual to their expectations formed by that individual's Facebook profile. This social comparison is particularly meaningful when considered along a temporal trajectory, where individual information seeking strategies and motives change as the relationship progresses (e.g. Altman and Taylor, 1973). Over the course of a deepening relationship, the Facebook profile would provide new insights as inside jokes and personal preferences were shared and communally understood.

Information behavior in early stage transition (i.e. early in the network-building process) tended to prioritize *socially reliable* information, signals that would be generally characterized as *assessment signals* as employed in Donath's online signaling framework (Donath, 2007). These socially reliable information types include pictures, the friend network, and wall posts. The following extended quote captures the general perception of socially reliable information: it says more about you than things you say yourself, much like Goffman's back-stage.

> *Interviewer*: So when you're looking at their profile, what are the elements of the profile, what things on their profile are most important in helping you know more about those people?
>
> *P1*: I'd say everything about it. I mean, you go in, you look at their wall, the kind of people that post on their wall, what language they use, the things they post on their wall, going to their home town, their interests, I guess their personality really shows through like whatever groups they join in or how they phrase certain things. Also pictures.

Interviewer: Right. Pictures, yeah.

P1: Yes. Flip through a lot of their pictures and you just get a good sense of them as a person or at least how they want to present themselves on Facebook.

Interviewer: Right. And do you feel like the information that maybe people share on their walls, does that say more about them maybe than the information that they're sharing about themselves?

P1: I would say so.

Interviewer: You would.

P1: Because it's the language you use, the context and just little things.

Interviewer: It is the little things.

P1: Yeah. (P1)

Every student I talked to mentioned the importance of pictures, and most mentioned the importance of the wall and friend network. The sentiment was echoed almost verbatim by P2:

> Pictures is a big thing, definitely. I guess sometimes I'll look at interests and stuff, but mainly when I get on Facebook I'll just look at pictures or what people have written on their wall. And I feel like that's the best way to really get to know someone. (P2)

And P11:

> *P11*: Whenever I wanted to find out about a person, I would just look at their Facebook profile and view their pictures. Personally, I think that that, because it is all about you, it gives a great sense of who you are as a

person, your Facebook profile does. So, for me, it helped me get a better understanding of what kind of people I was meeting.

Interviewer: I've heard you mention pictures a few times. Is that the most important bit of information?

P11: Probably. Probably, just pictures and their walls, and things like that.

Interviewer: Their walls...

P11: It also helps you get a sense of who is really good friends with who, just by looking at who's writing on whose walls.

Interviewer: Do you ever do things like look at their music interests, or movies, or that kind of thing? Books?

P11: Occasionally. Occasionally.

Interviewer: It seems that's kind of a third level of information?

P11: Yeah. (P11)

I believe that students prioritize socially reliable information for the following reasons. First, socially reliable information tends to be rich in its informative capacity. An individual's pictures or back-and-forth wall conversations can convey information on many relevant Blau factors simultaneously. Second, information such as wall posts, network membership, and tagged photos are *verified*, as these information types require reciprocal action to exist. Third, socially reliable information often enables the discovery and comparison of social location (in Blau-space); a potential friend can compare him or herself to the extant network, and estimate the odds of successful friendship based on observed prior friendships.

In later stages of the transition, socially reliable information is still highly important, but it serves primarily to provide context and deepening within an ongoing relationship. Following the Ren, Kraut, and Kiesler (2007) conception of common identity

and common bond theory in online community, there is evidence that information behavior shifts from common identity orientation to common bond orientation over the course of the year. In early stages of transition, students appear to be primarily oriented around the common identity of the transitional cohort (e.g. being freshmen, Carolina students, Class of 2013, etc.). As friendships develop within the cohort, ties and information sharing turn toward common, shared bonds. The interviews provided two pieces of evidence to support this transition. First, students reported employing stronger privacy settings as the year went on, indicating that profile disclosures moved towards enacted ties, rather than potential ties[7] (P1, P2, P4, P7, P14, P15). Second, the nature of interaction shifted from "informing" uses to a focus on coordinated action within groups of friends. I now discuss these processes of coordination.

Coordinating social activities

When asked to prioritize the value of Facebook's features during transition, the use of Facebook to coordinate events emerged as the most important use. All students I talked to mentioned the value of events, and most felt that events were integral to their social lives and their relationship to the campus at large. Facebook's event feature allows for the simple creation of "events", through which students can coordinate activities such as parties (P1, P2, P4, P5, P15), group activities (P1, P4, P5, P6, P8, P10, P12), and study sessions (P4, P9, P11, P13). An example of an event page is presented in Figure 5.8.

[7]Most of the students that did not report changing their privacy settings were already "friends-only" at the beginning of the school year. I only interviewed one person, P13, that did not use privacy settings.

Figure 5.8: Example Facebook event page (public event)

Coordinating outings

Students were primarily satisfied with the ease with which they could create events and invite friends to events. Because event creation was trivial, and norms supported the creation of events for any purpose, events were plentiful:

> Per week, you probably get 30 different events sent to you. Like this is going on this weekend, this is going on tomorrow; this is going on next month. (P10)

A number of respondents indicated that the proliferation of events fostered a sense of inclusion. P5 notes that "Facebook in the first couple weeks was crazy because that's when everyone was inviting people to events" (P5). The sentiment is echoed by P8, who felt that events "make me feel connected in a way that I knew what was going on" (P8).

Filtering and choosing

As noted by many interviewees, the sheer volume of event invitations presented a challenge: which ones to attend? The students I interviewed reported two primary strategies for management of events. First, they would look for friends that had RSVP'd to the event. This simple strategy allowed for easy prioritization of the events.

> So, Facebook, on your home page, it'll show, like so and so is going to this. And especially if there's multiple friends that I have that are going to a certain event, then I'll be more inclined to look at and think that it's a bigger deal. You know, if it seems to be a more popular event. (P11)

P11's quote also captures the important second strategy, which is "watching and waiting." If a student is invited to an event, they have four options: *Accept, Maybe, No*, and ignore. On any particular day, Facebook's news feed algorithm promotes events that are popular in the student's network. Although the news feed algorithm is unknown, it appears popularity is loosely a function of how many of the student's friends are attending the event, as indicated by a "Yes" reply. Students would then make just-in-time decisions about events that appeared popular because they arrived in the news feed. P4 describes the events that have risen to the top of her news feed on any particular day as being "Top Status."

Social awareness

Finally, events provide a window onto the larger interactional habits of the freshman cohort, which has both positive an negative implications. P5 describes the power of this ability, while noting the challenge inherent in living so publicly.

> On Facebook you can pretty much figure out what anyone's doing, what they're going to do by, 'Oh so and so's going here to this party', There could

> be two parties on one night you figure out someone's going here. I feel like Facebook's almost dangerous to a certain extent because you can find out almost anything about what someone's doing, and where they're about to go. (P5)

Most students I talked to (P1, P2, P4, P7, P8, P9, P11, P13, P14, P15) noted that events and the event notification system increased their awareness of the campus itself. Because event types are heterogenous, and generally each event on campus, from a dorm party to a special lecture, has a Facebook event listing, students were able to broadly track the range of activities available on campus.

> That way I feel like I know more about what's going on around campus and which one of my friends, what kind of people I might meet if I were to go to these events. I definitely feel like that has made me more connected to the people on campus and just knowing what's going on. I don't know, I just think that's really helpful. (P2)

In addition to concerns about privacy, two respondents indicated that events sometimes created the perception of exclusion. While private events are common, and not reported to the news feed, interviewees did note some apprehension regarding public events to which they were not invited.

> I'll be like, oh, I wish I could have done that. I'm sad now that I didn't get to do that. Or, I'm jealous. Or, I can't believe they left me out. (P2)

Overwhelmingly, however, events were regarded as one of the most positive and important aspects of mediated sociality during the transitional process.

5.6.4 Theme: Use of Facebook for academic adaptation

The final theme that emerged in the interviews was Facebook's role in academic adaptation, which occurred at all phases of the transition. The students I talked to described multiple academic uses for Facebook. Some of these uses, such as use of the Class of 2013 group, were previously discussed. This section focuses primarily on functional uses of Facebook for academic adaptation during transition. First, I explore the use of Facebook in preparation for academic adaptation. Second, I discuss how students employed Facebook in coordinating action that facilitated academic adjustment.

Preparatory uses

As described in the analysis of pre-transitional uses of Facebook, students frequently turned to Facebook when they had questions about the transition. Students were commonly able to use Facebook to address questions about academic success during their transition. Particularly, students used Facebook to gather information that would prepare them for the academic challenges of transition. I now describe three such uses. First, the students I talked to used Facebook to request support regarding macro-level academic issues, such as majors and course trajectories within majors, or strategies for managing academic workload compared to high school (P2, P7, P8, P10, P11). The presence of upperclassmen and a cohort with similar questions meant questions asked in Facebook, and particularly in the Class of 2013 forum, would be met with reliable information.

> The discussion threads were very helpful. People with the same major. I'm a music major so we can talk about auditions coming up and stuff on there. I found out information that way. (P2)

> I did want to do pre-med and so I talked to a friend and she was 'everybody does biology for pre-med, you need to stand out. UNC has really great

> school public health so you should try one of those subsets of public health.' (P7)

Second, students commonly requested and provided micro-level academic support, particularly regarding one-time issues such as recommendations about a good elective or professor (P8, P9, P11). Prior to arrival at campus, students had to rely on the advice of upperclassmen, procured primarily through interpersonal ties or the Class of 2013 group.

> Yeah, back in the class of 2013 group, there was discussions about, 'Are these professors good?', or 'Are these professors bad?', and it's a good way to get personal advice about that type of stuff. (P8)

> I've heard some people put on a status: 'I need a class to take. An easy class.' (P5)

Finally, students used Facebook as a distributed reference service, to which they could turn when they had academic questions. For example, if an individual had subject-specific needs, he or she could turn to members of his or her network for help and answers regarding specific problems. P4 describes answering one such request for help:

> She put on her status that she will need help with her calculus and I specialize in that. I love math so I just went in. I'll go ahead and call her and just basically help. (P4)

Students also described Facebook as a safety net — a way to keep up on notes (P15) and assignments (P13, P15). Facebook also provided a useful space to "vent" about academic issues, as "venting" would generally be met with compassion or offers of help (P13, P2). Facebook provides somewhat of an academic safety net to students, in which both tangible and emotional academic support needs can be readily met.

Coordinating supportive action

Among the students I talked to, one of the primary uses of events was to organize study and group sessions. In fact, students reported using many facets of Facebook's infrastructure to coordinate collaborative academic action, whether it was group work, study sessions or homework help. This particular theme was deeply integrated, with all students talking extensively about their academic uses of Facebook during transition.

Almost all students described using Facebook to set up study groups. The groups, managed either through Facebook group wall postings, or events, were initiated in Facebook but realized in person.

> And I've used it a lot for group projects in class, finding my group member, I guess my group mates. And all of us being able to communicate back and forth with each other. Everyone can see what's going on, the messages. That's what I've used Facebook for the most recently. (P2)

> It's a hundred-something person class, but there's 10 of us and I made an event on Facebook, 'History Study Party', and whatever. And I invited all of them and I sent a message saying, 'It's all in place. When do y'all want to start studying for this exam, or going over the study guide.' (P5)

Facebook's value as a tool for coordination appears to be related to both functional affordances and normative practices. Functionally, students felt that Facebook was superior to other collaborative technologies (e.g. Blackboard, e-mail, text) because of its flexible and effortless nature. Groups could collaborate asynchronously until a consensus was formed, in which case action would be taken.

> You don't have to actually arrange a time when everybody is free to meet. You can just reply when you happen to be in front of a computer. That

> is extremely helpful in planning study groups. If you have to meet with a group of people, the event thing is very helpful. (P8)

> I sent a message to everyone I knew who took my class in the last week and said, 'OK, these are the times I was thinking about studying and I'm free. When would you all be free to meet?' (P15)

While no student stated this explicitly, the sheer amount of time spent on Facebook may contribute to the perception of highly available, collaborative academic support:

> One time I put on my status that I'm struggling with this biology homework. And then everybody was like, 'Oh, you're struggling too. OK. We can get together and study at a certain place and stuff like that.' (P4)

Students also reported the use of chat (P10, P13), and Facebook direct messages (P7, P13) for other forms of academic collaboration. Finally, the use of Facebook as an academic tool was enhanced by the production of norms that fostered academic-focused Facebook relations. That is, individuals within classes were free to use Facebook for academic coordination without expectation of friendship within or outside of the site (P4, P9, P12)

> Yeah, we got assigned to a group in English, so I friended everyone in my English group. We all collaborated with that. And then usually that was that. (P9)

This norm production strikes me as vital in Facebook's success as a tool for academic collaboration. I believe this norm has evolved rationally; in talking to students, it is clear there is no software with the affordances or the built-in network that allows academic collaboration on the level of Facebook. The lack of good options establishes Facebook as a necessary location for academic collaboration. I believe this norm has

also evolved from legacy practice; the long-standing norm of very large friendship networks among college students, combined with recent and ongoing challenges to privacy experienced by the population, most likely serve to decrease the "social importance" of the space. Almost all students I talked to indicated that Facebook was a "public" place, which likely fosters the norms that enable academic collaboration.

Negative case: Facebook and time management

A discussion of Facebook's academic value would be incomplete without a discussion of the inherent threat Facebook poses to academic success: that it is widely perceived as a persistent distraction. Nearly all interviewees identified Facebook as a distraction or a procrastination device (P1, P2, P3, P4, P7, P8, P9, P10, P11, P13 P14, P15). Numerous interviewees referred to *Facebook addiction* (P1, P2, P8, P14) as a legitimate problem detrimental to academic success. One part of the problem is that students felt a need to constantly check the site.

> Distraction, distraction, distraction. Slight addiction. I use my Blackberry and I'm on Facebook, and probably within five minutes I may refresh the page 10 times and it doesn't change. I'm on the bus and I have nothing else to do, and I'm refreshing, refreshing, refreshing. (P14)

A number of the students I spoke with described a social obligation to check the site. That is, if the student were to not check Facebook, they might miss something important:

> I don't know if this is really like one of the things, but just how addictive Facebook is, and how present and important it is on campus. Because I feel like I have to always checking and I feel like I have to always be informed about what's going on. (P2)

Other students simply enjoyed the site for entertainment value, indicating a trade-off: "Class time is not that interesting. Facebook is" (P13). Students also described an array of tactics for fighting Facebook addition. P10 described a pact that he entered into with eight students, in which they agreed, and did, deactivate their Facebook accounts for three months. The group agreed that they would "not use Facebook and focus on studies." Other social strategies include account lock outs. P13 reports, secondarily, on this practice:

> I know people who like give it up for finals and give their password to their friend and make their friend change the password and write it down somewhere else. But I don't do any of that. (P13)

Finally, other students chose to combat Facebook addiction with technology:

> It definitely, procrastination. It takes away from study time so much. Someone gave me a link to a site that you can block websites from your computer for a certain amount of time. So I blocked Facebook for this whole entire exam week. (P9)

Based on P9's comments, there appears to be a market for addressing social-media based threats to productivity through assistive technologies.

5.6.5 Review

Drawing on 15 semi-structured interviews conducted with freshmen at the University of North Carolina at Chapel Hill in April and May 2010, this research has explored how Facebook is used during the transition to college. Using a mixture of inductive and deductive analysis, this research identified and explored three themes concerning the use of Facebook during the transition to college.

The first theme, *Pre-Transition*, reflects the emergent uses of social network sites in preparation for transition. The second theme, *Social-Adaptation*, reflects the use of the social network site for coordination of social relations during transition. The third theme, *Academic-Adaptation,* reflects the use of the social network site as an academic support. I have also briefly discussed Facebook's challenges to academic success, particularly those related to time management.

5.7 Discussion and Conclusion

The goal of this chapter was to deeply explore the supportive outcomes of social network site use during transition, particularly the transition to college. Drawing on a sample survey of freshmen at the University of North Carolina at Chapel Hill, and 15 semi-structured interviews from the same population, I have explored this question both quantitatively and qualitatively.

The quantitative analysis reveals that supportive and social-informational uses of social network sites in transition exert a direct and mediated positive effect on overall adaptation. I find that when students turn to their Facebook network to address the needs of transition, such as support and information, these students have better outcomes. Of course, my analysis of cross-sectional data is not causal, but a theoretically-guided structural equation model found support for the hypotheses I specified.

Also notable in the quantitative analysis was the important mediating role of social support. In line with theoretical prediction, social support is shown to exert a significant and positive effect on overall adaptation, as well as the adaptation sub-components of social and general adaptation. Furthermore, use of the social network site to address supportive needs is associated with higher levels of social support, indicating that the social network site is an effective place for the provision of social support.

This analysis highlights the valuable role played by a socio-technical network during

life transition. Individuals that use a social network during transition, particularly to address their transition-related needs, appear to better adapt and adjust to the challenges of transition.

In the qualitative analysis, I attempt to document and understand how use of the social network site translates to social support and enhanced adaptation during transition. Analysis revealed the importance of pre-transitional uses of social network sites; the social network site was first of use prior to the transition, acting as a forum in which students could address transitional-related questions and needs. During the transition, the social network site served two key roles. First, it acted as a connective place, in which students could learn about their peers and manage their fast-changing friendship networks. Second, students integrated Facebook into their academic routine, using it for group coordination and study help.

Stepping back, the positive effect of social network sites during transition seems to be twofold. First, the technology provides a place for individuals to come together and jointly address needs. The network of Facebook is powerful, and as more people join, it stands to reason that people's real-world, distributed support network will also be on the site. Between this established network and the nascent transitional network, the social network site creates the impression of support and furthers a range of tangible supports. Second, Facebook's software seems to address a great number of social and technical inefficiencies of the transitional process. These include, but are not limited to, group coordination, keeping track of people met, asynchronous communication, deep informing through the profile, and multiplex methods for interaction with different levels of social obligation. Designed by a group of college students, the software seems uniquely suited to the needs and inefficiencies of student life, and therefore it addresses the challenges of transition in an effective manner.

In conclusion, social network sites seem to afford novel support for transitional

populations, under constraint. In the final chapter, I discuss some of these constraints and propose solutions, as well as a research agenda to address these issues.

Chapter 6

Discussion and Conclusion

In this research I have identified a number of ways that social network sites facilitate adaptation to transition. Drawing on data collected directly from Facebook, from a sample survey, and from semi-structured interviews, this research had two primary goals. The first goal of the research was to understand the dynamics of socio-technical networks (e.g. networks within a social network site) during a transition. The second goal of the research was to identify outcomes and uses of social network sites that facilitate adaptation to transition.

This chapter reflects upon the study's findings. I first provide a general summary of findings, identifying how my analysis answers the two core research questions. Next, I discuss limitations of the data collection and analysis. I then describe the study's comparative methodology and cross-cutting findings, focusing on how the components of this mixed-methods analysis of transition speak to one another. Based on my findings, I then discuss implications for policy and design. I conclude with the discussion of a

research agenda that extends this analysis.

6.1 Summary of Findings

The goal of this research was to substantively explore how supportive and informational uses of social network sites facilitate adaptation to the transition to college. To address this goal I explored two primary questions.

1. Using data collected from Facebook, I explored the dynamics of socio-technical networks (e.g. networks within a social network site) during transition.

2. Using a sample survey and semi-structured interviews, I identified outcomes and uses of social network sites that facilitate adaptation to transition.

I now present key findings from my analysis that provide insight into my specified research questions.

6.1.1 Socio-technical networks during transition

To explore the dynamics of socio-technical networks during transition, I analyzed a data set of freshman Facebook profiles collected, at one week intervals, over the course of the 2005 fall semester. In conducting this analysis, I had two goals. First, I wished to identify factors that influence the structure of the socio-technical network during transition. Second, I wished to identify factors that influence the growth of transitional networks over time.

Factors of association

Using exponential random graph modeling, I explored the factors of association that produce structure in networks articulated during transition in the Facebook data set.

I found evidence that social and structural forces exert a strong influence on the composition of the socio-technical network. Within the virtual realm where individuals can connect across social structure and geography, I observed that tie formation is still strongly influenced by structural, social, and personal factors. For this reason, the amount of information and support that one can draw from social network sites is shaped and constrained by these structural trajectories.

In the early stages of the transition, I observed that demonstrated "preferences" play an outsize role structuring association. During the information-poor early stages of transition, taste and preference indicators appear to play an important role in the social location and sorting of potential peers. During a transition, preestablished schema (specifically, notions about tastes and preferences) provide background and common ground in interaction. In my qualitative analysis, I found evidence that other parts of the profile were commonly employed to locate potential peers within taste and class structure. Students frequently turned to pictures and wall postings to better understand potential peers; within their investigation is an implicit analysis of taste, preference, and status.

The single most important factor structuring association was assignment into residence halls. Individuals in shared residence halls are, on average, 4.8 times more likely to have an association than individuals in different residence halls. The residence hall provides a social identity and a location for situated interaction, fostering the creation of ties. Certainly, some ties are "caused" by residential co-location, but as I found in my interviews, the residence hall represented a discrete social location that individuals turned to prior to the transition. That is, the residence hall provided a structure within which ties could be created, without prior offline interaction. There are a number of explanations for this finding: Individuals may want to express solidarity with hallmates, they may want to explore the social geography of their future residence, or they may

have questions about the transition that they feel comfortable addressing within the residence.

It is worthwhile to understand the structure of association within a transitional network. In addition to highlighting the importance of taste and preference within transitional networks, I have identified the significant influence of third-party action on network structure. The socio-technical networks I observed were shaped by the placement of ego into a residence, which has lasting implications beyond the transitional period. The effect of this placement may be cumulative. Individuals placed within high-performing residences (e.g. "honors" dorms,"specialty" dorms) may realize a life-long benefit due to the presence of alters from these specialty residences within their socio-technical networks. Indeed, configuration into certain residential situations may create a "Matthew effect," where individuals are exposed to, and draw support from, a pool of alters that is different from the population at large.

Finally, my analysis of network structure allows empirical demonstration of the rapid-fire nature of early-stage transition. The first few weeks of the transition are characterized by establishing ties within the cohort, a process that both increases ties available to an individual and makes the global network smaller. It is in these crucial weeks that the trajectories and constraints of the socio-technical network are solidified, with factors such as preference and residence hall exerting a large amount of influence on individual network makeup. This finding is useful for counselors and student support staff, as it illustrates that transitional support networks are shaped quickly, and in a somewhat arbitrary fashion. Positive interventions should therefore target these early weeks, and create opportunity for diverse connection beyond ideological and residential similarity.

Socio-technical network dynamics

I then identified factors influencing the growth of networks during the transition. Using data extracted from Facebook profiles, I identified use and disclosure practices that are associated with network growth. I found that sharing of tastes and preferences, and frequent updating of the identity within the socio-technical network, were associated with the growth of an individual's network.

Understanding network growth is important for a number of reasons. First, adaptation to transition is a function of the support networks an individual articulates in the transitional environment. It appears that individuals that are more open, sharing information about their tastes and preferences, accumulate larger networks during the transitional period. Indeed, taste and preference information provides powerful insight on an individual's social location, which may ease relational formation.

In attempting to map the dynamics of a transitional space, the analysis of network growth is a necessary concomitant to the analysis of network structure. As I demonstrated in the multi-level model, network structure can directly inform outcomes such as network growth. When I modeled the growth of networks, using residence hall as a grouping factor, I was able to demonstrate that factors such as gender and out-of-state status significantly influence the trajectory of network growth. This finding provides further evidence of the role social and structural factors play in shaping socio-technical networks.

Marlow's (2009) analysis of relational activity in Facebook (Figure 4.13) demonstrates a positive linear relationship between Facebook network size and communicative interaction. If larger networks lead to more interaction, and thus greater social support, it is worthwhile to understand the factors that contribute to larger networks. As my analysis of the dynamic panel of profiles demonstrates, socio-demographic factors and patterns of utilization, particularly the sharing of interest information and

profile change, are associated with the growth of socio-technical networks. With these findings, counselors and student support staff can develop evidence-based strategies for helping students grow socio-technical networks, and thus gain access to greater potential supportive resources.

6.1.2 Outcomes of social network site use during transition

I conducted a sample survey and semi-structured interviews in the spring of 2010 to explore outcomes and uses of social network sites that facilitate adaptation to transition. The goal of my survey was to identify how use of social network sites during transition can facilitate adaptation to the transition. In conducting semi-structured interviews, my goal was to understand the population's use of social technology, to understand support processes in social network sites, and to understand how students integrated social network sites into their everyday information seeking during transition.

The supportive role of social network sites

Across disciplines and methodologies, researchers have consistently found that adaptation to transition is facilitated by the presence of support. Support can come in many forms, such as simply having a supportive network, or being able to call on others for help. It is not surprising that an inherently connective technology, such as a social network site, would provide means for the acquisition of support facilitating transition. I employed quantitative analysis to explore the relationship between the use of social network sites for support and integration during transition and overall adaptation to transition. The generative component of this work involved the creation of measurement scales for *supportive* and *integrative* uses of social network sites during transition.

Employing multiple regression and structural equation modeling, I demonstrated that use of social network sites during transition, for supportive and social-informational

purposes, is associated with increased social support. Supportive uses of social network sites are also shown to exert a positive, direct effect on adaptation to transition. While these findings are associational in nature (inherent in cross-sectional modeling), they support the concept that online support fosters received support, which in turn furthers adaptation to transition. Along with the other supportive structures employed during the transition, the social network site appears to be a useful place to turn to address the needs of transition. In doing so, individuals are able to find support that facilitates their adaptation to transition. Based on these findings, organizations should consider the benefits of encouraging the development of supportive socio-technical cohorts. In organizations where cohort-based transition is commonplace, organizations should foster the articulation of transitional networks to take advantage of supportive outcomes.

In three cases, my hypotheses were not supported. First, I did not find a main effect of social-informational uses of social network sites during transition on adaptation. Social-informational uses facilitate one's understanding of their environment, roles, and networks. Once individuals understand their environment, they are better able to call on others for support — thus the highly significant relationship between SNS-SIP and received social support. I also did not find a main effect of social network site support on the stress measures CES-D and PSS. This indicates that social network site support *alone* does not reduce the stress of transition. Noting this limitation, I have found strong evidence that the social network site is a supportive structure during transition. I have demonstrated that when students turn to a social network site for support during transition, this behavior is associated with higher levels of adaptation. To address the unsupported hypotheses, further research is recommended. Particularly, I recommend an extension of the qualitative study exploring everyday life information seeking in social network sites during transition. Through continued and iterative theorization

of the process of information seeking in social network sites during transition, I will be able to construct and test measures that more accurately describe this phenomena. A second study should be conducted in the laboratory, with a goal of understanding perceptions of information gathered during transitional periods. During the transition, individuals have little evidence of informational quality, other than the social signals inherent in the social network site (e.g. Donath, 2007). With an experiment that manipulates information type and identity signals, I may be able to better explicate the relationship between socio-technical information seeking and transitional outcomes.

Information behavior in social network sites during transition

To comprehend the role of social network site use during transition, I conducted semi-structured interviews with freshmen that had recently completed their "transition" to college. The purpose of the interviews was threefold. First, I wanted to develop an understanding of the population's use of social network sites and their attitudes towards disclosure and privacy. This background work was primarily to provide comprehension of the transitional student's information lifeworld. Second, I wished to better understand processes of support in social network sites. This work contextualized the processes of support I study, and allowed me to reflect on of the ecological validity of my findings. Finally, I wished to understand how students draw on social network sites as information resources during transition. This research perspective is guided by everyday life information seeking (e.g. McKenzie, 2001; Savolainen, 1995) theories of information behavior.

In my analysis, I document how use of the social network site translates to social support and enhanced adaptation during transition. This analysis revealed the importance of pre-transitional uses of social network sites; the social network site was first

used prior to the transition, acting as a forum where students could address transitional-related questions and needs. After the transition, the social network site served two key roles. First, it acted as a connective information ground, in which students could learn about their peers and manage their fast-changing affiliation networks. Second, students integrated Facebook into their academic routine, using it for group coordination and academic assistance.

I discovered two notable incidents where use of the social network site shaped the nature of the collective transition to campus. The first incident was the creation and use of the "Class of 2013" group. This self-organized group was valuable for answering pressing questions about the transition, such as information about the local cohort, organizational information about the campus, academic information, information about the setting, and information about the new set of peers. Students felt that the information was of high quality, due to the fact that current UNC students actively participated in the group. The second incident was the emergence of the "Roommate Finder" thread within the Class of 2013 discussion board. Like the Class of 2013 group, the Roommate Finder represents novel, self-organized collective action in response to the challenges of transition. Students were able to match up with potential roommates through this discussion thread. Considering the impact of a positive roommate experience on successful adaptation to college, the Roommate Finder represents highly meaningful support in action, and it demonstrates the continued supportive potential of social network sites.

Reflecting on the findings, the positive effect of social network sites during transition seems to be twofold. First, the technology provides a place for individuals to come together and jointly address needs. Second, the social network site (i.e., Facebook) software seems to address a great number of social and technical inefficiencies of the transitional process. These include, but are not limited to, group coordination, keeping track of people met, asynchronous communication, deep informing through the

profile, and multiplex methods for interaction with different levels of social obligation. Facebook, first designed by a group of college students, seems uniquely suited to the needs and inefficiencies of student life. The fact that Facebook addresses the challenges of transition in an effective manner may simply be coincidental, but it also seems plausible that the values and preferences of a highly transitional group of individuals are embodied in the software.

6.2 Limitations

There are a number of limitations of this research. First, I do not claim that the results of this study are generalizable outside of the population. I am confident that my Facebook data set and sample survey generalize to their target population, but I do not claim that these results generalize to all college freshmen. For example, campuses lacking residence halls, or campuses with different residential structures may demonstrate different factors of association and network structures than those identified in this study. On the other hand, the study of social network sites on different campuses (e.g. Acquisti and Gross, 2006; Lampe, Ellison, and Steinfield, 2006, 2007; Stutzman, 2006; Stutzman and Kramer-Duffield, 2010) reveal many similarities in use, which may indicate that these findings generalize to sites with similar social and residential constructions as the location of the study. It is advised that the reader consider matching factors when applying these findings to another campus.

Second, this analysis is associational in nature. In this study, I have tried to avoid making causal claims, and I apologize if any of my constructions imply causality. Many of the analytic techniques I employed allow for causal inference (e.g. panel modeling, structural equation modeling), but causality requires much more than an analytic method (cf. Pearl, 2010). In this research, I have attempted to strongly match my questions to theoretical prediction. At the theoretical level, my findings contribute

another datapoint to these larger causal frameworks.

Third, while I have made every effort to achieve maximum identification in the models I have tested, it is likely that the match between construct and phenomenon is not always perfect. For example, an individual's supportive socio-technical network is most certainly not a precise match to the offline supportive network. I argue that these networks are distinct, but specifying the value of the online supportive network remains a significant research goal. Other important limitations of these data include the self-reported nature of surveys and interviews, and the fact that the two primary data collections occurred at different time periods.

6.3 Methodological Approaches to Transition

The adaptation to transition is a complex process requiring the management of stress associated with transition, and general integration into the transitional environment (e.g. Hogan and Astone, 1986; Schlossberg, 1981). Across disciplines, the study of transition generally explores three interrelated components. The first component is the structure of the transitional network (e.g. Lin et al., 1979; Ensel and Lin, 1991). The study of the transitional network fosters an understanding support available to individuals during transition. The second component is the study of stress response to transition (e.g. Vernberg and Field, 1990; Sarason, Johnson, and Siegel, 1978; Cutrona, 1984), which fosters understanding of the affective mechanisms of transition. Finally, researchers explore information practices during transition (McKenzie, 2001, 2003*a*), identifying how individuals answer their informational needs during transition.

In the study, I addressed these three analytic components with two coherent data sets. Using Facebook profile data, I explored the dynamics of a transitional network. Drawing on a sample survey and semi-structured interviews, I explored the supportive and informational role social network sites play in adaptation to transition. Separately,

these components make a substantial individual contribution to understanding of social network site use during transition. Together, I am able to compare within the data sets, identifying causes and confounds that appear in the analysis of a singular component. For example, when exploring the structuring role of residence halls in transitional networks, one might assume that being "in proximity" is the sole cause explaining this trend in association. When discussing the use of social network sites prior to transition, however, I found that my interviewees actively sought shared-residence ties to prepare for the transition. Although the individuals were not yet in proximity, their information seeking strategies were partially bound by future proximity.

In employing multiple methods, I had two primary goals. My first goal was to evaluate the contribution and limitations of the particular analytic strategy to the understanding of socio-technical systems during life transition. For example, behavioral data may provide a "complete picture" of activity during transition, but it may miss the nuance and context necessary to stand alone as an analytic strategy. Through comparative evaluation, I was able to identify a number of the contextual limitations of the singular analytic strategies. My second goal is to provide within-data comparisons to highlight different perspectives on the same population. The first component of analysis draws from the freshman Facebook profiles set. Using networks and longitudinal modeling, I explored how two different analytic approaches to the same data set can highlight important differences and limitations. The second component draws from survey and interview analysis of a particular cohort. Using these two data points, I explored the differences and limitations between the two forms of analysis, paying particular attention to the challenges raised by the socio-technical and transitional contexts. This reflexive "triangulation" between and within data sets allows for criticism and comparison of findings across research questions.

Based on my experience conducting the analysis, I offer three points of methodological action. First, the analysis of network structure highlights variables that might simply be internalized by the research participant. For example, the high density of within-residence ties is normative for the student; if this factor of association was not uncovered in the network analysis, I may not have grouped the data in the multi-level model, or probed interviewees about the establishment of residential ties. Second, qualitative work is invaluable for "identifying" poorly identified variables. In this study, the size of the network is a key variable. It is through qualitative interviewing that the value of larger network sizes became apparent. That is, the students I talked to relied on social and algorithmic filtering processes to manage the scope of their networks, highlighting the value of larger networks. Third, the use of survey methods allowed for quantification of findings from the networks and qualitative analysis. The analysis of networks is highly deterministic, which leaves the researcher little room for subjective evaluation. Qualitative interviewing, unless it is done with a large population, is not amenable to statistical quantification. Each of these analyses serve important purposes, but I found a middle ground with surveys that adds validity and speaks to both the network analysis and the qualitative interviews.

6.4 Implications of the Study

Social network sites are a connective infrastructure within personal networks, and are well suited to address the needs of individuals in transition. Because social network sites are inherently connective, they afford a location for the provision and receipt of social support during transition. Furthermore, social network sites represent a powerful collaborative information ground, to which individuals in transition can turn for information about the transitional environment. Social network sites afford novel solutions to the two primary challenges of transition — support and integration — which makes

the study of social network site use during transition worthwhile.

In the course of my work, I identified a number of implications for the design of social network sites that support individuals during life transition. In the following section, I discuss three such implications. First, I explore the situational relevance of information needs during transition. Second, I describe how design should adapt to network structure during transition. Third, I discuss methods for facilitating interaction during transition.

6.4.1 Situational relevance in transition

When considering why individuals might turn to a social network site during transition, I draw on Patrick Wilson's conception of *situational relevance* (Wilson, 1973). I believe that the social network site represents a situationally relevant information ground that individuals can turn to in order to address supportive and informational needs during transition. The social network site is situationally relevant for the following reasons:

1. The social network site provides a location where a range of information needs relevant to the transition can be addressed. These include factual needs, such as information about campus or deadlines, and subjective needs, such as information about the quality of dormitories and classes. Because the student is able to address many of their needs in the site, it offers high situational relevance.

2. The network structure of participation in the social network site creates an information-rich space. This is because the space includes individuals that are preparing for the transition, and individuals that have recently completed the transition. Having a mix of pre- and post-transitional participants in the site produces high quality information, and a sense that almost any information need relevant to the transition can be met in the site.

3. The sharing of identity information is common, promoting positive norms for community participation (e.g. Millen and Patterson, 2002). As contributions are tied to an identity that is perceived as genuine, there is implicit trust regarding information shared in the site. Furthermore, the identification provided by the profile enables social location, in that individuals from outside the core demographic could be easily spotted and discounted, assuming they were not employing duplicitous profiles.

4. Because the site is deeply integrated into the transitional network and everyday practice, individuals approach the site with different norms of privacy and disclosure than if they were on a third-party forum. As most of the students I studied were long-time Facebook users, they felt comfortable in the space and understood the boundaries of their disclosures. Because the site was deeply integrated into everyday practice there was no "ramp-up" process before meaningful sharing began.

5. The site addresses social motives. Joining the transitional cohort in the social network site may allow the student to reflect a new social identity, it may allow the student to share that identity with others on both sides of the transition, and it may create new opportunities for social interaction. As many of the students I spoke with indicated, there is much to socially gain from participation.

6. The site has a flexible infrastructure that enables ad hoc collaboration around transitional challenges. This is evidenced in the case of the Class of 2003 group and the Roommate Finder discussion thread.

6.4.2 Adapting to network structure

When analyzing the structure of networks during the transition, I was struck by two basic findings. First, networks change extremely quickly during transition, particularly after the relocation to campus. Second, during a transition, the network is likely to grow at a different pace compared to periods of stasis. It is therefore probable that populations in transition could be automatically identified in social network site data.

Assuming that transitions are identifiable in social network site data, I believe this offers new opportunities to scholars of transition. Transition has typically been studied in relation to life events, age-grading, and other normative phenomena. Analysis of large-scale network structure may lead to better understanding of the structure of transition. It may also facilitate the study of poorly-understood or under-theorized transition, such as those in mid-life. Furthermore, the study of large-scale network structure may lead to the discovery of new transitions, through the identification of points in the life course that structurally approximate known transitions. The potential for the discovery of new transition is perhaps the most promising outcome of the study of large-scale network structure, as it affords opportunity to find and support populations in need.

The automatic identification of transition is also useful to designers, particularly to those that construct relevance filters within social network sites. Consider a transition, where an individual rapidly expands his or her social network. With this expansion, we might assume that the individual wants to focus attention on the transitional network, identify new contacts within the transitional network, and effectively segment the pre- and post-transitional networks with intelligent filtering. By identifying characteristic patterns in the changes to network structure, it is possible to provide support to the population through design.

In addition to facilitating quick adaptation to transition, designers should also construct filters to address the long-term implications of transition. Consider a transition, where a large number of people join ego's network within a time period. Compared to other time periods, it is likely that the average subjective quality of these poorly-screened additions will be less than "targeted" additions to the network that occur during non-transitional periods. Designers may wish to account for transitional additions to the network over time, filtering these "freshman year friends" out of prioritized social groups.

6.4.3 Facilitating interaction during transition

For a social network site to be useful during transition, individuals must be able to find one another and make connections. To accomplish this task, individuals must generally encounter one another, share personal information that sufficiently enables location in the network, and then the connection must be formed. In my study, numerous interviewees described an awkward encounter where individuals would meet, ask each other's last names, and then ask for the spelling the last name. This information could then be used to locate the potential connection in the social network site.

The transfer of identifiable information to further connection represents a socio-technical boundary negotiation. If organizations wish to take advantage of the benefits of social network sites during transition, it may be worthwhile to institute policies that foster the sharing of identifiers. Of course, a policy of this sort must be nuanced and respect privacy, but there may be informal techniques that can make the boundary negotiation less complicated. In my study, I observed that residence halls and orientation groups had formed their own Facebook groups, allowing students to find and friend one another. This represents an organic solution to the problem of boundary negotiation — one that could be applied in a range of organizational settings.

I also found evidence that information shared on the profile was highly valued during early-stage transition. In the information-poor transitional state, individuals were likely to draw strong inference about information shared on the profile. Organizations should consider fostering practice that increases awareness of the information shared during transition: that it creates a "first impression" that may affect potential interaction.

6.5 Future Research

Very early in my research career, I was drawn to Facebook. As an active participant in the "social web" for over fifteen years, I had never witnessed software with such connective capacity and remarkable uptake. In my earliest research it was evident that one of the motives driving utilization was transition. Students on the college campus were voracious consumers of information — about one another. This simple finding fostered an interest in transition that has led me to this dissertation and beyond.

I am drawn to the study of social implications of technology because I want to conduct research and design systems that improve the lives of others. As I have watched the growth of social media (including, but not limited to, social network sites), I observe individuals from all walks of life "connecting in" to networks that are eager to provide support. The transition is generally an occasion that requires support. I believe that social media has tremendous potential for supporting those going through life's many transitions.

Social media provides the connective infrastructure between groups of people that can, in turn, support each other. When viewed as infrastructure, I see unlimited potential for improving interfaces, making filtering algorithms intelligent to transition, and fostering social practices that increase the supportive potential of social media. To address these challenges, I am actively conducting research on the supportive potential

of social media among older users (Stutzman, Stull, and Thompson, 2009), I am investigating the mechanisms of social capital within the Facebook interface (Yoder and Stutzman, 2011), and I am contributing to a discussion about the role of transition in content filtering algorithms (Stutzman, 2010). I have more challenges than time.

The secondary goal of this study was to conduct a mixed-methods evaluation of transition. Drawing on Facebook profile data, a sample survey, and semi-structured interviews, I have explored a methodology for studying transition that I feel is promising. Each data set and form of analysis has its own limitations; by combining observation at three levels, I believe I have addressed concerns within and between my research questions. Of course, the key limitation of this study is that the data are from two distinct time periods. Moving forward, my goal is to employ this method with data from a single observation.

6.6 Conclusion

This dissertation has demonstrated that during a life transition, a social network site is a useful place to turn for the social and informational support that facilitates adaptation to transition.

Appendix A

IRB Communication Regarding Profile Data Collection

This appendix includes documents related to the capture of Facebook data analyzed in Chapter 4.

A.1 IRB Decision

Personally identifying information redacted in archival copy.

> Hi Fred,
>
> Thanks for your detailed response, which I have thought through a couple of times late last night and early this morning, but did not come to a final decision until later this afternoon. I will share with you my initial thoughts, as well as my final ones, since my final thoughts may help you in the short run, but the earlier ones may help you later on.
>
> Early thoughts: Even though I appreciate your scenario about the one-time survey of webpages as involving Terms of Use policies similar to those of Facebook, news web pages are different in kind from the individual webpages of Facebook. The comparison here is more like comparing coverage from different newspapers, or seeing how many papers picked up a specific UP story. The news stories may be about people, who are identified, but they would not be considered "human subjects research." Your work seems much more like "hsr" since you have individually identified persons responding to specific prompts.
>
> I also appreciated the info about other, more similar studies, where the researchers apparently had no prior permission, but though that might appear to be precedent, it still would not make it "right" if such permission were necessary, in the eyes of the owner of copyright.

Further, though you might want to expand the issue to something that is so big as to be impossible, as a way out, I was prepared to state that we didn't really care about all possible studies, just about yours. Ok, that's the first set.

I then decided that what you are doing is actually NOT HUMAN SUBJECTS RESEARCH, and therefore does not need IRB review. My rationale here comes from disentangling the identifiability of the webpages in Facebook, where identifiability is integral to the mission and media, from the issue of privacy. Yes, the pages are identifiable, but NO, they are not private-no one at UNC placing information on a Facebook webpage has a "reasonable expectation of privacy" if thousands of people have access to it. In fact, the entire point is to share information about the self. As we discussed, individuals in a mall do not have the expectation that no one will see what they do as they walk around the center court areas, or even shop, whereas individuals who enter a ladies's room in that same mall do expect that no one is covertly watching while they are in the stall. The expectation of privacy is context-specific. Information in Facebook could not truly be considered private, so while the data you mine is identifiable, it is NOT private, and is thus not covered by 45 CFR 46 (CFR= Code of Federal Regulations) because it is not human subjects research. So, IRB has no say. If IRB has no say, then you don't have to submit anything. BUT, you need to be prepared with a coherent answer if asked about it.

For that purpose, I looked at the decision trees that the federal Office of Human Research Protection includes on their website. I don't tend to use them, since I feel that I have internalized the info for the most part, but I know IRBs that do, and there is one that fits the bill for you. It is available at http://www.hhs.gov/ohrp/humansubjects/decisioncharts.htm

I have marked up a copy of Chart 1 and attached a pdf of the flow-it's crude, but it should give you a sense of the options and the flow.

So, you're off my hook, but I still want to caution you that you and your faculty advisors and relevant leadership folks at SILS might want to discuss the situation, in all its complexity, with university counsel. You might want to include, if not initially, then eventually, members of the other departments that you named-Computer Science, Communication Studies, Political Science, Cultural Studies, and Operations Research, among others. You and your work are raising important new issues, and UNC hates to be caught pants down. The information you shared with me, which I presume is just a small part of what you have access to, might be very helpful in deliberations about use of material with published Terms of Use, separate from the issue of whether it involves "human subjects research."

Please note that not everyone may agree with my analysis and my decision, if only because of the perceived vulnerability of your freshmen participants

due to their apparent lack of a full appreciation of the pitfalls of Facebook-type media. But that's a separate issue, in my mind, from whether what you have done, and are thinking about doing with the social network info, is human subjects research. I, and IRBs in general, make different decisions when the context is a members-only listserv, or someone wants to analyze class discussion listservs (again, a set, small group), or analyze past email correspondence between individuals, so please understand that the issue here is not where the information is stored, but of the expectation of privacy. As you can see by the decision tree, if the information were not individually identifiable, then it also would NOT be human subjects research. So, happy Thanksgiving, and best wishes for your not-human-subjects-research, but please do heed my concern about harvesting profiles without the apparently-required prior permission. I can't imagine that you are the first to come up against this either, but you're just the first that I know about. Don't hesitate to contact me if you have any questions. Thanks for your patience and your efforts to help me understand your situation.

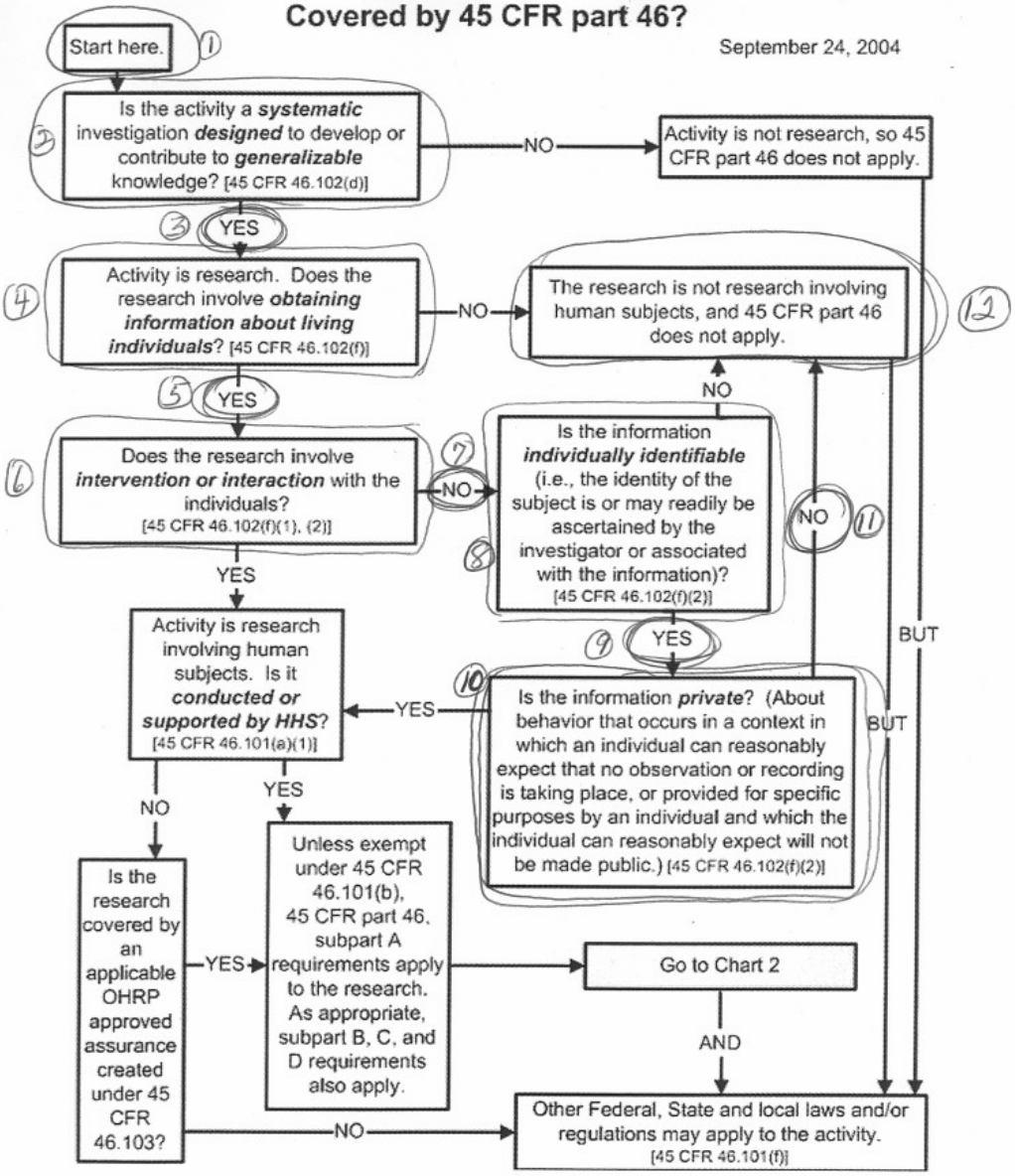
Take care, [Redacted]

A.1.1 Flow chart provided by IRB

Included on next page.

Chart 1: Is an Activity Research Involving Human Subjects Covered by 45 CFR part 46?

September 24, 2004



A.2 Communication with Facebook

Personally identifying information redacted in archival copy.

Fred,

I'm the Facebook engineer responsible for the security measure that disabled your account. Automated use of our site has been against our terms of service for some time and it has always been a violation to download information. As an academic, I'm surprised you are accustomed to running scripts against websites without first obtaining permission!

That said, we are familiar with your research (I saw your talk at Google) and are happy to work with you to let you gather the data you need to continue. Generally we ask for a research plan, but since we've seen several of your papers and talks we're willing to give you the benefit of the doubt.

We can re-enable your account [Redacted] but we need you to change the name to one that is not obviously fake and also modify the privacy settings on the account to be the strictest possible so that other users can't see the account in search results. You'll need to notify me of the name you choose so that I can program our security tools to allow you automated access to the site.

Realize that you are officially the only current exception we've allowed in a large security system designed to protect the data of our users from automation. There is a chance that your account could be accidentally disabled again in the future, if that happens please just ping me and I'll get you set up again.

Finally, in a month or two we will be going to a no-exceptions system for limiting scraping. We hope to have a data warehousing project in place by then so researchers like yourself can request specific data which we will provide pre-scrubbed for our users' protection. [Redacted] (who I believe you've had some contact with) is heading up that project. We'll try to keep you posted when these changes are going to take place.

Give us a little time to reactivate your account, and then get back to me with the new name and any questions you have.

Thanks,

[Redacted]

Facebook Engineer

Appendix B

Factors of Association Extended Regressions

The following regression estimates reflect the simultaneous (k-dimensional) evaluation of the factors of association described in Chapter 4. Estimates are provided as standard coefficients, and are to be interpreted as the effect of shared factors (e.g. same *Gender*, same *Residence Hall*) on the probability of a tie. *Relationship Status* estimates provided as raw coefficients. *Significance codes: 0:**** 0.001:*** 0.01:** 0.05:*.*

Table B.1: Simultaneous evaluation of factors of association, week 1

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-5.066878	0.010148	0.0000	****
Political Views	0.332851	0.011457	0.0000	****
Academic Major	0.454828	0.019157	0.0000	****
Gender	-0.175515	0.012882	0.0000	****
Interested In	0.161307	0.013554	0.0000	****
NC Residency	0.396862	0.009588	0.0000	****
Residence Hall	1.445540	0.010702	0.0000	****
Relationship Status	0.055542	0.009488	0.0000	****

Table B.2: Simultaneous evaluation of factors of association, week 2

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.963892	0.009232	0.0000	****
Political Views	0.337064	0.010699	0.0000	****
Academic Major	0.431786	0.017975	0.0000	****
Gender	-0.155006	0.012085	0.0000	****
Interested In	0.153971	0.012699	0.0000	****
NC Residency	0.354320	0.008849	0.0000	****
Residence Hall	1.518867	0.009819	0.0000	****
Relationship Status	0.053371	0.008846	0.0000	****

Table B.3: Simultaneous evaluation of factors of association, week 3

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.897691	0.008894	0.0000	****
Political Views	0.334653	0.009984	0.0000	****
Academic Major	0.420474	0.016847	0.0000	****
Gender	-0.104019	0.011188	0.0000	****
Interested In	0.153646	0.011652	0.0000	****
NC Residency	0.356664	0.008334	0.0000	****
Residence Hall	1.552717	0.009117	0.0000	****
Relationship Status	0.036064	0.008274	0.0000	****

Table B.4: Simultaneous evaluation of factors of association, week 4

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.781104	0.008283	0.0000	****
Political Views	0.313570	0.009719	0.0000	****
Academic Major	0.428475	0.016453	0.0000	****
Gender	-0.074517	0.010869	0.0000	****
Interested In	0.145129	0.011284	0.0000	****
NC Residency	0.312248	0.007933	0.0000	****
Residence Hall	1.559205	0.008817	0.0000	****
Relationship Status	0.048523	0.007970	0.0000	****

Table B.5: Simultaneous evaluation of factors of association, week 5

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.738146	0.008059	0.0000	****
Political Views	0.321355	0.009199	0.0000	****
Academic Major	0.427039	0.015408	0.0000	****
Gender	-0.043244	0.010217	0.0000	****
Interested In	0.145250	0.010526	0.0000	****
NC Residency	0.313634	0.007541	0.0000	****
Residence Hall	1.557558	0.008322	0.0000	****
Relationship Status	0.050614	0.007526	0.0000	****

Table B.6: Simultaneous evaluation of factors of association, week 6

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.673591	0.007753	0.0000	****
Political Views	0.312392	0.008952	0.0000	****
Academic Major	0.416158	0.015100	0.0000	****
Gender	-0.037045	0.009884	0.000178	****
Interested In	0.147359	0.010173	0.0000	****
NC Residency	0.300571	0.007291	0.0000	****
Residence Hall	1.556318	0.008089	0.0000	****
Relationship Status	0.049098	0.007326	0.0000	****

Table B.7: Simultaneous evaluation of factors of association, week 7

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.421895	0.006157	0.0000	****
Political Views	0.260565	0.009304	0.0000	****
Academic Major	0.365699	0.016048	0.0000	****
Gender	-0.119430	0.009966	0.0000	****
Interested In	0.145872	0.010551	0.0000	****
NC Residency	0.198934	0.006905	0.0000	****
Residence Hall	1.522101	0.008302	0.0000	****
Relationship Status	-0.021684	0.007493	0.0038	***

Table B.8: Simultaneous evaluation of factors of association, week 8

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.520059	0.006972	0.0000	****
Political Views	0.302797	0.008631	0.0000	****
Academic Major	0.379738	0.014960	0.0000	****
Gender	-0.054412	0.009457	0.0000	****
Interested In	0.136880	0.009804	0.0000	****
NC Residency	0.255477	0.006863	0.0000	****
Residence Hall	1.549997	0.007806	0.0000	****
Relationship Status	0.023642	0.007100	0.000868	****

Table B.9: Simultaneous evaluation of factors of association, week 9

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.518502	0.007104	0.0000	****
Political Views	0.302582	0.008499	0.0000	****
Academic Major	0.385464	0.014805	0.0000	****
Gender	-0.042175	0.009324	0.0000	****
Interested In	0.137776	0.009611	0.0000	****
NC Residency	0.262031	0.006831	0.0000	****
Residence Hall	1.555982	0.007702	0.0000	****
Relationship Status	0.016726	0.007063	0.0179	**

Table B.10: Simultaneous evaluation of factors of association, week 10

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.461350	0.006756	0.0000	****
Political Views	0.290833	0.008485	0.0000	****
Academic Major	0.376456	0.014847	0.0000	****
Gender	-0.052237	0.009239	0.0000	****
Interested In	0.135627	0.009566	0.0000	****
NC Residency	0.239829	0.006676	0.0000	****
Residence Hall	1.552200	0.007643	0.0000	****
Relationship Status	0.005619	0.007011	0.423	

Table B.11: Simultaneous evaluation of factors of association, week 11

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.484761	0.006950	0.0000	****
Political Views	0.299439	0.008182	0.0000	****
Academic Major	0.382542	0.014435	0.0000	****
Gender	-0.025905	0.009025	0.00410	***
Interested In	0.140815	0.009262	0.0000	****
NC Residency	0.267826	0.006623	0.0000	****
Residence Hall	1.570826	0.007440	0.0000	****
Relationship Status	0.018133	0.006868	0.00829	***

Table B.12: Simultaneous evaluation of factors of association, week 12

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.4583679	0.0068527	0.0000	****
Political Views	0.3015488	0.0080788	0.0000	****
Academic Major	0.3878838	0.0143197	0.0000	****
Gender	-0.0306993	0.0089168	0.000576	****
Interested In	0.1486907	0.0091452	0.0000	****
NC Residency	0.2706870	0.0065431	0.0000	****
Residence Hall	1.5681411	0.0073612	0.0000	****
Relationship Status	-0.0002049	0.0068166	0.976021	

Table B.13: Simultaneous evaluation of factors of association, week 13

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.414530	0.006701	0.0000	****
Political Views	0.296913	0.007970	0.0000	****
Academic Major	0.374642	0.014195	0.0000	****
Gender	-0.046732	0.008870	0.0000	****
Interested In	0.162413	0.009090	0.0000	****
NC Residency	0.259384	0.006430	0.0000	****
Residence Hall	1.567069	0.007260	0.0000	****
Relationship Status	-0.009808	0.006761	0.147	

Table B.14: Simultaneous evaluation of factors of association, week 14

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.405854	0.006675	0.0000	****
Political Views	0.292400	0.007951	0.0000	****
Academic Major	0.358530	0.014194	0.0000	****
Gender	-0.035553	0.008730	0.0000	****
Interested In	0.152579	0.008950	0.0000	****
NC Residency	0.255564	0.006400	0.0000	****
Residence Hall	1.567119	0.007222	0.0000	****
Relationship Status	0.000877	0.006731	0.896	

Table B.15: Simultaneous evaluation of factors of association, week 15

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.367860	0.006569	0.0000	****
Political Views	0.291087	0.007855	0.0000	****
Academic Major	0.358829	0.014042	0.0000	****
Gender	-0.038487	0.008589	0.0000	****
Interested In	0.149005	0.008810	0.0000	****
NC Residency	0.245064	0.006317	0.0000	****
Residence Hall	1.563554	0.007153	0.0000	****
Relationship Status	-0.003081	0.006660	0.644	

Table B.16: Simultaneous evaluation of factors of association, week 16

Factor	Estimate	Std Err.	p-value	Sig.
Intercept	-4.339402	0.006481	0.0000	****
Political Views	0.290687	0.007765	0.0000	****
Academic Major	0.362568	0.013926	0.0000	****
Gender	-0.028347	0.008421	0.000761	****
Interested In	0.134236	0.008653	0.0000	****
NC Residency	0.244940	0.006250	0.0000	****
Residence Hall	1.565313	0.007095	0.0000	****
Relationship Status	-0.015901	0.006622	0.016341	**

Appendix C

IRB for Survey and Interviews

This appendix contains the solicitations and informed consent forms employed in the 2010 survey and interview data collection (Chapter 5).

C.1 Survey

C.1.1 Solicitation

Initial solicitation

> From: Fred Stutzman
>
> Subject: UNC Research Study of Facebook Use
>
> Greetings,
>
> Researchers at UNC-Chapel Hill's School of Information and Library Science are interested in your opinions about Facebook, and we'd like to invite you to take part in our short web survey.
>
> If you choose to take part in this survey, you'll be eligible to win an Apple iPod Touch or one of thirty $10.00 gift certificates to places like Amazon.com, the iTunes Store, or the Daily Grind!
>
> This survey will take about 15-20 minutes to complete. By taking this survey, you'll help us understand how to better serve incoming Freshmen - people who were in your shoes not long ago. Your opinion is very important!
>
> This research has been approved by the UNC Institutional Review Board, study 10-0709. Thank you very much for your participation.
>
> Take the survey: LINK
>
> Sincerely,
>
> Fred Stutzman
>
> Teaching Fellow, UNC School of Information and Library Science

Follow-up solicitation

> From: Fred Stutzman
>
> Subject: UNC-SILS Research Study of Facebook Use
>
> Recently, we invited you to take part in a short web survey regarding your use of Facebook. Your opinion is very important for this research, and we hope you'll consider taking the survey.
>
> If you choose to take part in this survey, you'll be eligible to win an Apple iPod Touch or one of thirty $10.00 gift certificates to places like Amazon.com, the iTunes Store, or the Daily Grind!
>
> This survey will take about 15-20 minutes to complete. By taking this survey, you'll help us understand how to better serve incoming Freshmen - people who were in your shoes not long ago. Your opinion is very important!
>
> This research has been approved by the UNC Institutional Review Board, study 10-0709. Thank you very much for your participation.
>
> Take the survey: LINK
>
> Sincerely,
>
> Fred Stutzman
>
> Teaching Fellow, UNC School of Information and Library Science

C.1.2 IRB form

The IRB form is embedded directly in the survey, which is included directly in the survey.

C.1.3 Materials

The following pages contain a copy of the 2010 sample survey. The survey's only skip logic was on the IRB consent question ("Do you wish to participate in this study"). The timing indicators were not displayed to participants.

Default Question Block

UNC-Chapel Hill researchers are interested in your opinions about Facebook!

By taking this short survey, you're eligible to win an **Apple iPod Touch** or one of **thirty $10.00 gift certificates** to places like Amazon.com, the iTunes Store, or the Daily Grind!

This survey will take about 15-20 minutes to complete. By taking this survey, you'll help us understand how to better serve incoming Freshmen - people who were in your shoes not long ago. **Your opinion is very important!**

Don't forget to leave your contact information when you complete the survey, so you can be entered into the drawing.

To begin the survey, please advance to the next page.

Thank you! First, we'd like to tell you about your rights as a participant in this study.

Some general things you should know:
You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty. Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

About this study:
Research studies are designed to obtain new knowledge. The purpose of this research study is to understand how Social Network Sites help first-year undergraduate students (freshmen) adjust to campus. You're being asked to be part of this study because we're interested in your experience as a first-year student, age 18 or older.

For this study, you'll be asked to fill out a web survey, which will take approximately 15-20 minutes. In this survey, you'll be asked questions about demographics, questions concerning your use of Facebook, questions about your college experience, and questions about your thoughts and feelings. By taking part in this study, you'll be eligible to be entered into a raffle for an Apple iPod Touch or thirty $10.00 gift certificates. Of course, your participation is completely voluntary, meaning you can stop at any time, or refuse to answer any question at any time, without penalty. It won't cost you anything to take part in this study.

What are some of the benefits of risks of participating:
By participating in this study, you help researchers better understand how social network sites like Facebook are useful for students transitioning to campus. This research has important implications for future first-year students at UNC and other universities around the country. Your participation is very important. As for risks, there are no known risks for participating in this research.

As a UNC Student, you may choose not to be in the study or to stop being in the study before it is over at any time. This will not affect your class standing or grades at UNC-Chapel Hill. You will not be offered or receive any special consideration if you take part in this research.

How will your privacy be protected?
We will make every effort to protect your privacy. In this research, we don't collect any personally identifying information, such as your name or address. We'll never report anything that is personally identifiable in our research reports. At the end of the survey, you will be prompted to share your email address if you wish to be entered in a drawing for the prizes. This email address will not be stored with the survey responses; it will be used for the prize drawing and then deleted.

If You Have Any Questions:
If you have any questions or concerns about the study, please contact PI Frederic Stutzman (fred.stutzman@unc.edu, 919-962-5646) or faculty advisor Gary Marchionini (march@ils.unc.edu, 919-962-8071).

Institutional Review Board Approval:
The Behavioral Institutional Review Board (Behavioral IRB) of the University of North Carolina at Chapel Hill has approved this study, 10-0709. If you have any concerns about your rights in this study you may contact the Behavioral IRB at 919-962-7761 or at aa-irb@unc.edu.

Your Consent:
I have had the chance to ask any questions I have about this study, and they have been answered for me. I have read the information in this consent form. By choosing 'yes' below, I signify that I agree to be in the study.

Do you wish to participate in this study?

- ○ Yes
- ○ No

Timing

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Page 1 of 6

How often do you use Facebook?

- ○ A few times a day
- ○ A few times a week
- ○ A few times a month
- ○ Never

What is your gender?

- ○

Male

Female

What is your age?

What is your ethnicity? You may choose more than one.

- African American
- Caucasian
- Asian
- Hispanic
- Native American
- Other:

In your opinion, have you found Facebook useful for the following:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Keeping up with what is popular on campus					
Getting academic advice (e.g. classes to take or avoid)					
Learning about campus fashion trends					
Finding out about campus events to attend					
Discovering the interests you share with campus friends					
Searching for information about campus-related activities					
Learning about campus customs or traditions					
Finding campus-related news (e.g. sports, events)					
Getting recommendations for things to do around campus (e.g. good movies or restaurants)					
Getting in touch with people on campus that you've recently met					
Learning about people you've met on campus					
Sharing inside jokes with campus friends					

Please evaluate the following statements:

	Strongly	Disagree	Neither	Agree	Strongly

		Disagree		Agree nor Disagree		Agree
I feel confident that I understand the basics of using Facebook						
I feel confident that I could post a status update to Facebook						
I feel confident that I could create a group or event page in Facebook						
I feel confident that I could explain the basics of using Facebook to someone else						

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Page 2 of 6

About how many minutes per day do you usually spend Facebook?	
About how many Facebook friends do you have?	

What percentage of your Facebook friends attend UNC?

Please evaluate the following statements about your use of Facebook:

		Yes	No	Not Applicable (N/A)
Do you have a "friends-only" Facebook profile?				
Do you use Facebook's "limited profile"?				
Do you use any Facebook privacy features?				
Are you Facebook friends with aunts or uncles?				
Do you use Facebook's "chat" feature?				
Are you Facebook friends with your parent(s)?				

	Yes	No	Not Applicable (N/A)
Are you Facebook friends with your grandparent(s)?	O	O	O

Please evaluate the following statements about your use of Facebook:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I feel I am part of the Facebook community	O	O	O	O	O
Facebook has become part of my daily routine	O	O	O	O	O
I feel out of touch when I haven't logged into Facebook for a while	O	O	O	O	O
I would be sorry if Facebook shut down	O	O	O	O	O
Facebook is part of my everyday activity	O	O	O	O	O
I'm proud to tell people I'm on Facebook	O	O	O	O	O

Please evaluate the following statements about your use of Facebook:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If I needed to complete a complex task on campus, I could find help in Facebook	O	O	O	O	O
Participating in Facebook makes me feel like I belong on campus	O	O	O	O	O
I feel good when I interact with my campus friends on Facebook	O	O	O	O	O
I could use Facebook to find an answer to a question I have about Chapel Hill	O	O	O	O	O
If I had to borrow a car to drive to an appointment near campus, I could use Facebook to find a car to borrow	O	O	O	O	O
Facebook makes me feel alone on campus	O	O	O	O	O
I could use Facebook to find a good class to take	O	O	O	O	O
Facebook has been important in my on-campus relationships	O	O	O	O	O
If I needed a ride to somewhere near campus, I could use Facebook to find a ride	O	O	O	O	O
If I was unable to sleep in my room for a night, I could use Facebook to find a place to stay	O	O	O	O	O
I could use Facebook to find an answer to a question I have about UNC	O	O	O	O	O
If I needed to find employment quickly, I could use Facebook to find job opportunities	O	O	O	O	O

Please evaluate the following statements:

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I feel confident that I could let only a select group of friend see my Facebook content		O	O	O	O	O
I feel confident that I know how to use Facebook's privacy features		O	O	O	O	O
I feel confident that I have control over who can see my Facebook content		O	O	O	O	O
I feel confident that I could explain the basics of Facebook privacy to someone else		O	O	O	O	O

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Please answer the next four questions quickly and to the best of your knowledge. It is OK to estimate.

How many of your high school friends attend UNC-Chapel Hill?	
How many close friends have you made during your first year at UNC-Chapel Hill?	
With how many people on campus have you discussed important matters in the last year?	
How many steady romantic relationships did you have in the last year?	

Please indicate how close do you feel to the following people on campus:

		Not close at all	Somewhat unclose	Somewhat close	Very close	Not applicable (N/A)
My roommate(s)		O	O	O	O	O
My suitemates		O	O	O	O	O
My hallmates		O	O	O	O	O

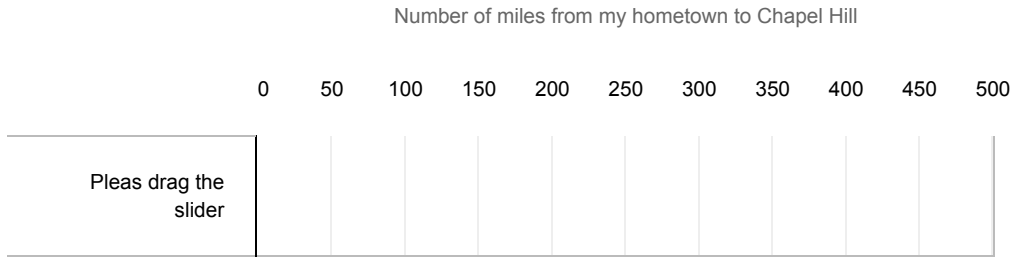
	Not close at all	Somewhat unclose	Somewhat close	Very close	Not applicable (N/A)
My high school friends	○	○	○	○	○
My campus friends	○	○	○	○	○

Are you a resident of North Carolina?

- ○ Yes
- ○ No

Please drag the slider to indicate approximately how many miles Chapel Hill is from your hometown.

If greater than 500, please choose 500.



Please answer the next two questions to the best of your knowledge. It is OK to estimate.

How many times did you visit your hometown during your first year at UNC?	
How many times did people from your hometown visit you at UNC during your first year?	

Thinking about the last month, how often was it that someone....

		Not at all	Once or twice	About once a week	Several times a week	About every day
Was right there with you (physically) in a stressful situation		○	○	○	○	○
Did some activity together to help you get your mind off of things		○	○	○	○	○
Talked with you about some interests of yours		○	○	○	○	○
Told you that she/he would keep the things that you talk about private, just between the two of you		○	○	○	○	○
Provided you with some transportation		○	○	○	○	○
Listened to you talk about your private feelings		○	○	○	○	○

		Not at all	Once or twice	About once a week	Several times a week	About every day
Loaned or gave you something (a physical object other than money) that you needed						
Told you what to expect in a situation that was about to happen						
Joked and kidded to try to cheer you up						
Loaned you under $25						

In addition to the Apple iPod Touch, we're giving away 30 gift certificates to people who take the survey. If you're chosen, what is your preferred gift certificate?

- Amazon.com
- Daily Grind (UNC Campus Coffee Shop)
- Apple iTunes Store

Timing

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Page 4 of 6 - Getting close!

The following statements describe college experiences. Reach each one and decide how well it applies to you at the present time (within the past few days). For each item, cloose the point in the continuum that best represents how closely the statement applies to you.

		Applies very closely to me	<<<	<<	<	.	>	>>	>>>	Doesn't apply to me at all
I feel that I fit in well as part of the college environment										
I am meeting as many people, and making as many friends as I would like at college										
I am very involved with social activities at college										
I am adjusting well to college										
I have had informal, personal contact with college professors										
I am pleased now about my decision to go to college										

	Applies very closely to me	<<<	<<	<	.	>	>>	>>>	Doesn't apply to me at all
I am pleased now about my decision to attend this college in particular	○	○	○	○	○	○	○	○	○
	Applies very closely to me	<<<	<<	<	.	>	>>	>>>	Doesn't apply to me at all
I have server close social ties at college	○	○	○	○	○	○	○	○	○
Lonesomeness for home is a source of difficulty for me now	○	○	○	○	○	○	○	○	○
I enjoy living in a college dormitory (omit if not in dorm)	○	○	○	○	○	○	○	○	○
I am satisfied with the extracurricular activities available at college	○	○	○	○	○	○	○	○	○
I am getting along very well with my roommate(s) at college (omit if no roommate)	○	○	○	○	○	○	○	○	○
I wish I were at another college or university	○	○	○	○	○	○	○	○	○
I feel that I have enough social skills to get along well in the collge setting	○	○	○	○	○	○	○	○	○
	Applies very closely to me	<<<	<<	<	.	>	>>	>>>	Doesn't apply to me at all
I am having difficulty feeling at ease with other people at college	○	○	○	○	○	○	○	○	○
I am satisfied with the extent to which I am participating in social activities at college	○	○	○	○	○	○	○	○	○
I expect to stay at college for a bachelor's degree	○	○	○	○	○	○	○	○	○
I have been feeling lonely a lot at college lately	○	○	○	○	○	○	○	○	○
I feel I have good control over my life situation at college	○	○	○	○	○	○	○	○	○
I feel I am very different from other students at college in ways I don't like	○	○	○	○	○	○	○	○	○
On balance, I would rather be home than here	○	○	○	○	○	○	○	○	○
	Applies very closely to me	<<<	<<	<	.	>	>>	>>>	Doesn't apply to me at all
Lately I have been giving a lot of thought to transferring to another college	○	○	○	○	○	○	○	○	○
Lately I have been giving a lot of thought to dropping out of college altogether and for good	○	○	○	○	○	○	○	○	○
I find myself giving considerable thought to taking time off from college and finishing later	○	○	○	○	○	○	○	○	○
I have some good friends or acquaintances at college with whom I can talk about any problems I have	○	○	○	○	○	○	○	○	○
I am quite satisfied with my social life at college	○	○	○	○	○	○	○	○	○

	Applies very closely to me	<<<	<<	<	.	>	>>	>>>	Doesn't apply to me at all
I feel confident that I will be able to deal in a satisfactory manner with future challenges here at college	○	○	○	○	○	○	○	○	○

Page 5 of 6. You're almost done! Thank you!

In the past year, did you do any of the following campus activities?

	Yes	No
Got a job (paid)	○	○
Joined a sorority or fraternity	○	○
Got an internship	○	○
Joined a religious organization	○	○
Attended religious services	○	○
Joined a club	○	○
Joined a service organization	○	○
Played an intramural sport	○	○
Joined an ethnic organization	○	○
Played a varsity sport	○	○

Approximately how many hours per week do you spend on non-academic campus activities?

Considering last semester's grades, and your anticipated grades for this semester, approximately what is your GPA? Please drag the slider to the approximate location.

UNC Grading Scale: 0.0=F, 1.0=D, 2.0=C, 3.0=B, 4.0=A

	0	1	2	3	4
Drag Slider to Approximate GPA					

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way

during the past week by checking the appropriate box for each question.

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)
I was bothered by things that usually don't bother me	○	○	○	○
I had trouble keeping my mind on what I was doing	○	○	○	○
I felt depressed	○	○	○	○
I felt that everything I did was an effort	○	○	○	○
I felt hopeful about the future	○	○	○	○
I felt fearful	○	○	○	○
My sleep was restless	○	○	○	○
I was happy	○	○	○	○
I felt lonely	○	○	○	○
I could not "get going"	○	○	○	○

These questions ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

	Never	Almost Never	Sometimes	Fairly Often	Very Often
In the last month, how often have you been upset because of something that happened unexpectedly?	○	○	○	○	○
In the last month, how often have you felt that you were unable to control the important things in your life?	○	○	○	○	○
In the last month, how often have you felt nervous and "stressed"?	○	○	○	○	○
In the last month, how often have you felt confident about your ability to handle your personal problems?	○	○	○	○	○
In the last month, how often have you felt that things were going your way?	○	○	○	○	○
	Never	Almost Never	Sometimes	Fairly Often	Very Often
In the last month, how often have you found that you could not cope with all the things that you had to do?	○	○	○	○	○
In the last month, how often have you been able to control irritations in your life?	○	○	○	○	○
In the last month, how often have you felt that you were on top of things?	○	○	○	○	○
In the last month, how often have you been angered because of things that were outside of your control?	○	○	○	○	○
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	○	○	○	○	○

Thank you very much for your participation!

If you have any questions about this survey, please contact Fred Stutzman, fred.stutzman@unc.edu. To contact UNC Counseling and Wellness services, please call (919) 966-3658. To contact UNC Academic Advising, please call (919) 966-5116.

If you'd like to be entered into the drawing for the Apple iPod Touch or Gift Certificates, please enter your email address below.

May we contact you regarding future research opportunities?

- ○ Yes
- ○ No

C.2 Semi-Structured Interviews

C.2.1 Solicitation

From: Fred Stutzman

Subject: Participate in Facebook research

As a first-year student, your opinion is very important.

Researchers at UNC's School of Information and Library Science are interested in how Facebook is used by first-year students making the transition to college. As a first year student, we'd like to interview you for one hour to talk about your use of Facebook. You will be compensated $15.00 for your time.

Participation in this research is entirely voluntary. Interviews can be in person, or remotely (over the phone, via Skype, etc.). To volunteer for participation, or ask any questions about the project, please email Principal Investigator Fred Stutzman at fred@fredstutzman.com. If you prefer, you may call 919-260-8508.

This research has been approved by the University of North Carolina Institutional Review Board, IRB-10-0677.

Thank you,

Fred Stutzman

C.2.2 IRB form

Included on next page.

University of North Carolina-Chapel Hill
Consent to Participate in a Research Study
Adult Participants
Social Behavioral Form

IRB Study # 10-0677
Consent Form Version Date: April 20, 2010
Title of Study: Networked Information Behavior During a Life Transition - Interviews

Principal Investigator: Frederic Stutzman
UNC-Chapel Hill Department: School of Information and Library Science
UNC-Chapel Hill Phone number: 919-260-8508
Email Address: fred@fredstutzman.com
Advisor: Dr. Gary Marchionini, 919-966-3611, march@ils.unc.edu

Study Contact telephone number: 919-260-8508
Study Contact email: fred@fredsutzman.com

What are some general things you should know about research studies?
You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty. Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

About this study:
Research studies are designed to obtain new knowledge. The purpose of this research study is to understand how Social Network Sites help first-year undergraduate students (freshmen) adjust to campus. You're being asked to be part of this study because we're interested in your experience as a first-year student, age 18 or older.

For this study, you'll be asked to complete a one hour interview. For participating in the interview, you'll be paid $15.00. Of course, your participation is completely voluntary, meaning you can stop at any time, or refuse to answer any question at any time, without penalty. It won't cost you anything to take part in this study.

What are some of the benefits or risks of participating:
By participating in this study, you help researchers better understand how social network sites like Facebook are useful for students transitioning to campus. This research has important implications for future first-year students at UNC and other universities around the country. Your participation is very important. As for risks, there are no known risks for participating in this research.

As a UNC Student, you may choose not to be in the study or to stop being in the study before it is over at any time. This will not affect your class standing or grades at UNC-Chapel Hill. You will not be offered or receive any special consideration if you take part in this research.

How many people will take part in this study?
If you decide to participate, you will be one of approximately 20 people in this research study.

How long will your part in this study last?
This interview will not last longer than one hour.

What will happen if you take part in the study?
You are one of about 20 individuals to participate in in-depth interviews. You will be interviewed at an agreed upon convenient location. With your permission, the interview will be tape recorded. The interviewer will ask you several questions regarding your use of social networking websites. Please be assured that there are no "right-or-wrong" answers. Also, please be assured that you are free not to answer any question or to end the interview at any

time. After the interview, which will last no more than one hour, you will receive $15.00 for your participation in this study. Once you complete the study, you will be debriefed about the purpose of the study.

How will your privacy be protected?

We will make every effort to protect your privacy. Participants will not be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies for purposes such as quality control or safety.

With your permission, the interview will be tape recorded. Your comments will be recorded but your name will not be associated with your responses. After the interview, recordings will be stored and locked to restrict access to anyone except the Principle Investigator.

Check the line that best matches your choice:
_____ OK to record me during the study
_____ Not OK to record me during the study

Will you receive anything for being in this study?

You will be receiving $15.00 for taking part in this study. If you withdraw before the interview is completed, you will be paid at a rate of $0.25 for every minute completed.

Will it cost you anything to be in this study?

There will be no costs for being in the study

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

- -

Title of Study: Networked Information Behavior During a Life Transition - Interviews
Principal Investigator: Frederic Stutzman

Participant's Agreement:

I have read the information provided above. I have asked all the questions I have at this time. I voluntarily agree to participate in this research study.

_____ _____
Signature of Research Participant Date

_____
Printed Name of Research Participant

_____ _____
Signature of Person Obtaining Consent Date

_____
Printed Name of Person Obtaining Consent

C.2.3 Materials

The following questions were used during the semi-structured interviews.

Block 1: General Experience

- Can you describe your history using social network sites? What sites do you use, when did you join them?
- Can you describe who or what persuaded you to join?
  - What is their relation to you?
  - Were they the first person to invite you to join?
  - What was the critical incident that motivated joining?
- What is your opinion of the site(s)? (Do you enjoy using them?)
  - Is there a particular site you like or dislike?
  - Has your opinion of the sites changed over time? How so?
- How do you use the site?
  - Do you share personal information, status updates, post photos or videos, use applications, comment on others walls, etc?

Block 2: Audience and Motivation

- Can you describe the members of your network on [SNS]?
  - Prompt: Family members, coworkers, neighbors, people from past?
  - Are you comfortable with your connections to these people?
  - How do you feel these connections impact your ability to share information?
  - Have you ever had to reject a friend request, or de-friend someone?
- Can you describe your main activities when using [SNS]?
  - Do you mainly browse, respond to messages - is there a specific activity you spend a lot of time doing?
- Who (what profiles) do you pay the most attention to? What social groups are they from?
  - Was this surprising to you?

- Who do you think is paying attention to you and your activities?
  - How did you ascertain this?
  - Do you feel comfortable with this?

Block 3: Stress and Support

- Do you find that your use of [SNS] (ever) affects your mood?
  - Does it affect you positively and negatively?
- Do you feel that the [SNS] is a supportive place?
  - Could you go to the social network and ask for help?
  - Do you feel that people are listening to you?
- Can you describe an incident where you experienced the following:
  - Emotional support - an incident where a member of your social network emotionally supported you?
  - Instrumental support - an incident where you used the social network to accomplish an external goal (like attending a party, finding people to help you move, etc)
  - Informational support - an incident where you use the social network to address an informational problem (restaurant recommendation, etc).
- Do you feel closer to people as a result of your use of SNS?
  - In particular, who?
  - How has your relationship evolved because of SNS use?
- Do you feel that your use of SNS is replacing any forms of communication?
- Do you feel that your use of SNS is replacing any forms of interpersonal interaction?
- Do you feel more "connected" as a result of your social network use?
- Do you feel more independent as a result of your social network use?

Block 4: Transitional Uses

- Do you feel like you have a better sense of the campus because you participate in social network sites?
- Did you use social network sites to learn about the campus before you arrived?
- Did you use social network sites to learn about potential roommates or friends before you arrived? Can you describe that process?
- Do you feel your that participation in social network sites helps you better understand those around you?
- Have you experimented with your presentation in the social network site, trying to make your identity seem to fit in with the campus? Can you describe that process?
- Do you use the social network site to find out about events or goings-on on campus? Please describe.
- Do you use the social network site to connect to people on campus when you have a question related to school or school life? Example?
- Do you feel more connected to the campus community because of your participation in social network sites? Why?

Block 5: Privacy

- Do you feel like your privacy is protected in social network sites?
- Can you describe an incident or incidents where you felt your privacy in a social network site was violated?
  - How did you go about dealing with the violation?
- What steps have you taken to protect your privacy in social network sites?
  - Do you use privacy settings?
- Do you worry about future ramifications of information disclosure?
- Do you take any steps to prevent over-sharing?

Block 6: Information and Attributes

- Do you share your real name, and real personal information on [SNS]? IF Y:
  - Have you participated in other online community where you have shared your real name?
  - Do you feel comfortable using your real name in other sites on the internet?
- How technical would you describe yourself?
  - What is your previous experience with IT?
- How has your use of SNS affected your overall computing use?
  - Has it affected your work computing?

Appendix D

Survey Regressions with Multiple Imputation

This appendix reports the results of the regression equations presented in Section 5.4.5 using multiple imputation. Upon inspection of the data, the variables *roommate quality* and *hallmate quality* were contributing to most of the missingness in the dataset. These two variables were imputed using multivariate normal regression, which uses an iterative MCMC estimator to accommodate arbitrary missing data. 50 imputations were run; the following report results of multiple linear regressions on the imputed data. As in the case of the regressions presented in Section 5.4.5, robust standard errors were employed.

Table D.1: Multiple regression predicting ISSB, controls added stepwise

	(1) ISSB	(2) ISSB	(3) ISSB	(4) ISSB
Gender	0.258*** (5.03)	0.287*** (5.70)	0.265*** (5.15)	0.236*** (4.59)
NC Resident	0.0368 (0.63)	0.0263 (0.47)	0.0259 (0.47)	0.0199 (0.35)
Roommate		0.0372 (0.64)	0.0278 (0.48)	0.0324 (0.56)
Hallmate		0.140** (2.72)	0.146** (2.85)	0.116* (2.25)
Local Friends		0.191*** (6.42)	0.191*** (6.33)	0.158*** (4.80)
CES-D			-0.196* (-2.54)	-0.211** (-2.66)
PSS			0.166** (3.00)	0.187** (3.28)
FB Friends				0.120** (3.11)
SNS-E				0.160*** (3.82)
Intercept	2.785*** (32.71)	2.291*** (19.03)	2.041*** (13.01)	0.614* (2.08)
N	977	946	943	897

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender*: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of - state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy.*

Table D.2: Multiple regression predicting ISSB from SNS-SIP and SNS-S

	(1) ISSB	(2) ISSB	(3) ISSB	(4) ISSB
Gender	0.198*** (3.82)	0.200*** (3.81)	0.212*** (4.17)	0.214*** (4.18)
NC Resident	0.0391 (0.68)	0.0342 (0.60)	0.0431 (0.75)	0.0449 (0.77)
Roommate	0.0343 (0.60)	0.0322 (0.57)	0.0333 (0.59)	0.0356 (0.63)
Hallmate	0.103* (2.02)	0.102* (2.01)	0.109* (2.14)	0.109* (2.13)
Local Friends	0.149*** (4.55)	0.147*** (4.49)	0.148*** (4.50)	0.146*** (4.44)
CES-D	-0.223** (-2.81)	-0.232** (-2.92)	-0.216** (-2.74)	-0.224** (-2.85)
PSS	0.188** (3.30)	0.188** (3.30)	0.191*** (3.35)	0.194*** (3.40)
FB Friends	0.0898* (2.20)	0.0845* (2.03)	0.0851* (2.12)	0.0874* (2.15)
SNS-E	0.116* (2.55)	0.0995* (2.05)	0.126** (3.06)	0.125** (3.01)
SNS-SIP	0.158*** (3.52)			
SNS-SIP RF		0.0485 (1.07)		
SNS-SIP IF		-0.00362 (-0.07)		
SNS-SIP SNA		0.137** (2.60)		
SNS-S			0.172*** (4.20)	
SNS-S IS				0.134** (3.11)
SNS-S TS				-0.0151 (-0.36)
SNS-S ES				0.0523 (1.36)
Intercept	0.452 (1.48)	0.455 (1.48)	0.431 (1.46)	0.405 (1.35)
N	897	897	897	897

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender*: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.*

Table D.3: Multiple regression predicting SACQ-SA, controls added stepwise

	(1) SACQ-SA	(2) SACQ-SA	(3) SACQ-SA	(4) SACQ-SA
Gender	-0.0907 (-1.04)	-0.000721 (-0.01)	0.00601 (0.09)	-0.0266 (-0.40)
NC Resident	0.144 (1.40)	0.0835 (0.91)	0.0154 (0.21)	-0.00469 (-0.06)
Roommate		0.318*** (3.34)	0.162* (2.11)	0.137 (1.80)
Hallmate		0.264** (3.25)	0.167** (2.61)	0.151* (2.34)
Local Friends		0.516*** (10.55)	0.326*** (8.48)	0.281*** (7.12)
ISSB			0.441*** (10.19)	0.416*** (9.27)
CES-D			-0.873*** (-10.12)	-0.851*** (-9.72)
PSS			-0.337*** (-4.88)	-0.349*** (-4.88)
FB Friends				0.204*** (4.18)
SNS-E				0.156* (2.25)
Intercept	6.542*** (46.44)	5.129*** (27.00)	6.118*** (26.44)	4.369*** (10.30)
N	977	946	943	897

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender*: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.*

Table D.4: Multiple regression predicting SACQ-SA from SNS-SIP and SNS-S

	(1) SACQ-SA	(2) SACQ-SA	(3) SACQ-SA	(4) SACQ-SA
Gender	-0.0417 (-0.61)	-0.0314 (-0.46)	-0.0409 (-0.61)	-0.0373 (-0.55)
NC Resident	0.00401 (0.05)	0.00923 (0.13)	0.0138 (0.19)	0.0152 (0.20)
Roommate	0.138 (1.81)	0.138 (1.82)	0.139 (1.83)	0.140 (1.84)
Hallmate	0.146* (2.26)	0.146* (2.28)	0.148* (2.29)	0.149* (2.30)
Local Friends	0.278*** (7.03)	0.280*** (7.08)	0.276*** (6.93)	0.276*** (6.92)
ISSB	0.409*** (9.04)	0.410*** (9.08)	0.398*** (8.83)	0.397*** (8.78)
CES-D	-0.857*** (-9.81)	-0.856*** (-9.83)	-0.859*** (-9.87)	-0.861*** (-9.83)
PSS	-0.347*** (-4.86)	-0.350*** (-4.91)	-0.342*** (-4.81)	-0.340*** (-4.70)
FB Friends	0.191*** (3.82)	0.200*** (3.94)	0.178*** (3.69)	0.180*** (3.70)
SNS-E	0.138 (1.93)	0.108 (1.46)	0.132 (1.92)	0.134 (1.94)
SNS-SIP	0.0704 (1.33)			
SNS-SIP RF		-0.105 (-1.78)		
SNS-SIP IF		0.149* (2.22)		
SNS-SIP SNA		0.0418 (0.58)		
SNS-S			0.134** (2.66)	
SNS-S IS				0.0652 (1.22)
SNS-S TS				0.0471 (0.92)
SNS-S ES				0.0178 (0.36)
Intercept	4.301*** (10.01)	4.257*** (9.84)	4.238*** (9.99)	4.226*** (9.89)
N	897	897	897	897

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender*: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.*

Table D.5: Multiple regression predicting SACQ-A, controls added stepwise

	(1) SACQ-A	(2) SACQ-A	(3) SACQ-A	(4) SACQ-A
Gender	0.0530 (0.60)	0.110 (1.31)	0.142 (1.92)	0.122 (1.63)
NC Resident	0.137 (1.37)	0.0797 (0.85)	0.0155 (0.20)	-0.000300 (-0.00)
Roommate		0.199* (2.01)	0.0448 (0.55)	0.0156 (0.19)
Hallmate		0.197* (2.39)	0.110 (1.63)	0.0975 (1.43)
Local Friends		0.432*** (8.44)	0.255*** (5.96)	0.235*** (5.11)
ISSB			0.357*** (7.21)	0.329*** (6.41)
CES-D			-0.882*** (-8.60)	-0.885*** (-8.46)
PSS			-0.347*** (-4.60)	-0.342*** (-4.38)
FB Friends				0.102 (1.51)
SNS-E				0.232** (3.01)
Intercept	7.073*** (48.85)	5.973*** (29.01)	7.191*** (29.71)	5.638*** (10.92)
N	977	946	943	897

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender*: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of - state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.*

Table D.6: Multiple regression predicting SACQ-A from SNS-SIP and SNS-S

	(1) SACQ-A	(2) SACQ-A	(3) SACQ-A	(4) SACQ-A
Gender	0.111 (1.44)	0.127 (1.66)	0.113 (1.50)	0.110 (1.45)
NC Resident	0.00639 (0.08)	0.00625 (0.08)	0.0115 (0.15)	0.0112 (0.14)
Roommate	0.0165 (0.20)	0.0136 (0.17)	0.0165 (0.20)	0.0172 (0.21)
Hallmate	0.0937 (1.38)	0.0941 (1.38)	0.0956 (1.41)	0.0940 (1.38)
Local Friends	0.233*** (5.04)	0.232*** (5.05)	0.232*** (5.00)	0.231*** (4.97)
ISSB	0.324*** (6.28)	0.320*** (6.24)	0.317*** (6.13)	0.313*** (6.07)
CES-D	-0.890*** (-8.50)	-0.904*** (-8.67)	-0.891*** (-8.51)	-0.894*** (-8.50)
PSS	-0.341*** (-4.36)	-0.345*** (-4.45)	-0.338*** (-4.33)	-0.338*** (-4.26)
FB Friends	0.0923 (1.39)	0.0970 (1.50)	0.0860 (1.30)	0.0860 (1.29)
SNS-E	0.217** (2.72)	0.155 (1.88)	0.216** (2.79)	0.212** (2.73)
SNS-SIP	0.0542 (0.90)			
SNS-SIP RF		-0.155* (-2.46)		
SNS-SIP IF		0.0986 (1.38)		
SNS-SIP SNA		0.167* (2.10)		
SNS-S			0.0858 (1.50)	
SNS-S IS				0.0760 (1.33)
SNS-S TS				-0.0436 (-0.81)
SNS-S ES				0.0618 (1.22)
Intercept	5.586*** (10.70)	5.534*** (10.76)	5.554*** (10.78)	5.549*** (10.71)
N	897	897	897	897

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors. Gender*: 0=M, 1=F. NC Resident, 0=In-state, 1=Out-of -state. Roommate quality, 0=Low, 1=High. Hallmate quality, 0=Low, 1=High. Local and Facebook friends log transformed. SNS-E: Social network site efficacy. SNS-SIP: 12 item Social Network Site Social Information Processes Scale. SNS-SIP RF, IF, SNA: 4 item SNS-SIP factors scale. SNS-S: 12 item Social Network Site Support Scale. SNS-S IS, TS, ES: 4 item SNS-S factors scale.*

Appendix E

Psychometric Properties of Scales

This appendix contains the psychometric properties of the scales employed in the 2010 survey. The following scales are described:

- Scale E.1: Social Information Process
- Scale E.2: Social Network Site Self-Efficacy
- Scale E.3: Facebook Intensity
- Scale E.4: Social Network Support
- Scale E.5: Social Network Site Privacy Efficacy
- Scale E.6: Index of Socially Supportive Behaviors
- Scale E.7: Student Adaptation to College
- Scale E.8: Center for Epidemiologic Studies Short Depression Scale
- Scale E.9: Perceived Stress Scale

Scale E.1: Social Information Processes

Background

I hypothesize that three social-informational processes (SIP) in social network sites may facilitate adaptation during the transition to college. They are:

- *Role and identity management*
- *Information seeking and encountering*
- *Social network augmentation*

The first process, role and identity management is a multi-level subjective construct measuring the extent to which the individual uses the social network site for acculturation processes. Information seeking and encountering is a multi-level subjective and behavioral construct measuring the extent to which the individual uses the social network site to find and encounter information about the transitional lifeworld. Social network augmentation is a subjective construct measuring the extent to which the social network site facilitated the deepening of relationships in the transitional setting. These constructs were developed by the researcher and represent original contributions.

Measures

The Social Information Processes scale is assessed with three factors, as described in the Background materials. Each factor is assessed with four Likert questions. The question is framed as follows: "*In your opinion, have you found Facebook useful for the following.*" Context for the response frame is provided in the study introduction. Responses to the question are: *Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree.* The questions were presented to the respondent in random order.

Role Factor

1. Keeping up with what is popular on campus
2. Learning about campus customs or traditions
3. Finding campus-related news (e.g. sports, events)
4. Learning about campus fashion trends

Information Factor

1. Searching for information about campus-related activities
2. Finding out about campus events to attend
3. Getting recommendation for things to do around campus (e.g. good movies or restaurants)
4. Getting academic advice (e.g. classes to take or avoid)

Social Network Augmentation

1. Learning about people you've met on campus
2. Discovering the interests you share with campus friends
3. Sharing inside jokes with campus friends
4. Getting in touch with people on campus that you've recently met

Performance

First, I provide descriptive measures of item performance. These include histograms and a table listing the means, standard deviations, etc. Then I correlate the scales, conduct factor analysis within the factor, alphas within the factor. Finally, I conduct factor analysis within the scale, and report alphas within the scale.

Factor One: Role Factor

The first factor of the SIP scale is the Role Factor, a subjective construct measuring the extent to which the individual uses the social network site for acculturation processes. Descriptive statistics of the responses, as well as a histogram of responses, are provided below.

Variable labels are as follows:

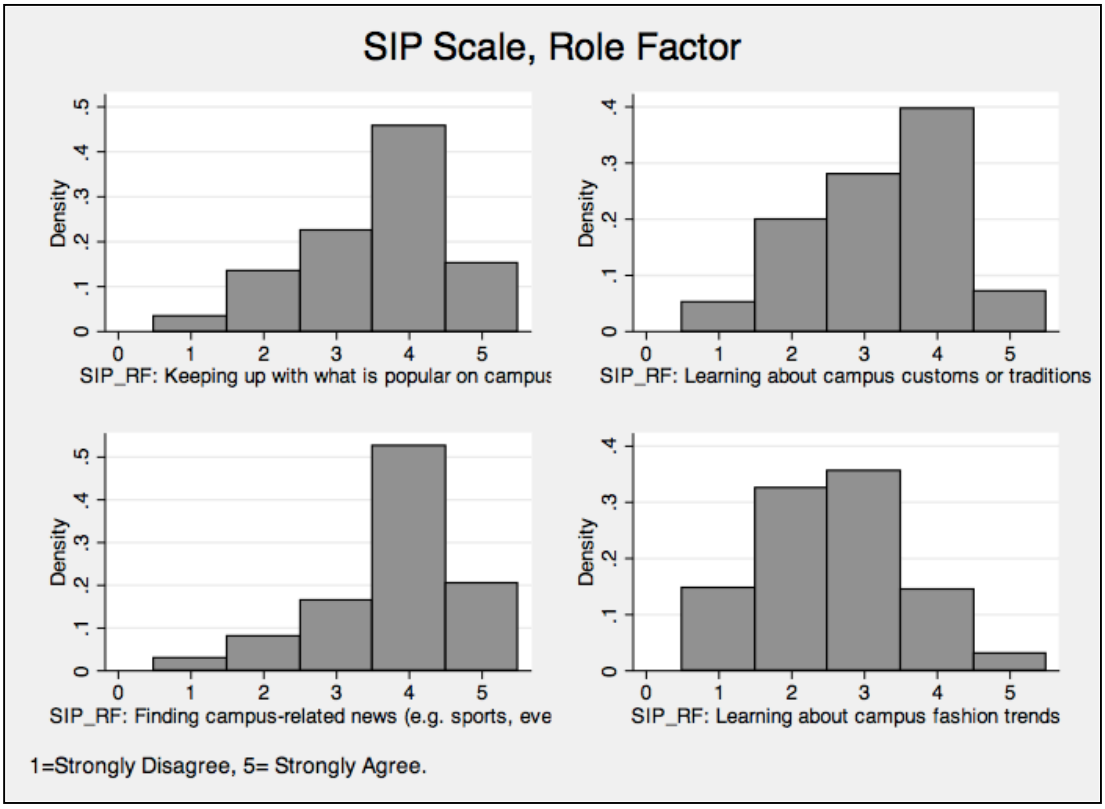
- **s1_f1_q1:** Keeping up with what is popular on campus
- **s1_f1_q2:** Learning about campus customs or traditions
- **s1_f1_q3:** Finding campus-related news (e.g. sports, events)
- **s1_f1_q4:** Learning about campus fashion trends

Descriptive Statistics

Table 1: Descriptive Statistics for SIP scale, Role Factor.

Variable	Obs	Mean	Std. Dev.	Min	Max
s1_f1_q1	979	3.556691	1.010984	1	5
s1_f1_q2	980	3.235714	1.021	1	5
s1_f1_q3	980	3.79898	.9456092	1	5
s1_f1_q4	979	2.586313	1.003805	1	5

Figure 1: Histogram of responses for SIP scale, Role Factor.



Upon inspection of the histogram, I see that the fourth question in the Role Factor battery, Learning about campus fashion trends, exhibits a leftward skew, while the previous three questions exhibit a rightward skew. Finally, I create a correlation matrix to explore relationships between the scale items; all items correlate positively.

Table 2: Correlation Matrix for SIP scale, Role Factor.

	s1_f1_q1	s1_f1_q2	s1_f1_q3	s1_f1_q4
s1_f1_q1	1.0000			
s1_f1_q2	0.5031*	1.0000		
s1_f1_q3	0.4989*	0.4451*	1.0000	
s1_f1_q4	0.4975*	0.4850*	0.3473*	1.0000

Correlations significant at the $p<.05$ level are starred.

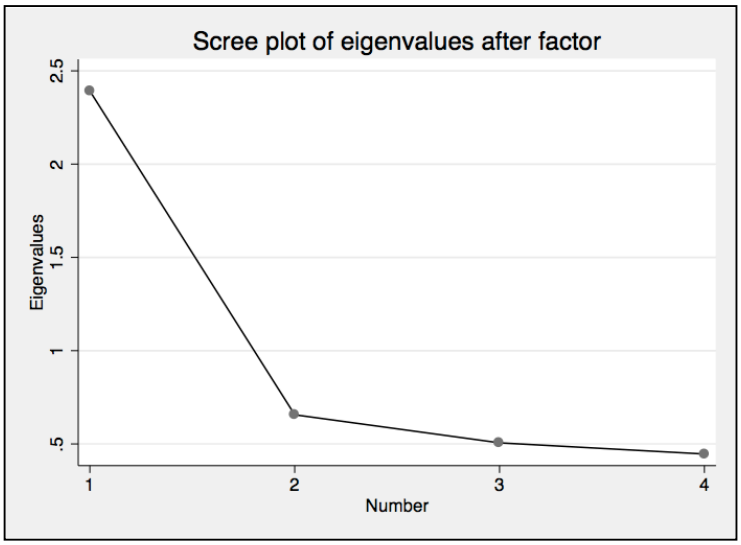
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .5979 of the variance. Questions 3 and 4 load outside the 60/40 criteria, notably.

Table 3: Principle Components Analysis for SIP scale, Role Factor.

Variable	Factor1	Uniqueness
s1_f1_q1	0.8167	0.3331
s1_f1_q2	0.7902	0.3755
s1_f1_q3	0.7335	0.4619
s1_f1_q4	0.7496	0.4381

Figure 2: Screeplot for SIP scale, Role Factor

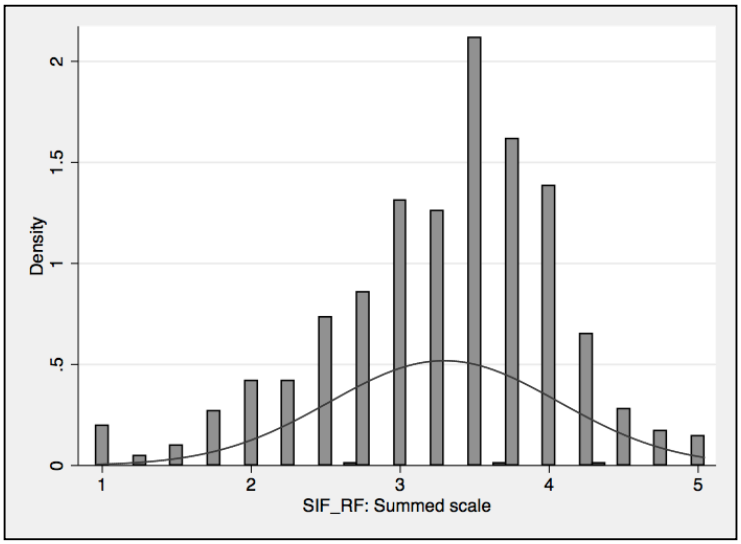


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is acceptable, at .7756. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .459), the fact the scale loads on a single factor that is responsible for most of the variance. It does appear that question 4 could be reworked, as it is reverse-directional of the other items (Figure 1); it does not post a serious threat to validity, but it is an area for future work.

Summed Scale for SIP scale, Role Factor

Finally, the four factors are summed to create the summed scale for SIP, Role Factor. This scale has a mean of 3.2952 and a standard deviation of .7695. A histogram is provided in Figure 3.

Figure 3: Histogram for Summed Scale for SIP scale, Role Factor



Factor Two: Information Factor

The second factor of the SIP scale is the Information Factor, a subjective and behavioral construct measuring the extent to which the individual uses the social network site to find and encounter information about the transitional lifeworld. Descriptive statistics of the responses, as well as a histogram of responses, are provided below.

Variable labels are as follows:

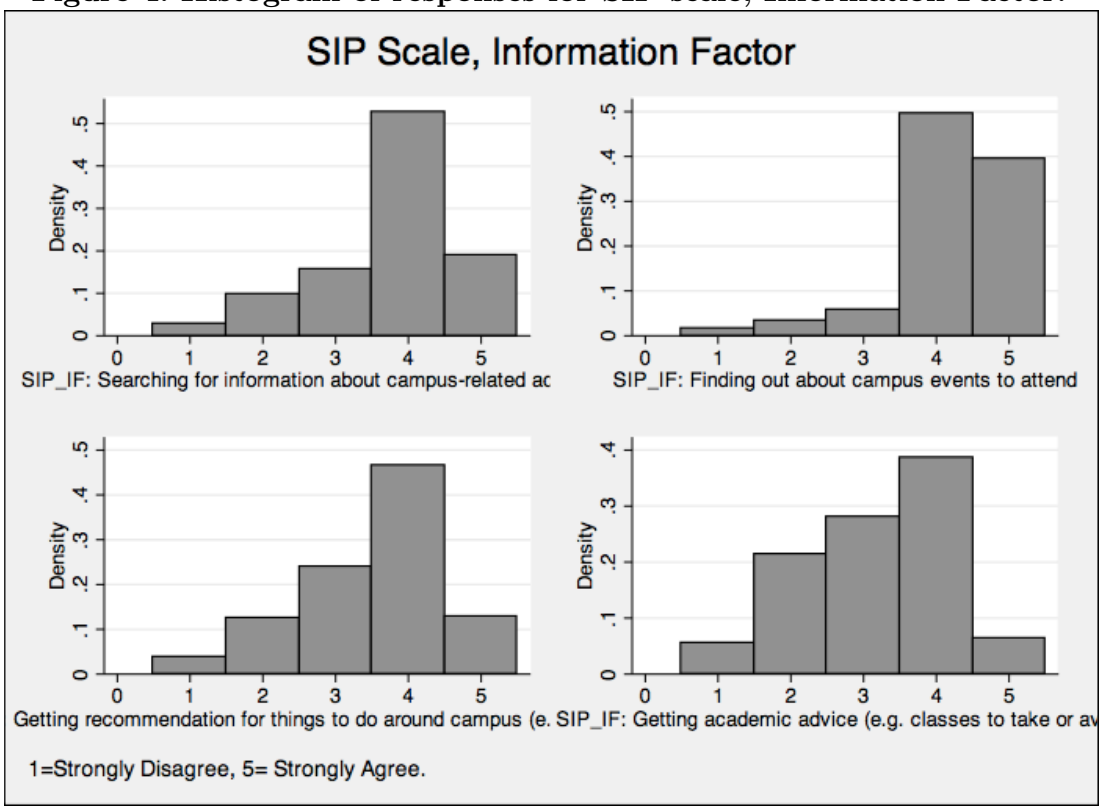
- **s1_f2_q5:** Searching for information about campus-related activities
- **s1_f2_q6:** Finding out about campus events to attend
- **s1_f2_q7:** Getting recommendation for things to do around campus (e.g. good movies or restaurants)
- **s1_f2_q8:** Getting academic advice (e.g. classes to take or avoid)

Descriptive Statistics

Table 4: Descriptive Statistics for SIP scale, Information Factor.

Variable	Obs	Mean	Std. Dev.	Min	Max
s1_f2_q5	979	3.75383	.9601855	1	5
s1_f2_q6	980	4.218367	.834196	1	5
s1_f2_q7	979	3.527068	.9907717	1	5
s1_f2_q8	979	3.192033	1.020194	1	5

Figure 4: Histogram of responses for SIP scale, Information Factor.



Upon inspection of the histogram, I find that all questions demonstrate the same rightward skew. Question **s1_f2_q6**, *Finding out about campus events to attend*, appears to skew strongly to the right, with almost 90% of respondents agreeing that Facebook helps them find campus events to attend. Finally, I create a correlation matrix to explore relationships between the scale items; all items correlate positively.

Table 5: Correlation Matrix for SIP scale, Role Factor.

	s1_f2_q5	s1_f2_q6	s1_f2_q7	s1_f2_q8
s1_f2_q5	1.0000			
s1_f2_q6	0.5938*	1.0000		
s1_f2_q7	0.4658*	0.4747*	1.0000	
s1_f2_q8	0.3519*	0.3492*	0.4521*	1.0000

Correlations significant at the $p<.05$ level are starred.

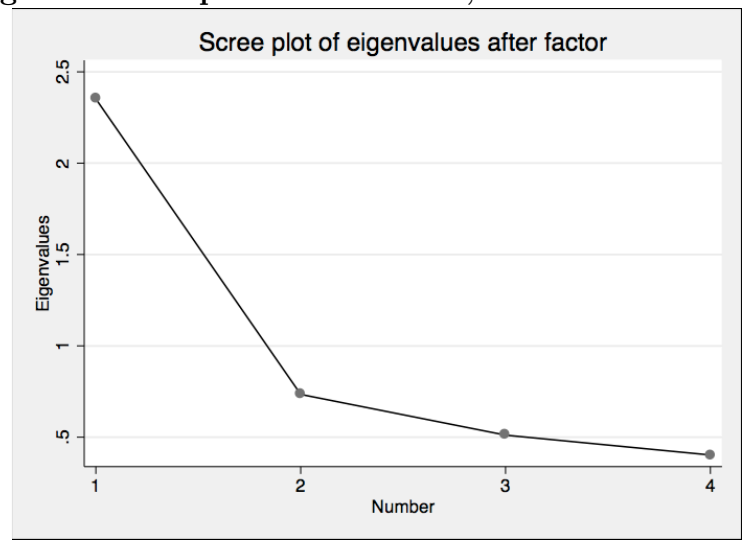
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .5879 of the variance. Question 4 loads outside the 60/40 criteria.

Table 6: Principle Components Analysis for SIP scale, Information Factor.

Variable	Factor1	Uniqueness
s1_f2_q5	0.7983	0.3626
s1_f2_q6	0.8037	0.3541
s1_f2_q7	0.7822	0.3882
s1_f2_q8	0.6758	0.5433

Figure 5: Screeplot for SIP scale, Information Factor

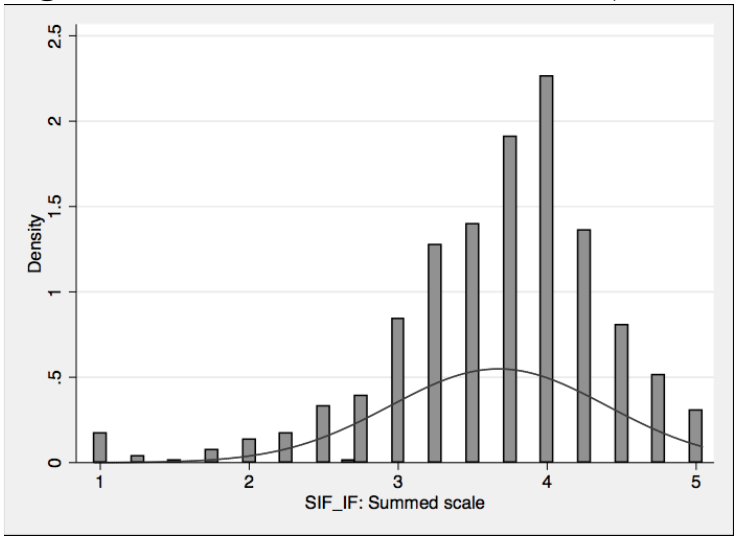


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is acceptable, at .7597. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .401), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SIP scale, Information Factor

Finally, the four factors are summed to create the summed scale for SIP, Information Factor. This scale has a mean of 3.6734 and a standard deviation of .7269. A histogram is provided in Figure 6.

Figure 6: Histogram for Summed Scale for SIP scale, Information Factor



Factor Three: Social Network Augmentation Factor

The third factor of the SIP scale is the Social Network Augmentation Factor, is a subjective construct measuring the extent to which the social network site facilitated the deepening of relationships in the transitional setting. Descriptive statistics of the responses, as well as a histogram of responses, are provided below.

Variable labels are as follows:

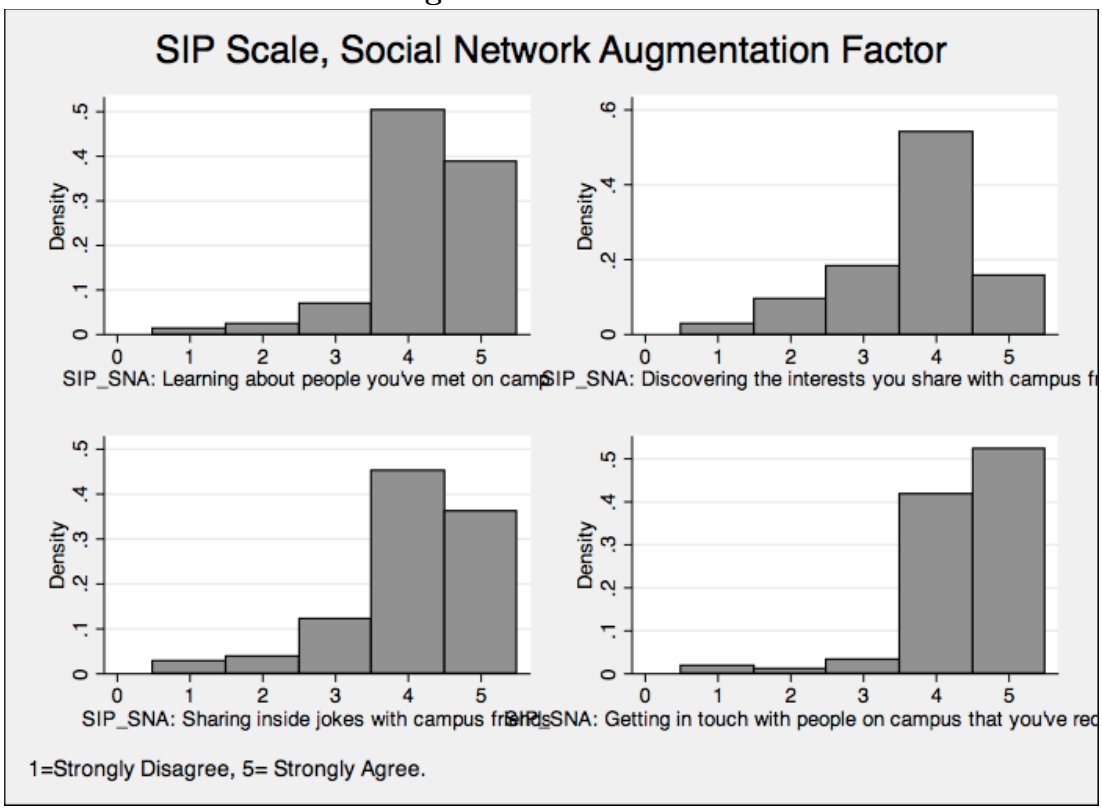
- **s1_f3_q9:** Learning about people you've met on campus
- **s1_f3_q10:** Discovering the interests you share with campus friends
- **s1_f3_q11:** Sharing inside jokes with campus friends
- **s1_f3_q12:** Getting in touch with people on campus that you've recently met

Descriptive Statistics

Table 7: Descriptive Statistics for SIP scale, Social Network Augmentation Factor.

Variable	Obs	Mean	Std. Dev.	Min	Max
s1_f3_q9	980	4.227551	.7933947	1	5
s1_f3_q10	978	3.704499	.9412639	1	5
s1_f3_q11	980	4.085714	.9289356	1	5
s1_f3_q12	978	4.419223	.7544604	1	5

Figure 1: Histogram of responses for SIP scale, Social Network Augmentation Factor.



Upon inspection of the histogram, I find that all questions demonstrate the same rightward skew. Three of the questions appear to be fairly invariant. Finally, I create a correlation matrix to explore relationships between the scale items; all items correlate positively.

Table 8: Correlation Matrix for SIP scale, Social Network Augmentation Factor.

s1_f3_q9	s1_f3_q9	s1_f3_10	s1_f3_11	s1_f3_12
s1_f3_q9	1.0000			
s1_f3_q10	0.4981*	1.0000		
s1_f3_q11	0.4891*	0.4435*	1.0000	
s1_f3_q12	0.6014*	0.4118*	0.4788*	1.0000

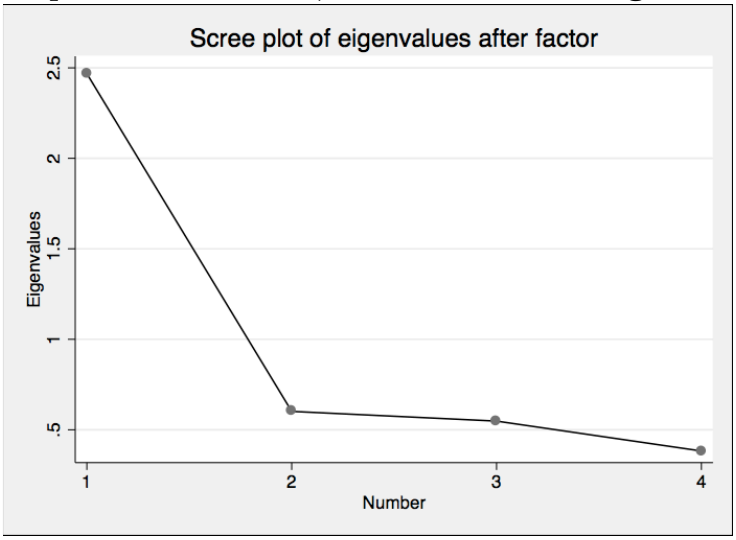
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .6169 of the variance. Questions 2 and 3 load outside the 60/40 criteria.

Table 9: Principle Components Analysis for SIP scale, Social Network Augmentation Factor.

Variable	Factor1	Uniqueness
s1_f3_q9	0.8355	0.3019
s1_f3_q10	0.7416	0.4500
s1_f3_q11	0.7627	0.4184
s1_f3_q12	0.7987	0.3620

Figure 8: Screeplot for SIP scale, Social Network Augmentation Factor

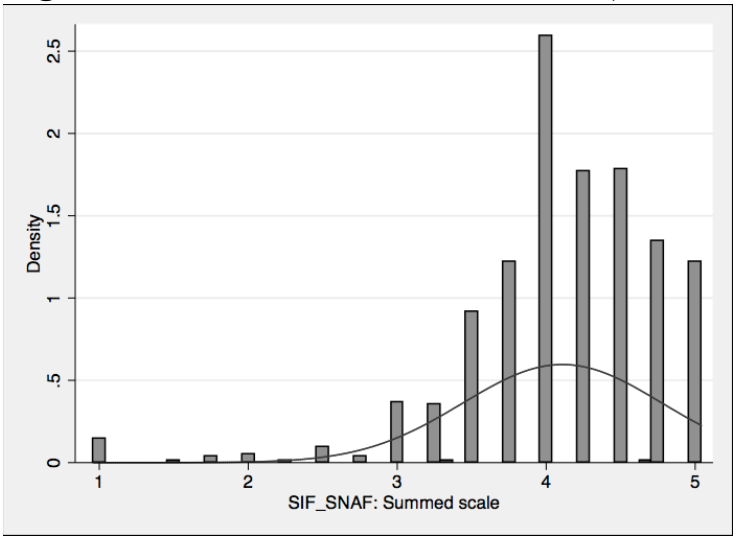


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is acceptable, at .7847. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .351), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SIP scale, Information Factor

Finally, the four factors are summed to create the summed scale for SIP, Information Factor. This scale has a mean of 4.1088 and a standard deviation of .6694. A histogram is provided in Figure 9.

Figure 9: Histogram for Summed Scale for SIP scale, Information Factor



Social-Informational Processes Scale: All Factors

Now that I have completed examination of the individual factors, I look at the full summed scale. To save space, I do not re-report frequencies. The following histogram provides a quick overview of the frequency distribution within all twelve SIP items.

Figure 10: Histogram of All SIP Items

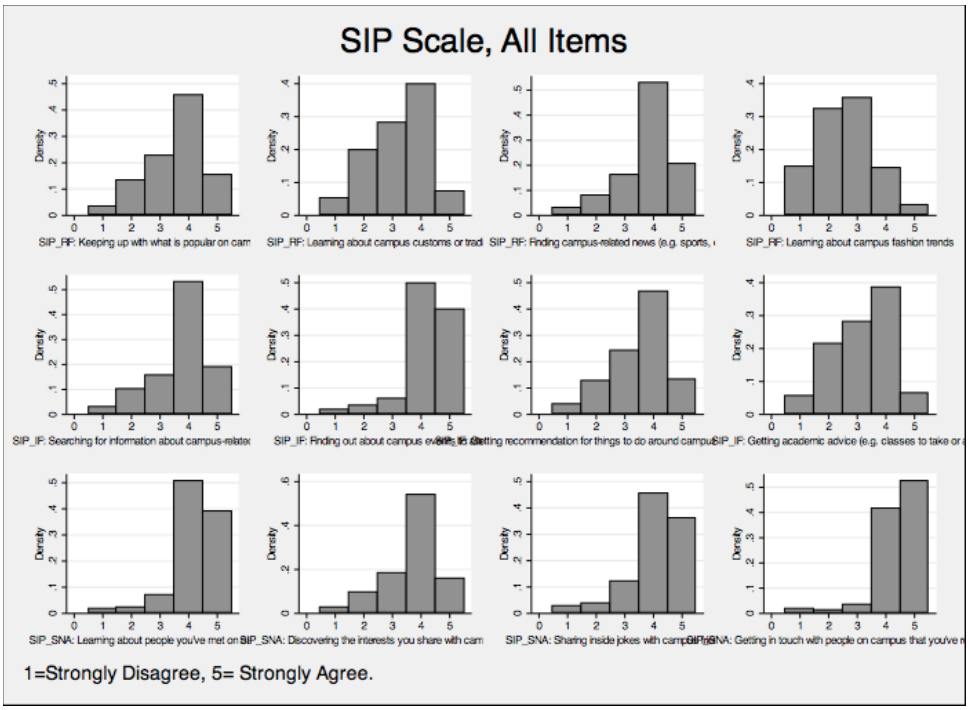


Table 10: Correlation Matrix

	s1_f1q1	s1_f1q2	s1_f1q3	s1_f1q4	s1_f2_q5	s1_f2_q6	s1_f2q7	s1_f2q7
s1_f1_q1	1.0000							
s1_f1_q2	0.5031*	1.0000						
s1_f1_q3	0.4989*	0.4451*	1.0000					
s1_f1_q4	0.4975*	0.4850*	0.3473*	1.0000				
s1_f2_q5	0.4944*	0.4601*	0.5607*	0.3640*	1.0000			
s1_f2_q6	0.4945*	0.3915*	0.5455*	0.2852*	0.5938*	1.0000		
s1_f2_q7	0.4957*	0.4822*	0.4547*	0.4314*	0.4658*	0.4747*	1.0000	
s1_f2_q8	0.3749*	0.3904*	0.3292*	0.3908*	0.3519*	0.3492*	0.4521*	1.0000
s1_f3_q9	0.3831*	0.3143*	0.3823*	0.2881*	0.4259*	0.4950*	0.3555*	0.3263*
s1_f3_q10	0.4533*	0.3990*	0.3984*	0.4172*	0.4400*	0.3952*	0.4761*	0.3263*
s1_f3_q11	0.4015*	0.3524*	0.3830*	0.2897*	0.3703*	0.4495*	0.4326*	0.3263*
s1_f3_q12	0.3805*	0.2811*	0.3904*	0.2275*	0.4473*	0.5338*	0.3760*	0.3244*

s1_f2_q7	s1_f2_q7	s1_f2_q7	s1_f2_q7
1.0000			
0.4981*	1.0000		
0.4981*	0.4435*	1.0000	
0.6014*	0.4118*	0.4788*	1.0000

Factor and Reliability Analysis

Finally, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on two factors (acceptable for such a large scale). The primary factor is responsible for .4700 of the variance, the second factor is responsible for .0953 of the variance.

The secondary factor is comprised primarily of two items s1_f1_q2 "Learning about campus customs or traditions," and s1_f1_q4 "Learning about campus fashion trends." When these are dropped from the summed scale, the remaining items load on a single factor responsible for .4910 of the variance. Versions of the summed scale are created for the 12- and 10-item version.

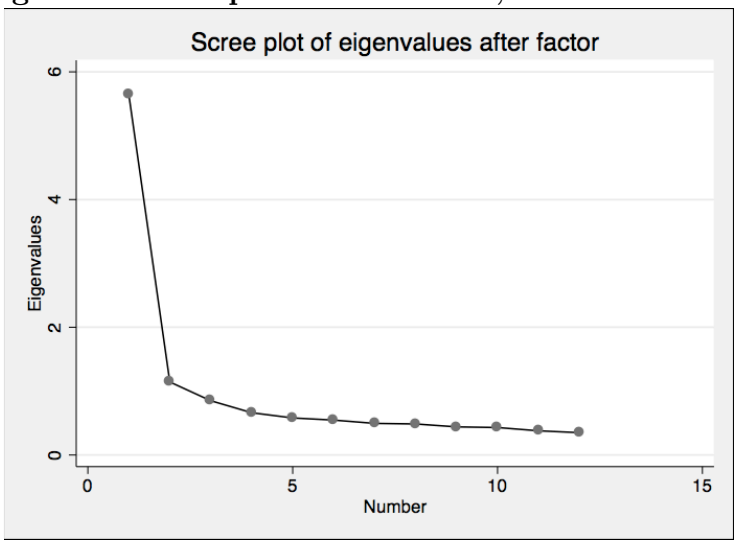
Summed Scale - 12 Item Version

The 12 item version of the SIP summed scale incorporates all 12 of items.

Table 11: Principle Components Analysis for SIP scale, all 12 items.

Variable	Factor1	Factor2	Uniqueness
s1_f1_q1	0.7363	0.2299	0.4050
s1_f1_q2	0.6667	0.3969	0.3980
s1_f1_q3	0.7040	0.0216	0.5039
s1_f1_q4	0.6018	0.5127	0.3749
s1_f2_q5	0.7356	-0.0357	0.4576
s1_f2_q6	0.7440	-0.2432	0.3873
s1_f2_q7	0.7195	0.1998	0.4425
s1_f2_q8	0.5989	0.2112	0.5967
s1_f3_q9	0.6791	-0.4437	0.3419
s1_f3_q10	0.6961	-0.0112	0.5153
s1_f3_q11	0.6612	-0.2620	0.4941
s1_f3_q12	0.6648	-0.5089	0.2991

Figure 12: Screeplot for SIP scale, 12 item version

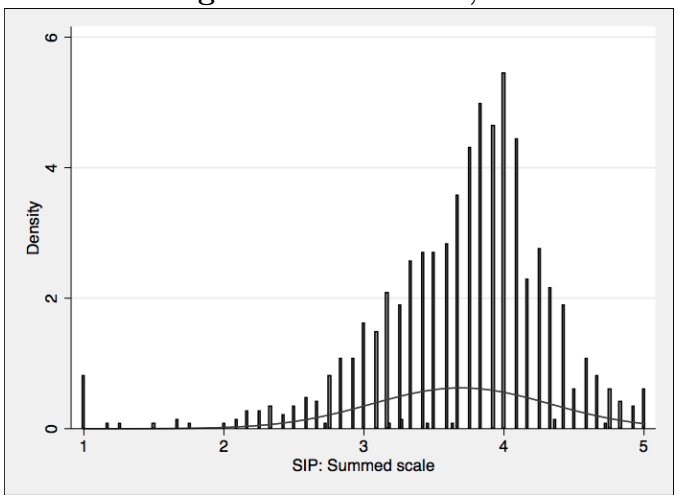


Reliability is assessed with Cronbach's alpha. Alpha for the 12-item scale is high, at . 8948. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .364), the fact the scale loads primarily on a single factor that is responsible for most of the variance.

Summed Scale for SIP scale, 12-Item

The twelve factors are summed to create the summed scale for SIP. This scale has a mean of 3.6924 and a standard deviation of .6381. A histogram is provided in Figure 13.

Figure 13: Histogram of SIP scale, 12-item version



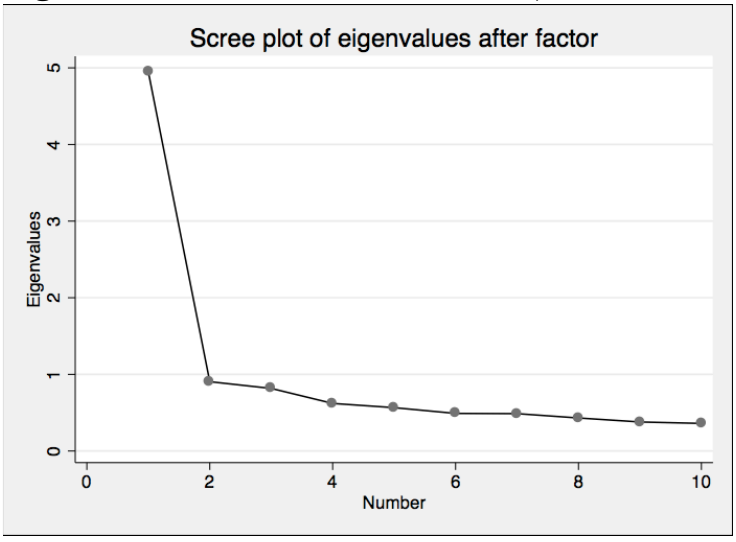
Summed Scale - 10 Item Version

The 10 item version of the SIP summed scale incorporates all of items except those that loaded on the secondary factor in the principle components analysis. These were questions s1_f1_q2 and s1_f1_q4.

Table 12: Principle Components Analysis for SIP scale, all 10 item.

Variable	Factor1	Uniqueness
s1_f1_q1	0.7135	0.4910
s1_f1_q3	0.7075	0.4994
s1_f2_q5	0.7409	0.4510
s1_f2_q6	0.7709	0.4056
s1_f2_q7	0.7078	0.4990
s1_f2_q8	0.5867	0.6558
s1_f3_q9	0.7083	0.4983
s1_f3_q10	0.6966	0.5148
s1_f3_q11	0.6808	0.5366
s1_f3_q12	0.7055	0.5023

Figure 14: Scree Plot for SIP scale, all 10 item.

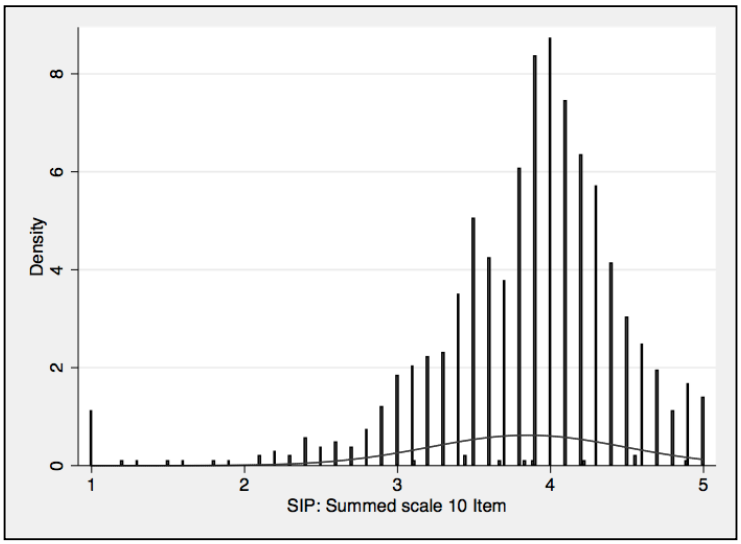


Reliability is assessed with Cronbach's alpha. Alpha for the 10-item scale is high, at .8829. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .365), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SIP scale, 10-Item

The twelve factors are summed to create the summed scale for SIP. This scale has a mean of 3.8486 and a standard deviation of .6429. A histogram is provided in Figure 15.

Figure 15: Histogram of SIP scale, 10-item version



Conclusion

Assuming criterion validity, the SIP scale appears to be robust. All of the individual dimensions load on single factors with acceptable reliability. When summed, the full scale has high reliability. One problem that emerged is that the full scale loads on two factors. This problem was addressed with the creation of a reduced 10-item scale that loads on a single factor.

Scale E.2: Social Network Site Self-Efficacy

Background

Social Network Site Self-Efficacy is a variable construct used to measure how one's perception of technological self-efficacy mediates the effects of participation. This measure was constructed by the researcher to measure self-efficacy in social network sites, and is based on previous work (e.g. Beenen et al., 2004; LaRose et al., 2001; Liu & LaRose, 2008). Respondents are asked about level of agreement with the statements. Responses to the question are: *Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree.* The questions were presented to the respondent in random order. The questions included in this scale are:

s2_f1_q1: I feel confident that I understand the basics of using Facebook
s2_f1_q2: I feel confident that I could explain the basics of using Facebook to someone else
s2_f1_q3: I feel confident that I could post a status update to Facebook
s2_f1_q4: I feel confident that I could create a group or event page in Facebook

Table 1: Descriptive Statistics for SNS Self-Efficacy Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
s2_f1_q1	981	4.739042	.5813379	1	5
s2_f1_q2	981	4.675841	.626716	1	5
s2_f1_q3	982	4.776986	.5923053	1	5
s2_f1_q4	979	4.500511	.851289	1	5

As evidenced by Table 1, there is low variance in the response. I can explore the patterns in the histogram included as Figure 1.

Figure 1: Histogram for SNS Self-Efficacy Scale

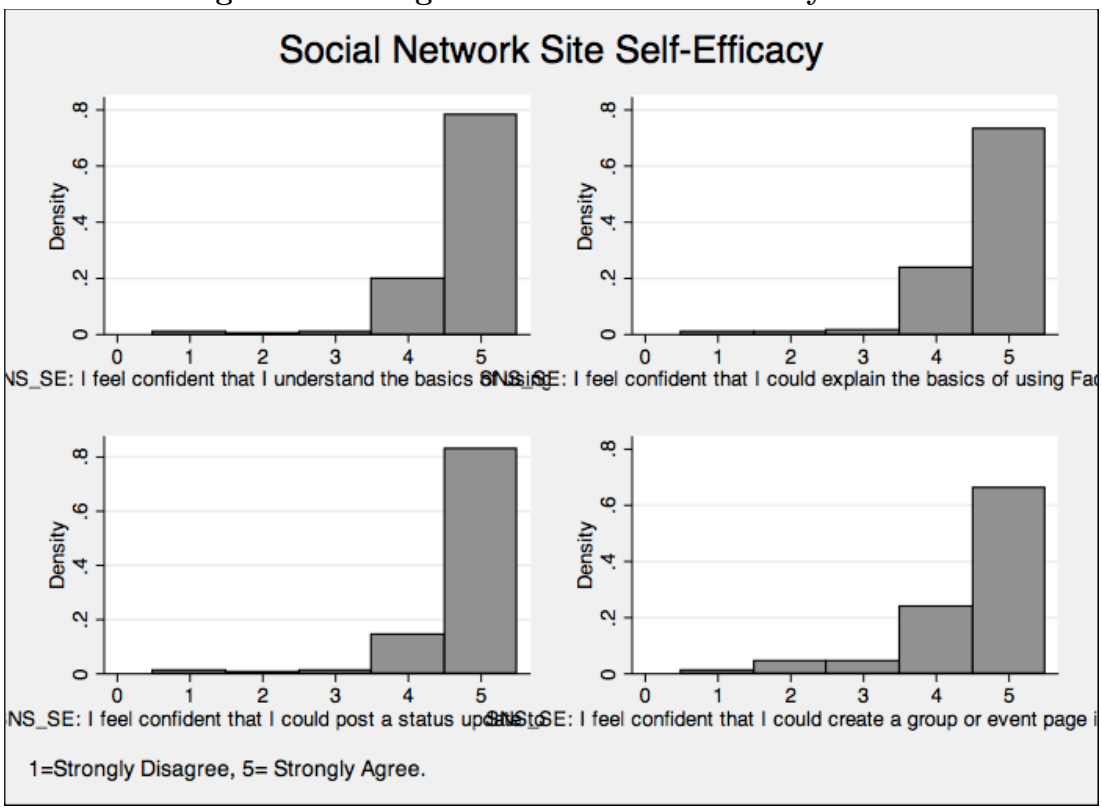


Table 2: Correlation Matrix

	s2_f1_q1	s2_f1_q2	s2_f1_q3	s2_f1_q4
s2_f1_q1	1.0000			
s2_f1_q2	0.8430*	1.0000		
s2_f1_q3	0.8615*	0.7804*	1.0000	
s2_f1_q4	0.6649*	0.6532*	0.6047*	1.0000

Correlations significant at the $p<.05$ level are starred.

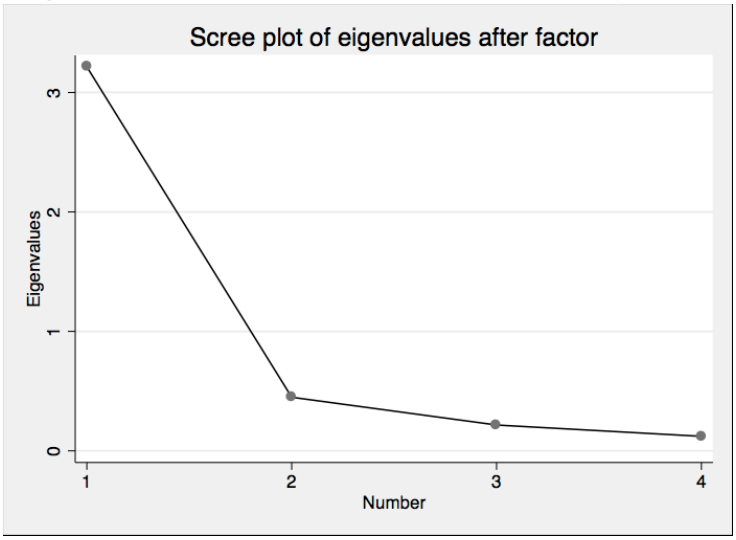
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .8034 of the variance.

Table 3: Principle Components Analysis for SNS Self-Efficacy Scale.

Variable	Factor1	Uniqueness
s2_f1_q1	0.9456	0.1058
s2_f1_q2	0.9183	0.1567
s2_f1_q3	0.9111	0.1698
s2_f1_q4	0.8038	0.3539

Figure 2: Screeplot for SNS Self-Efficacy Scale



Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is high, at .9004. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .313), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SNS Self Efficacy

Finally, the four items are summed to create the summed scale for SNS Self Efficacy. This scale has a mean of 4.6736 and a standard deviation of .5891. A histogram is provided in Figure 3. As I can see, the scale is skewed right. I explored transformations to potentially ameliorate the impact of the skew (Figure 4), but none appear useful on visual inspection. Therefore, the scale is left as a simple summed scale.

Figure 3: Histogram for Summed Scale for SNS Self-Efficacy

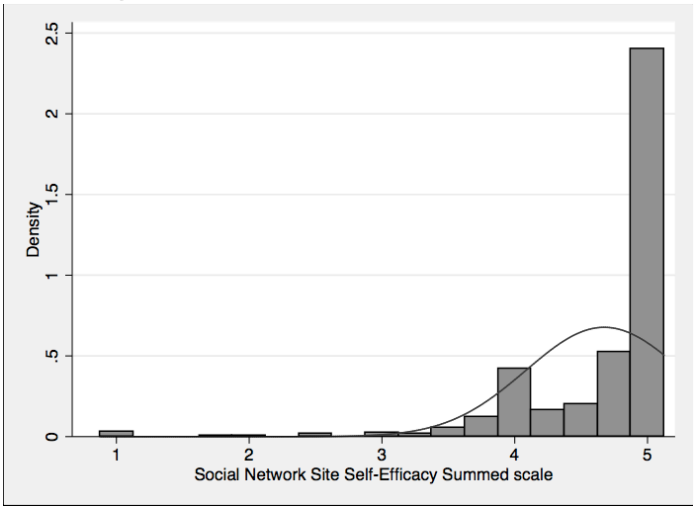
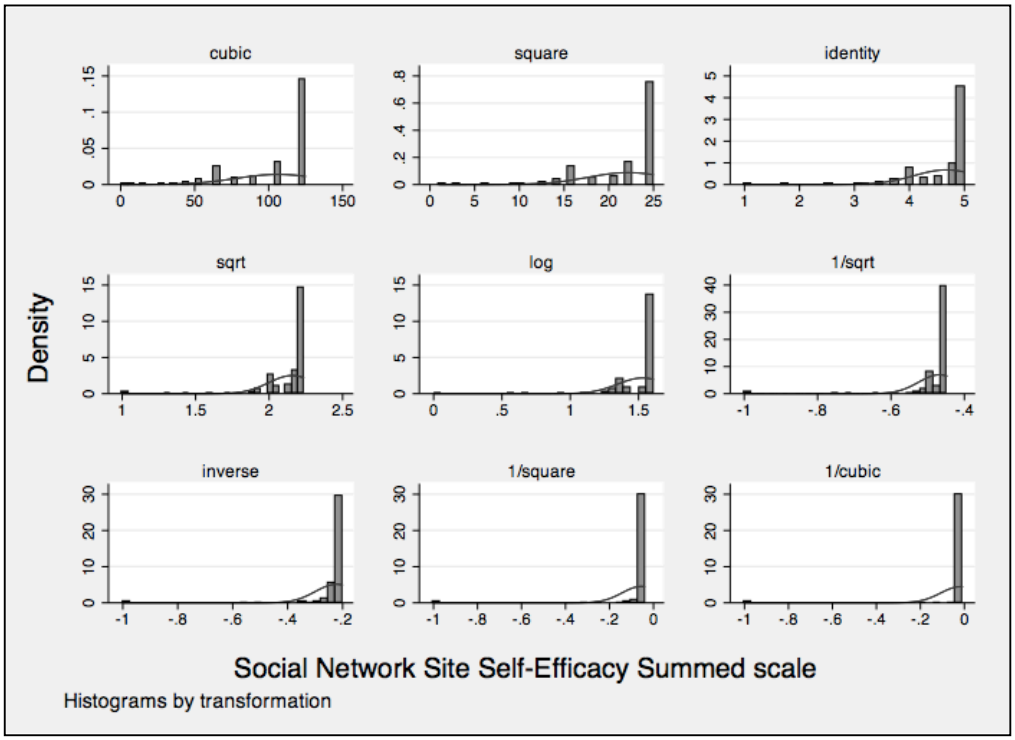


Figure 4: Histogram of potential transformations for SNS Self-Efficacy Scale



Scale E.3: Facebook Intensity

In an analysis of social network site use on a college campus, Ellison et al. (2007) identified a positive associational relationship between intensity of network use and contextual measures of social capital. This scale covers eight items. They are two behavioral measures and six subjective measures. The scale is modified slightly from Ellison's original scale. In Ellison's original scale, the first behavioral question was worded "About how many total Facebook friends do you have at MSU or elsewhere." The response was categorical, with eight categories covering friend number intervals. In my version, I ask the question "About how many Facebook friends do you have" and accept the response as interval. Ellison's second behavioral question was also slightly modified. In the original version, it was asked as "In the past week, on average, approximately how many minutes per day have you spent on Facebook." Response was again categorical. In my version, I asked "About how many minutes per day do you usually spend on Facebook" and accepted interval-level response.

The remaining six subjective questions were not changed. The questions are Likert items, with the respondent being asked their level of agreement to the question (Strongly Disagree - Strongly Agree). The items are:

- **std_s3_s_q1:** Facebook is part of my everyday activity
- **std_s3_s_q2:** I'm proud to tell people I'm on Facebook
- **std_s3_s_q3**: Facebook has become part of my daily routine
- **std_s3_s_q4:** I feel out of touch when I haven't logged into Facebook for a while
- **std_s3_s_q5:** I feel I am part of the Facebook community
- **std_s3_s_q6:** I would be sorry if Facebook shut down

Because the scale is comprised of items on different ranges, the items are standardized prior to scale creation. The scores reported are standardized, and are only meaningful with their z-transformation. The behavioral measures are **std_s3_b_q1 (Minutes/Day) and std_s3_b_q2 (Number of Friends).** Because the measures are standardized, I will not present descriptive statistics (the standard deviation of all items is set to one).

Figure 1: Histogram for Facebook Intensity Scale

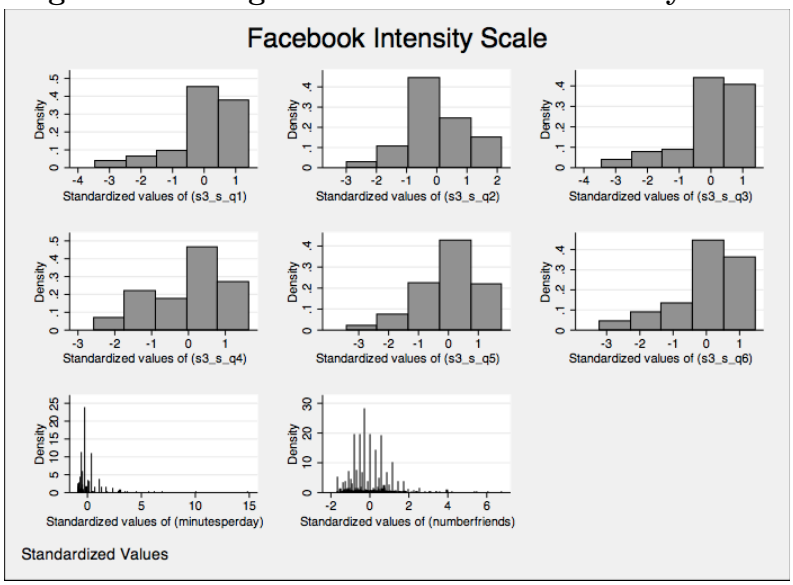


Table 1: Interitem Correlation Matrix for Facebook Intensity Scale

	std_s_q1	std_s_q2	std_s3_3	std_s3_4	std_s3_5	std_s3_6	std_b_q1	std_s3_b_q2
std_s_q1	1.0000							
std_s3_s_q2	0.4389*	1.0000						
std_s3_s_q3	0.8673*	0.4440*	1.0000					
std_s3_s_q4	0.6257*	0.4613*	0.6354*	1.0000				
std_s3_s_q5	0.5984*	0.5751*	0.5828*	0.5912*	1.0000			
std_s3_s_q6	0.5672*	0.4873*	0.5239*	0.5847*	0.5764*	1.0000		
std_s3_b_q1	0.3226*	0.2303*	0.3075*	0.2701*	0.2705*	0.2097*	1.0000	
std_s3_b_q2	0.2559*	0.2182*	0.2582*	0.2860*	0.3337*	0.2263*	0.0997*	1.000

Correlations significant at the $p<.05$ level are starred.

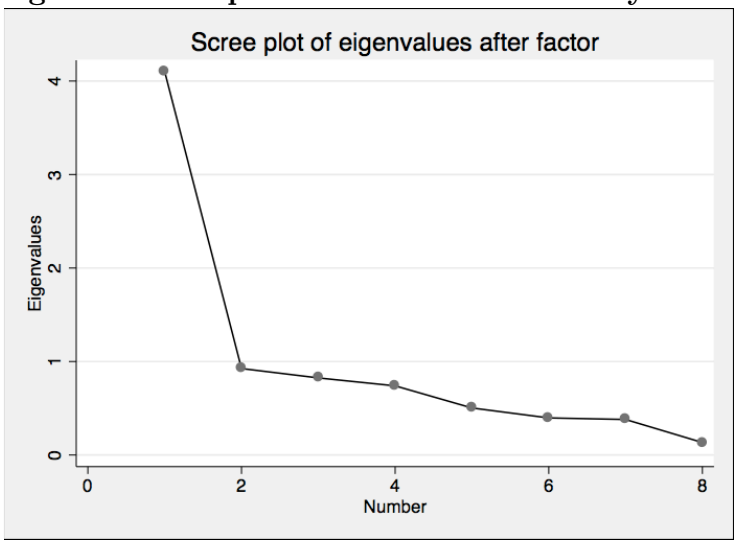
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .5123 of the variance. Notably, many of the items do not fit within the 60/40 criteria.

Table 2: Principle Components Analysis for Facebook Intensity Scale.

Variable	Factor1	Uniqueness
std_s3_s_q1	0.8529	0.2725
std_s3_s_q2	0.6692	0.5521
std_s3_s_q3	0.8413	0.2923
std_s3_s_q4	0.8051	0.3518
std_s3_s_q5	0.8052	0.3517
std_s3_s_q6	0.7529	0.4332
std_s3_b_q1	0.4261	0.8184
std_s3_b_q2	0.4128	0.8296

Figure 2: Screeplot for Facebook Intensity Scale

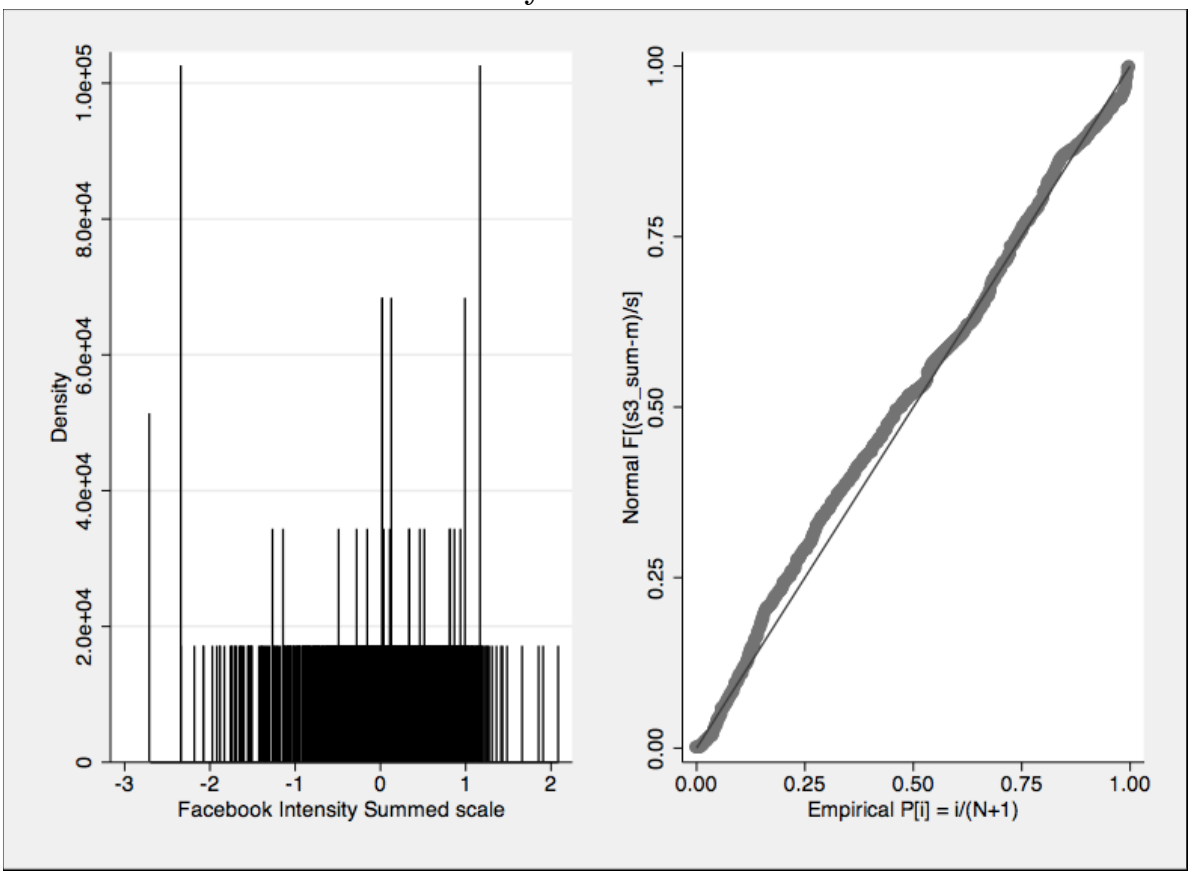


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 8-item factor scale is high, at .8555. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .425), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SNS Intensity

Finally, the eight standardized factors are summed to create the summed scale for Facebook Intensity. Because the scale is standardized, descriptive measures are not as meaningful. Figure 3 describes the distribution, with a histogram and a standardized normal probability plot.

Figure 3: Standardized histogram and probability plots for Facebook Intensity Summed Scale



Scale E.4: Social Network Support

To evaluate the supportive nature of social network sites, I measure informational, tangible, and emotional (collapsing esteem into emotional) support processes in social network sites using three original scales. The informational support scale measures the extent to which the individual uses the network for informational support. The tangible support scale measures the extent to which the individual successfully finds tangible support through the social network. Finally, the emotional support scale measures the extent to which the individual draws emotional support from the network.

Measures

The Social Network Support scale is assessed with three factors, as described in the Background materials. Each factor is assessed with four Likert questions. The question is framed as follows: "*Please evaluate the following statements about your use of Facebook:*" Context for the response frame is provided in the study introduction. Responses to the question are: *Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree.* The questions were presented to the respondent in random order.

Information Support Factor

1. I could use Facebook to find an answer to a question I have about UNC
2. I could use Facebook to find an answer to a question I have about Chapel Hill
3. I could use Facebook to find a good class to take
4. If I needed to complete a complex task on campus, I could find help in Facebook

Tangible Support Factor

1. If I needed a ride to somewhere near campus, I could use Facebook to find a ride
2. If I was unable to sleep in my room for a night, I could use Facebook to find a place to stay
3. If I needed to find employment quickly, I could use Facebook to find job opportunities
4. If I had to borrow a car to drive to an appointment near campus, I could use Facebook to find a car to borrow

Emotional Support Factor

1. Participating in Facebook makes me feel like I belong on campus
2. Facebook has been important in my on-campus relationships
3. Facebook makes me feel alone on campus [RC]
4. I feel good when I interact with my campus friends on Facebook

Readers will note that one of the questions in the Emotional Support Factor was reverse coded. In future analysis, this question should be worded "I don't feel lonely on campus when I use Facebook."

Performance

First, I provide descriptive measures of item performance. These include histograms and a table listing the means, standard deviations, etc. Then I correlate the scales, conduct factor analysis within the factor, alphas within the factor. Finally, I conduct factor analysis within the scale, and report alphas within the scale.

Factor One: Information Support Factor

The first factor of the SNS Support scale is the Information Support Factor, a subjective construct measuring the extent to which the individual uses the network for informational support. Descriptive statistics of the responses, as well as a histogram of responses, are provided below.

Variable labels are as follows:

- **s4_f1_q1**: I could use Facebook to find an answer to a question I have about UNC
- **s4_f1_q2:** I could use Facebook to find an answer to a question I have about Chapel Hill
- **s4_f1_q3:** I could use Facebook to find a good class to take
- **s4_f1_q4:** If I needed to complete a complex task on campus, I could find help in Facebook

Descriptive Statistics

Table 1: Descriptive Statistics for SNS Support scale, Information Support Factor.

Variable	Obs	Mean	Std. Dev.	Min	Max
s4_f1_q1	976	3.413934	.9622466	1	5
s4_f1_q2	976	3.309426	.9546396	1	5
s4_f1_q3	976	3.237705	.9718354	1	5
s4_f1_q4	977	3.22825	.9990263	1	5

Figure 1: Histogram for SNS Support scale, Information Support Factor.

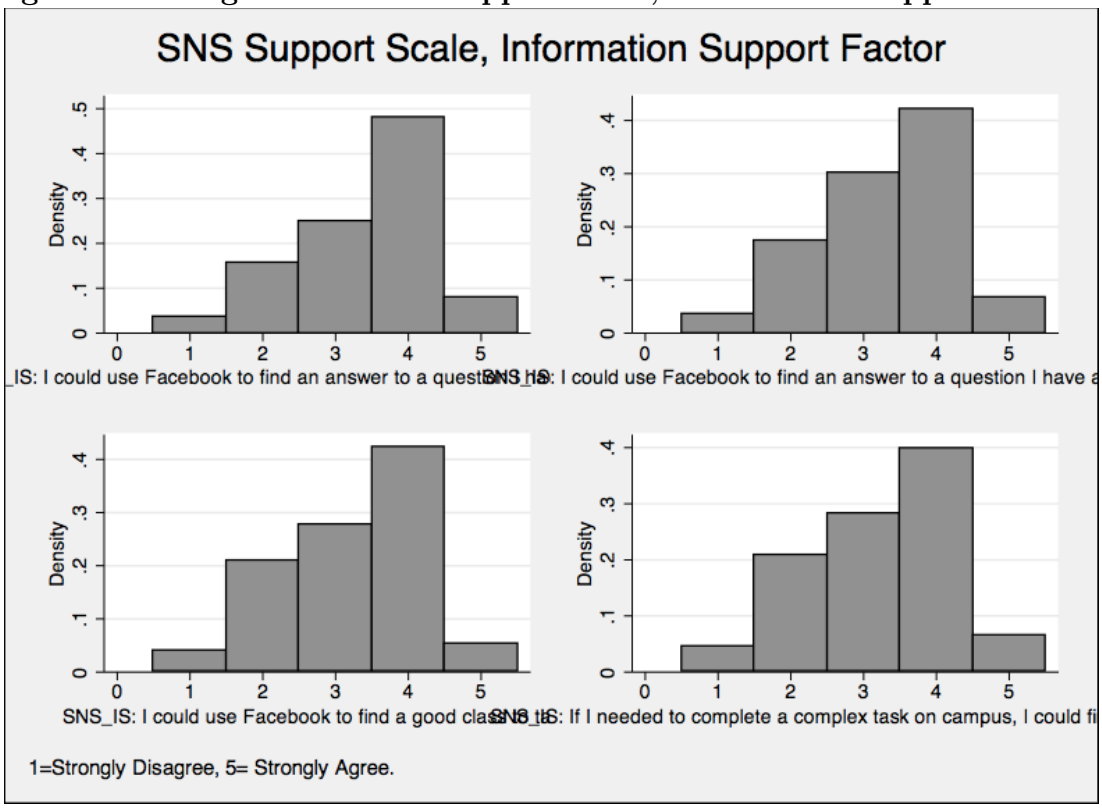


Table 2: Correlation Matrix for SNS Support scale, Information Support Factor.

	s4_f1_q1	s4_f1_q2	s4_f1_q3	s4_f1_q4
s4_f1_q1	1.0000			
s4_f1_q2	0.7249*	1.0000		
s4_f1_q3	0.5142*	0.4950*	1.0000	
s4_f1_q4	0.5164*	0.4994*	0.4859*	1.0000

Correlations significant at the $p<.05$ level are starred.

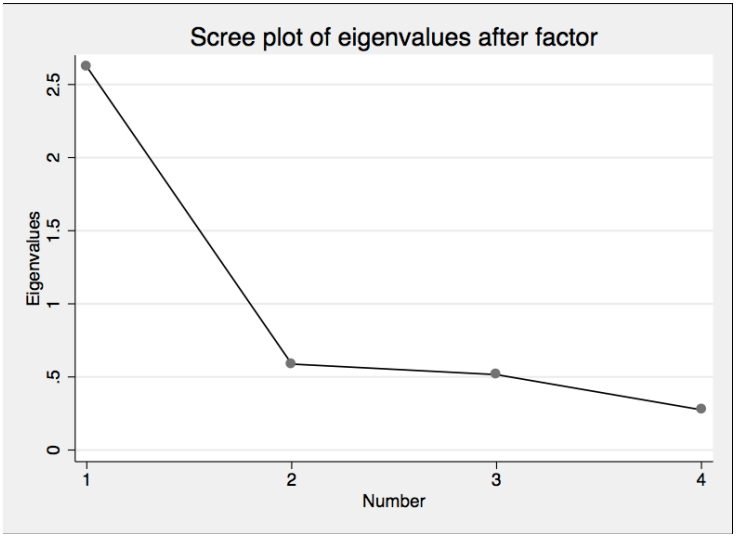
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .6553 of the variance. Questions 3 and 4 load outside the 60/40 criteria, however.

Table 3: Principle Components Analysis for SNS Support scale, Information Support Factor.

Variable	Factor1	Uniqueness
s4_f1_q1	0.8616	0.2576
s4_f1_q2	0.8503	0.2769
s4_f1_q3	0.7594	0.4233
s4_f1_q4	0.7609	0.4210

Figure 2: Screeplot for SNS Support scale, Information Support Factor.

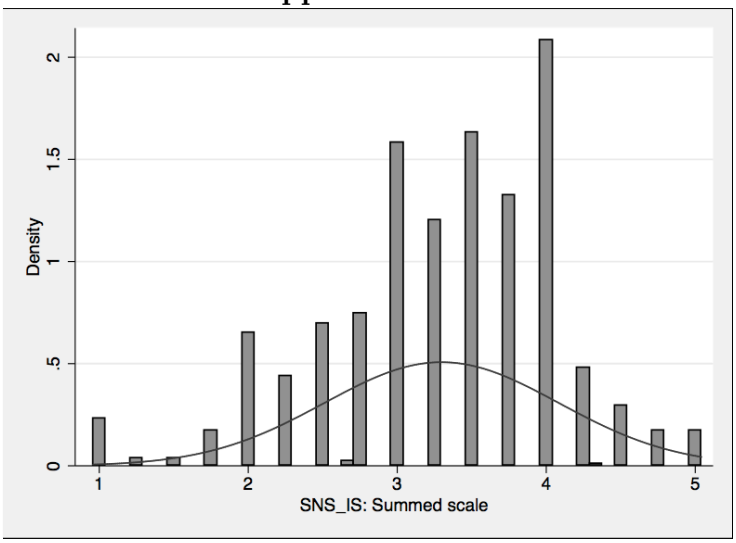


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is acceptable, at .8323. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .508), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SNS Support scale, Information Support Factor

Finally, the four factors are summed to create the summed scale for SNS Support, Information Support Factor. This scale has a mean of 3.2974 and a standard deviation of .7866. A histogram is provided in Figure 3.

Figure 3: Histogram for Summed Scale for SNS Support Scale, Information Support Factor.



Factor Two: Tangible Support Factor

The second factor of the SNS Support scale is the Tangible Support Factor, a subjective construct measuring the extent to which the individual successfully finds tangible support through the social network. Descriptive statistics of the responses, as well as a histogram of responses, are provided below.

Variable labels are as follows:

- **s4_f2_q5**: I could use Facebook to find an answer to a question I have about UNC
- **s4_f2_q6:** I could use Facebook to find an answer to a question I have about Chapel Hill
- **s4_f2_q7:** I could use Facebook to find a good class to take
- **s4_f2_q8:** If I needed to complete a complex task on campus, I could find help in Facebook

Descriptive Statistics

Table 1: Descriptive Statistics for SNS Support scale, Information Support Factor.

Variable	Obs	Mean	Std. Dev.	Min	Max
s4_f2_q5	978	3.480573	.979906	1	5
s4_f2_q6	978	3.340491	1.075272	1	5
s4_f2_q7	978	2.530675	.874745	1	5
s4_f2_q8	976	3.114754	1.050103	1	5

Figure 1: Histogram for SNS Support scale, Information Support Factor.

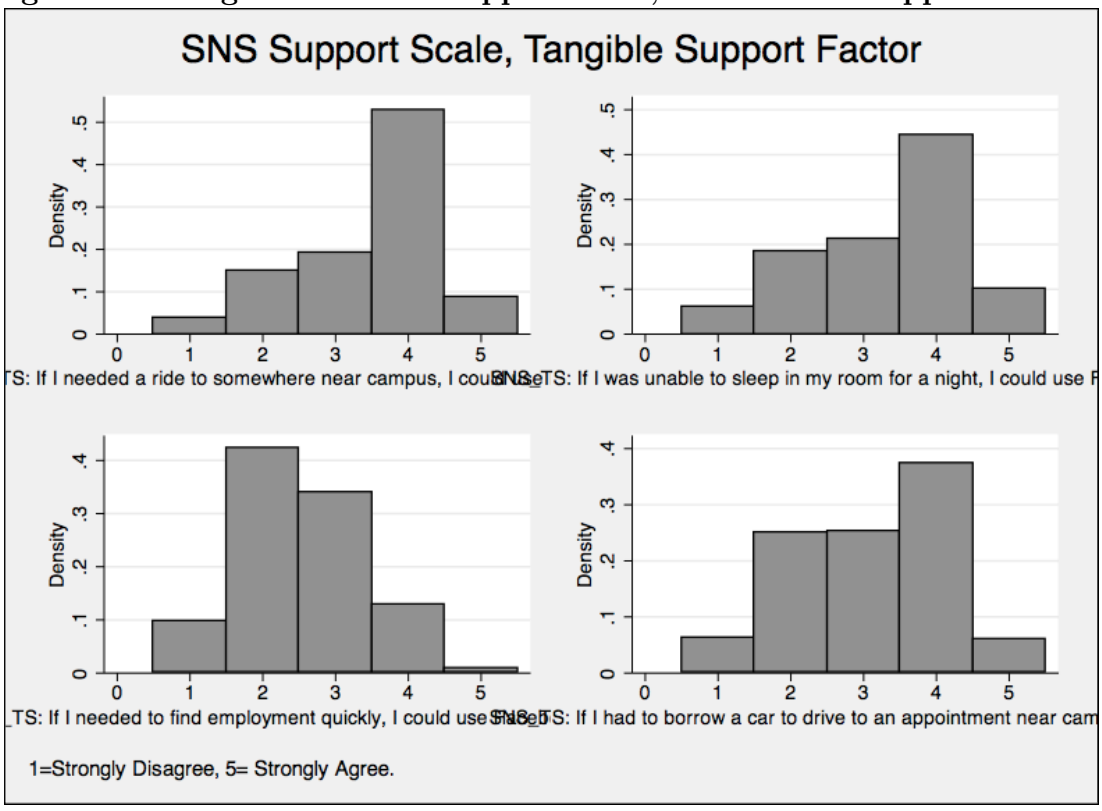


Table 2: Correlation Matrix for SNS Support scale, Information Support Factor.

	s4_f2_q5	s4_f2_q6	s4_f2_q7	s4_f2_q8
s4_f2_q5	1.0000			
s4_f2_q6	0.6265*	1.0000		
s4_f2_q7	0.3135*	0.3344*	1.0000	
s4_f2_q8	0.6375*	0.5706*	0.3862*	1.0000

Correlations significant at the $p<.05$ level are starred.

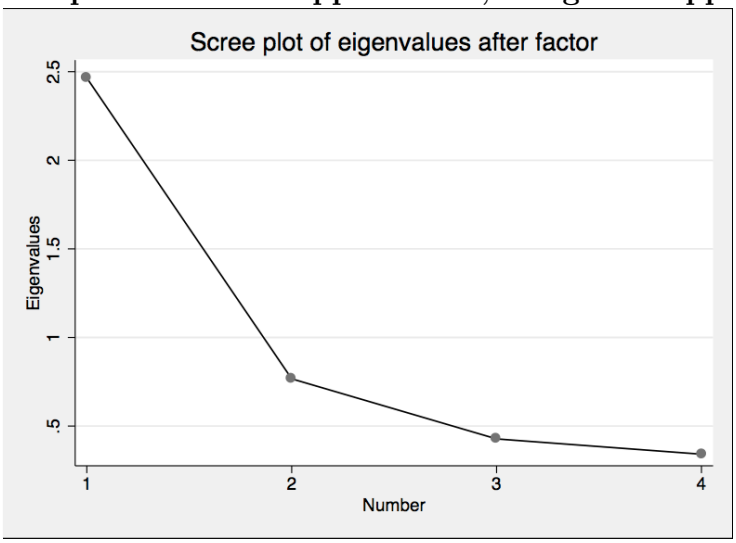
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .6161 of the variance. Questions 3 loads outside the 60/40 criteria, however.

Table 2: Principle Components Analysis for SNS Support scale, Tangible Support Factor.

Variable	Factor1	Uniqueness
s4_f2_q5	0.8468	0.2830
s4_f2_q6	0.8259	0.3179
s4_f2_q7	0.5910	0.6508
s4_f2_q8	0.8463	0.2839

Figure 2: Screeplot for SNS Support scale, Tangible Support Factor.

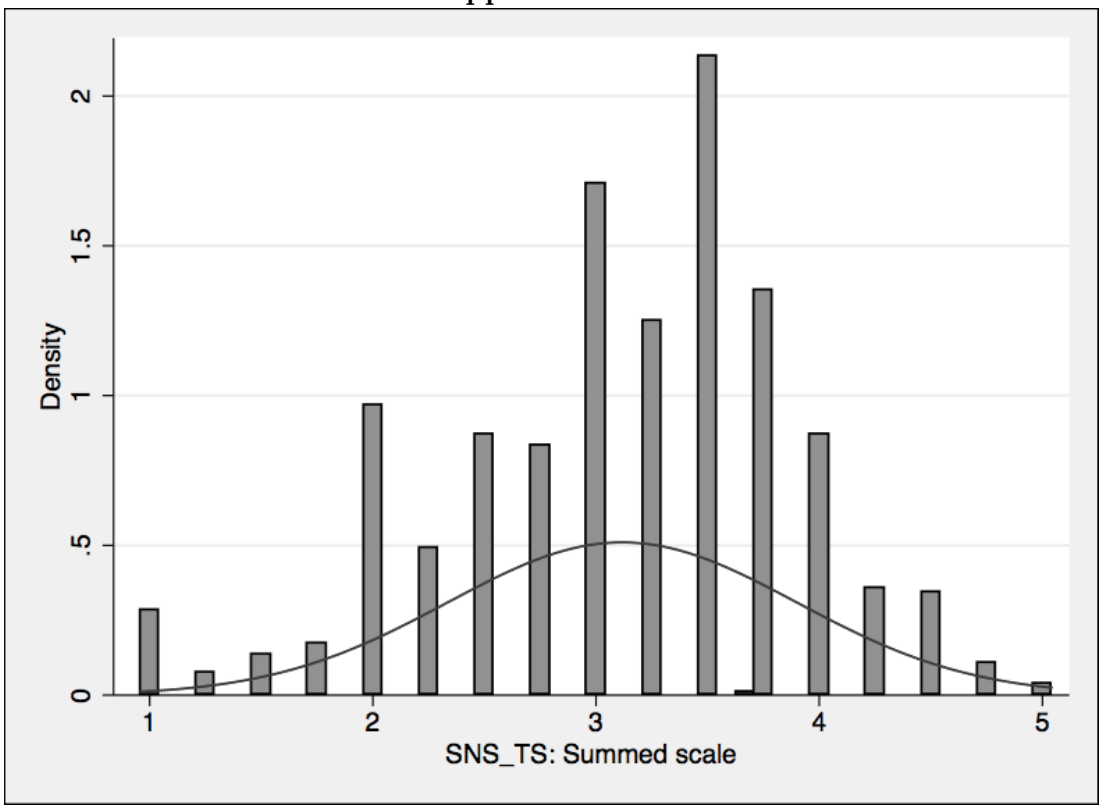


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is acceptable, at .7899. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .4826), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SNS Support scale, Tangible Support Factor

Finally, the four items are summed to create the summed scale for SNS Support, Tangible Support Factor. This scale has a mean of 3.1172 and a standard deviation of .7824. A histogram is provided in Figure 3.

Figure 3: Histogram for Summed Scale for SNS Support Scale, Tangible Support Factor.



Factor Three: Emotional Support Factor

The third factor of the SNS Support scale is the Emotional Support Factor, a subjective construct measuring the extent to which the individual successfully finds emotional support through the social network. It is important to note that one of the questions "Facebook makes me feel alone on campus." was dropped for technical reasons.

Descriptive statistics of the responses, as well as a histogram of responses, are provided below.

Variable labels are as follows:

- **s4_f3_q9**: Participating in Facebook makes me feel like I belong on campus
- **s4_f3_q10:** Facebook has been important in my on-campus relationships
- **s4_f3_q12:** I feel good when I interact with my campus friends on Facebook

Descriptive Statistics

Table 1: Descriptive Statistics for SNS Support scale, Emotional Support Factor

Variable	Obs	Mean	Std. Dev.	Min	Max
s4_f3_q9	978	3.007157	.9719452	1	5
s4_f3_q10	978	3.519427	.988227	1	5
s4_f3_q12	978	3.812883	.7736431	1	5

Figure 1: Histogram for SNS Support scale, Emotional Support Factor.

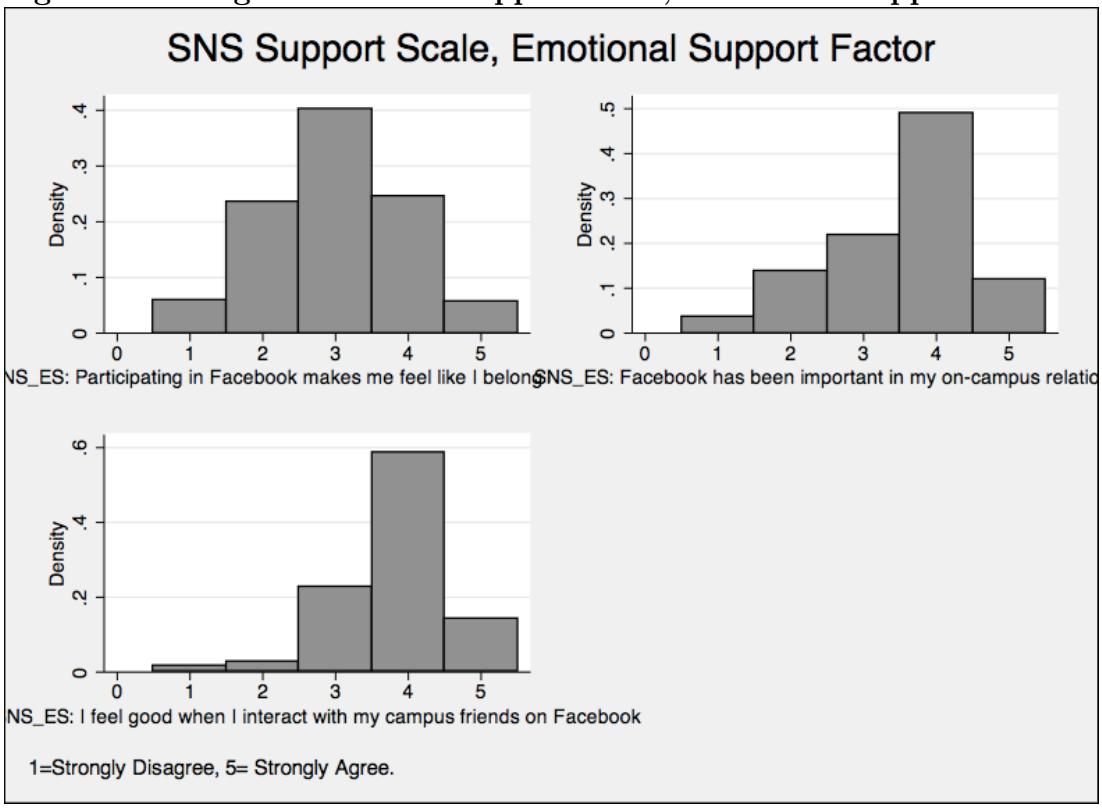


Table 3: Correlation Matrix for SNS Support Scale, Emotional Support Factor.

	s4_f3_q9	s4_f3_10	s4_f3_12
s4_f3_q9	1.0000		
s4_f3_q10	0.5758*	1.0000	
s4_f3_q12	0.5095*	0.5637*	1.0000

Correlations significant at the $p<.05$ level are starred.

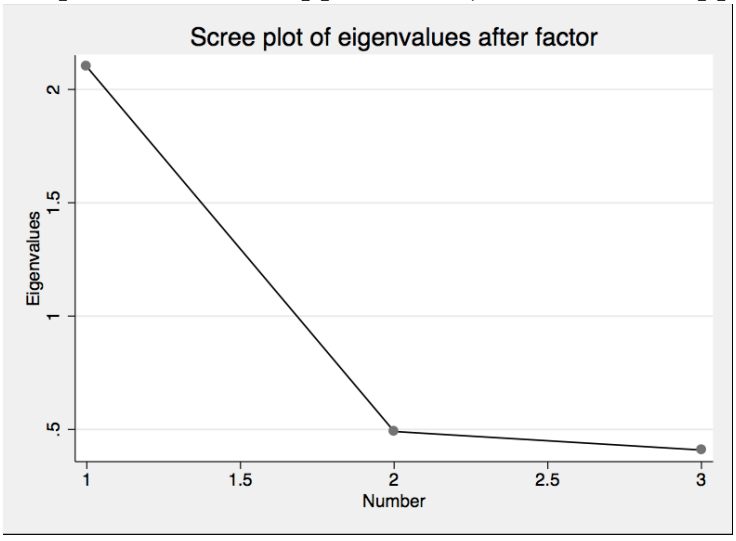
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .7000 of the variance.

Table 2: Principle Components Analysis for SNS Support scale, Emotional Support Factor.

Variable	Factor1	Uniqueness
s4_f3_q9	0.8298	0.3115
s4_f3_q10	0.8564	0.2666
s4_f3_q12	0.8233	0.3221

Figure 2: Screeplot for SNS Support scale, Emotional Support Factor.

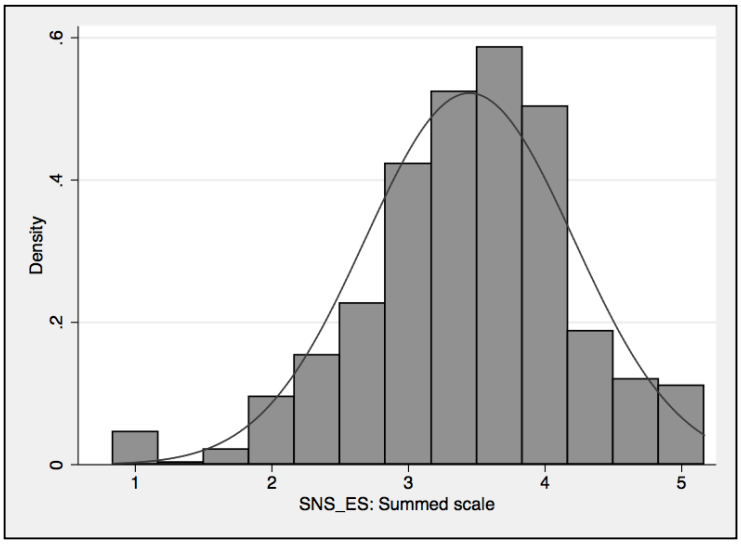


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 3-item factor scale is acceptable, at .7806. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .4557), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SNS Support scale, Tangible Support Factor

Finally, the three items are summed to create the summed scale for SNS Support, Emotional Support Factor. This scale has a mean of 3.4464 and a standard deviation of .7640. A histogram is provided in Figure 3.

Figure 3: Histogram for Summed Scale for SNS Support Scale, Emotional Support Factor.



Social Network Site Support Scale: All Factors

Now that I have completed examination of the individual factors, I look at the full summed scale. To save space, I do not re-report frequencies. The following histogram provides a quick overview of the frequency distribution within all eleven SNS Support items.

Figure 1: Histogram of All SNS Support Items

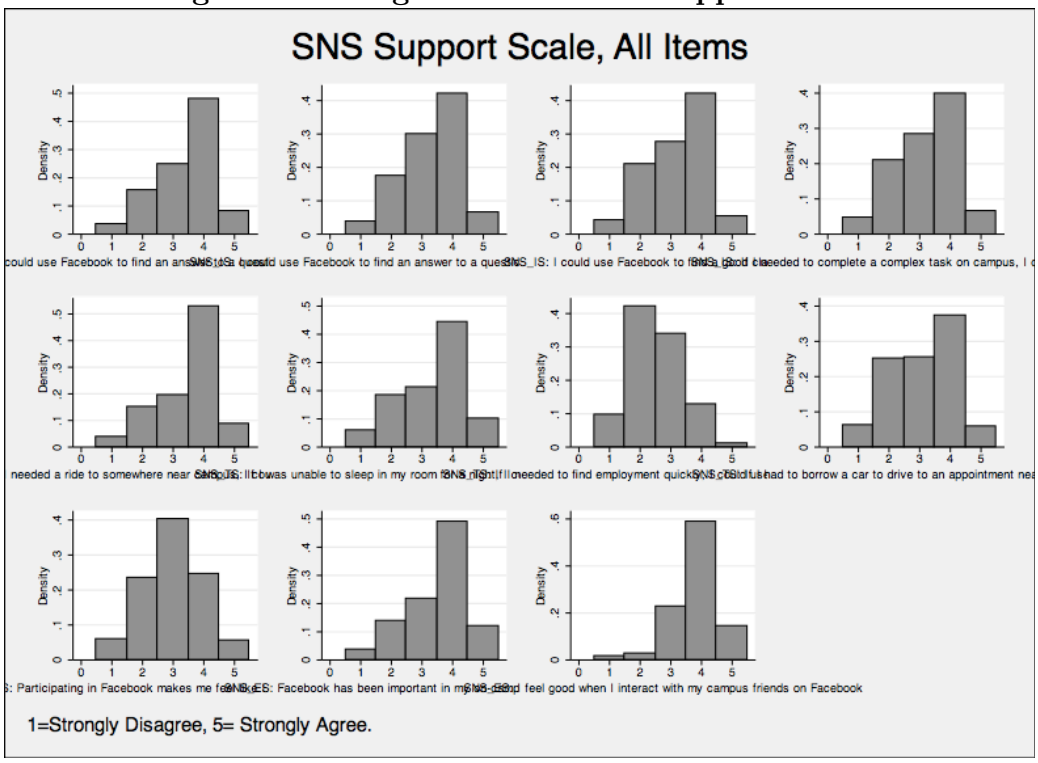


Table 1: Correlation Matrix

	s4_f1_q1	s4_f1_q2	s4_f1_q3	s4_f1_q4	s4_f2_q5	s4_f2_q6	s4_f2_q7
s4_f1_q1	1.0000						
s4_f1_q2	0.7249*	1.0000					
s4_f1_q3	0.5142*	0.4950*	1.0000				
s4_f1_q4	0.5164*	0.4994*	0.4859*	1.0000			
s4_f2_q5	0.4382*	0.4338*	0.4396*	0.4854*	1.0000		
s4_f2_q6	0.4064*	0.4186*	0.4502*	0.5294*	0.6265*	1.0000	
s4_f2_q7	0.3611*	0.3921*	0.4016*	0.4193*	0.3135*	0.3344*	1.0000
s4_f2_q8	0.4032*	0.4427*	0.3965*	0.4726*	0.6375*	0.5706*	0.3862*
s4_f3_q9	0.3612*	0.3746*	0.4086*	0.4149*	0.3414*	0.3571*	0.3591*
s4_f3_q10	0.3810*	0.3413*	0.4055*	0.4194*	0.3909*	0.3767*	0.2716*
s4_f3_q12	0.3864*	0.3534*	0.3852*	0.3813*	0.3982*	0.3597*	0.1938*

Null	s4_f2_q8	s4_f3_q9	s4_f3_10	s4_f3_12
s4_f2_q8	1.0000			
s4_f3_q9	0.3546*	1.0000		
s4_f3_q10	0.3430*	0.5758*	1.0000	
s4_f3_q12	0.2810*	0.5095*	0.5637*	1.0000

Correlations significant at the $p<.05$ level are starred.

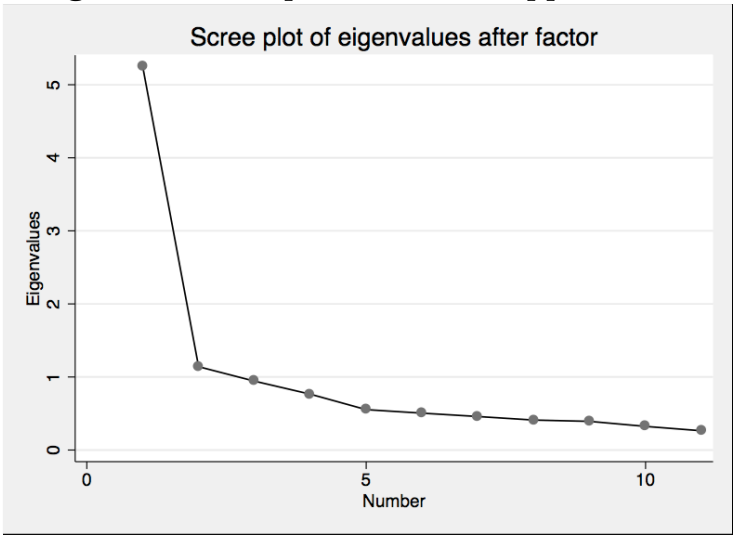
Factor and Reliability Analysis

Finally, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on two factors (acceptable for such a large scale). The primary factor is responsible for .4769 of the variance, the second factor is responsible for .1037 of the variance. The secondary factor is comprised entirely of the items from the Emotional Support Dimension.

Table 11: Principle Components Analysis for SNS Support scale.

Variable	Factor1	Factor2	Uniqueness
s4_f1_q1	0.7310	-0.1232	0.4504
s4_f1_q2	0.7280	-0.1847	0.4359
s4_f1_q3	0.7090	-0.0293	0.4965
s4_f1_q4	0.7447	-0.1084	0.4336
s4_f2_q5	0.7303	-0.2291	0.4142
s4_f2_q6	0.7199	-0.2293	0.4291
s4_f2_q7	0.5699	-0.2179	0.6277
s4_f2_q8	0.7007	-0.3269	0.4022
s4_f3_q9	0.6590	0.4796	0.3358
s4_f3_q10	0.6586	0.5352	0.2798
s4_f3_q12	0.6233	0.5505	0.3085

Figure 12: Screeplot for SNS Support scale



Reliability is assessed with Cronbach's alpha. Alpha for the 11-item scale is high, at .8900. Therefore, this scale appears to be reliable. I see evidence of this in the

acceptable correlation (average inter-item covariance is .3965, the fact the scale loads primarily on a single factor that is responsible for most of the variance, and that the variance is not split equally between two factors.

Summed Scale for SNS Support Scale, 11-Item

The twelve factors are summed to create the summed scale for SIP. This scale has a mean of 3.2725 and a standard deviation of .6676. A histogram is provided in Figure 13.

Figure 13: Histogram of SNS Support scale, 11-item version

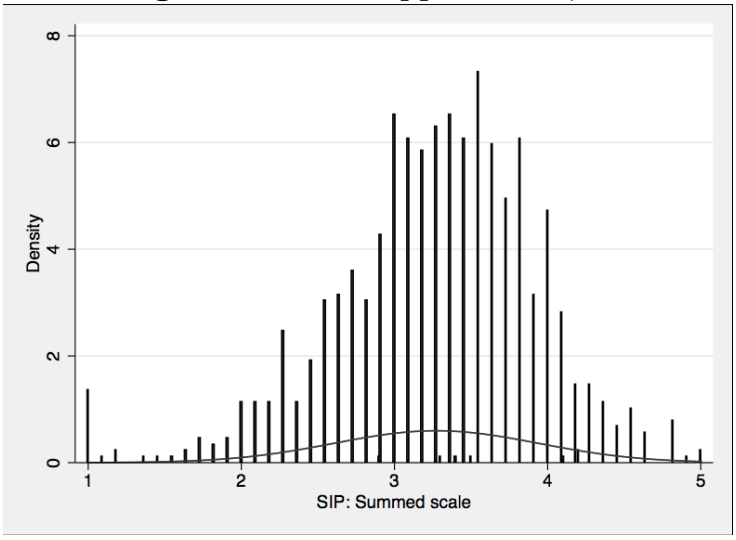
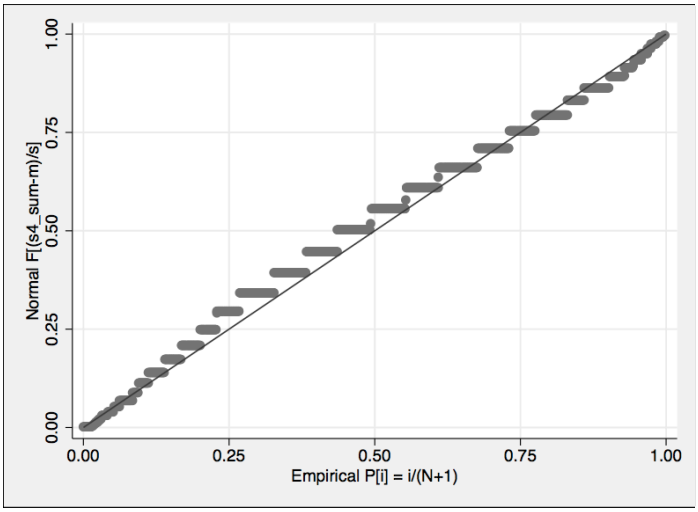


Figure 14: Standardized Normal Probability Plot of SNS Support Scale, 11 Items



Scale E.5: Social Network Site Privacy Efficacy

Social Network Site Privacy Efficacy is an original construct designed to measure privacy efficacy in social network sites. It is based on measures including the Westin Privacy Segmentation Index, Dimensions of Privacy Index, Online Privacy Concerns Index (cf. Kisselburgh, 2008; Tufekci, 2008). Respondents are asked about level of agreement with the statements. Responses to the question are: *Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree.* The questions were presented to the respondent in random order. The questions included in this scale are:

- **s5_f1_q1:** I feel confident that I know how to use Facebook's privacy features
- **s5_f1_q2**: I feel confident that I could let only a select group of friend see my Facebook content
- **s5_f1_q3:** I feel confident that I could explain the basics of Facebook privacy to someone else
- **s5_f1_q4:** I feel confident that I have control over who can see my Facebook content

Table 1: Descriptive Statistics for SNS Privacy Efficacy Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
s5_f1_q1	978	4.240286	.7995218	1	5
s5_f1_q2	978	4.172802	.8725288	1	5
s5_f1_q3	976	4.171107	.8784749	1	5
s5_f1_q4	978	4.0818	.9000489	1	5

Figure 1: Histogram for SNS Privacy Efficacy Scale

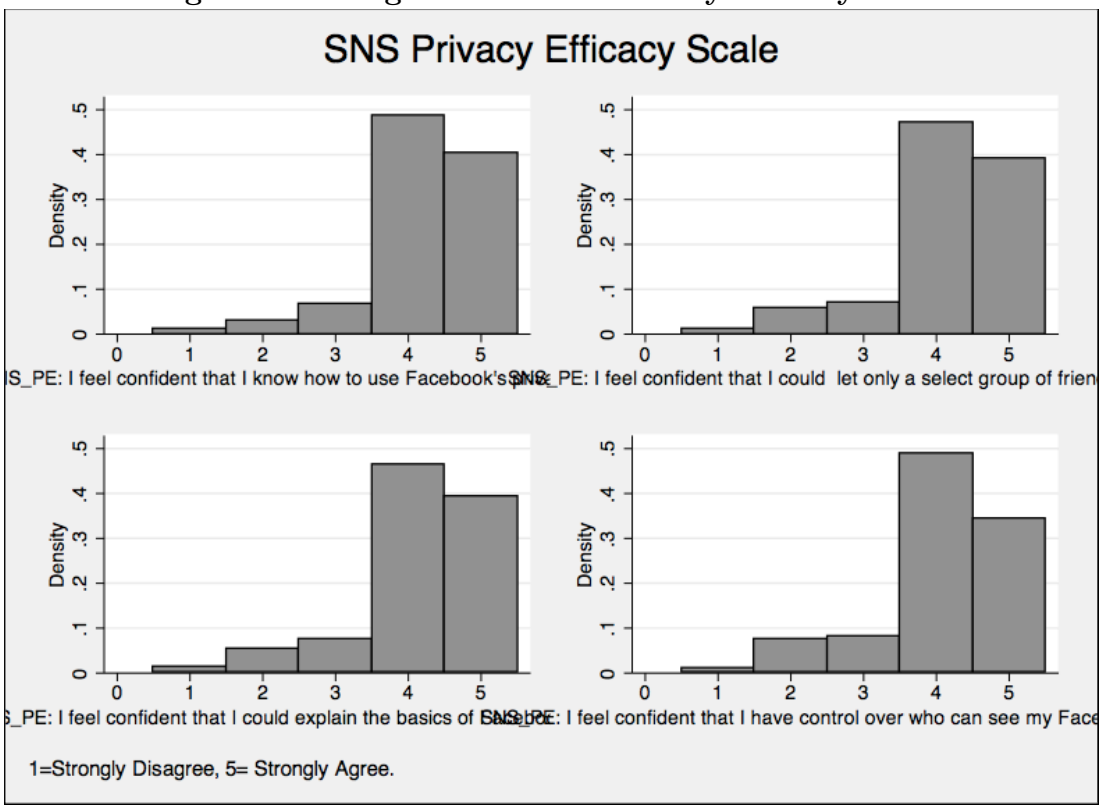


Table 2: Correlation Matrix

	s5_f1_q1	s5_f1_q2	s5_f1_q3	s5_f1_q4
s5_f1_q1	1.0000			
s5_f1_q2	0.7195*	1.0000		
s5_f1_q3	0.8363*	0.6495*	1.0000	
s5_f1_q4	0.6696*	0.6754*	0.6217*	1.0000

Correlations significant at the $p<.05$ level are starred.

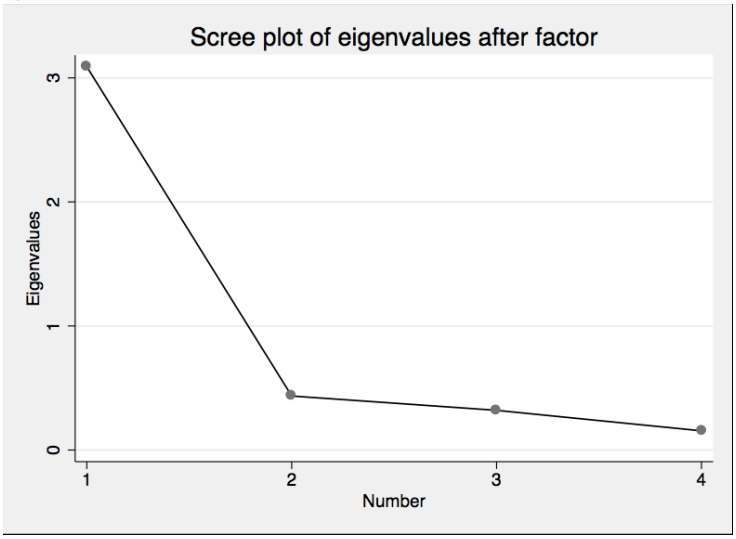
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a single factor, responsible for .7723 of the variance.

Table 3: Principle Components Analysis for SNS Privacy Efficacy Scale.

Variable	Factor1	Uniqueness
s5_f1_q1	0.9219	0.1500
s5_f1_q2	0.8648	0.2522
s5_f1_q3	0.8875	0.2124
s5_f1_q4	0.8390	0.2961

Figure 2: Screeplot for SNS Privacy Efficacy Scale



Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 4-item factor scale is high, at .8995. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .5152), the fact the scale loads on a single factor that is responsible for most of the variance.

Summed Scale for SNS Self Efficacy

Finally, the four items are summed to create the summed scale for SNS Privacy Efficacy. This scale has a mean of 4.1667 and a standard deviation of .7567. A histogram is provided in Figure 3. As I can see, the scale is heavily skewed right. I explored transformations to potentially ameliorate the impact of the skew (Figure 4), but none appear useful on visual inspection. Therefore, the scale is left as a simple summed scale.

Figure 3: Histogram for Summed Scale for SNS Privacy Efficacy

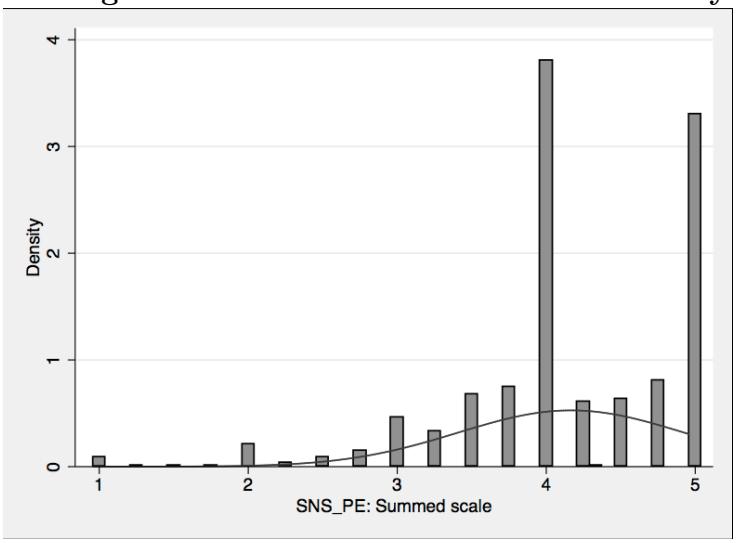
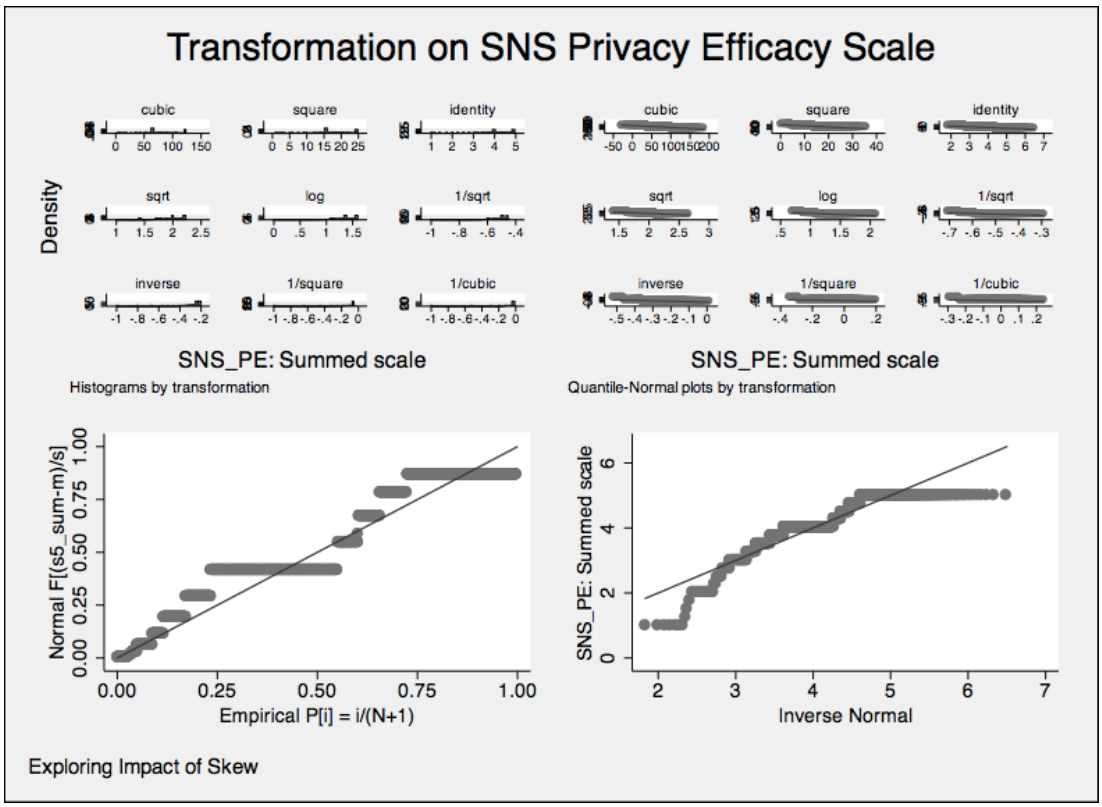


Figure 4: Histogram of potential transformations for SNS Privacy Efficacy Scale



Scale E.6: Index of Socially Supportive Behaviors

Background

The Index of Socially Supportive Behaviors (Barrera et al., 1981) is a scale designed to measure received social support. The received measure of social support employs Barrera et. al.'s (1981) Inventory of Socially Supportive Behaviors (ISSB). Received support scales are typically very long, and the ISSB is not different. The scale has been reduced to 10 items through the elimination of redundant and context-inappropriate elements. Respondents are asked to "**Think about the last month, how often was it that someone..**" and provided a list of items. Responses to the question are "*Not at all, Once or Twice, About Once a Week, Several Times a Week, About Every Day.*" As previously discussed, the scale was reduced from an original 40-item version to contextually appropriate, 10-item version. As the scale was originally designed with single mothers as the replication pool, some questions fit the needs of college students poorly. The questions included in this scale are:

- **s6_f1_q1:** Was right there with you (physically) in a stressful situation
- **s6_f1_q2:** Did some activity together to help you get your mind off of things
- **s6_f1_q3:** Talked with you about some interests of yours
- **s6_f1_q4:** Told you that she/he would keep the things that you talk about private, just between the two of you
- **s6_f1_q5:** Provided you with some transportation
- **s6_f1_q6:** Listened to you talk about your private feelings
- **s6_f1_q7:** Loaned or gave you something (a physical object other than money) that you needed
- **s6_f1_q8:** Told you what to expect in a situation that was about to happen
- **s6_f1_q9:** Joked and kidded to try to cheer you up
- **s6_f1_q10:** Loaned you under $25

Table 1: Descriptive Statistics for ISSB

Variable	Obs	Mean	Std. Dev.	Min	Max
s6_f1_q1	980	2.978571	1.198633	1	5
s6_f1_q2	976	3.364754	1.104837	1	5
s6_f1_q3	980	4.107143	.9554692	1	5
s6_f1_q4	978	3.025562	1.202335	1	5
s6_f1_q5	978	2.547035	.9460019	1	5
s6_f1_q6	979	3.227783	1.182786	1	5
s6_f1_q7	978	2.600204	1.036034	1	5
s6_f1_q8	974	2.700205	1.050845	1	5
s6_f1_q9	975	3.61641	1.151972	1	5
s6_f1_q10	979	1.888662	.8609122	1	5

Figure 1: Histogram for ISSB

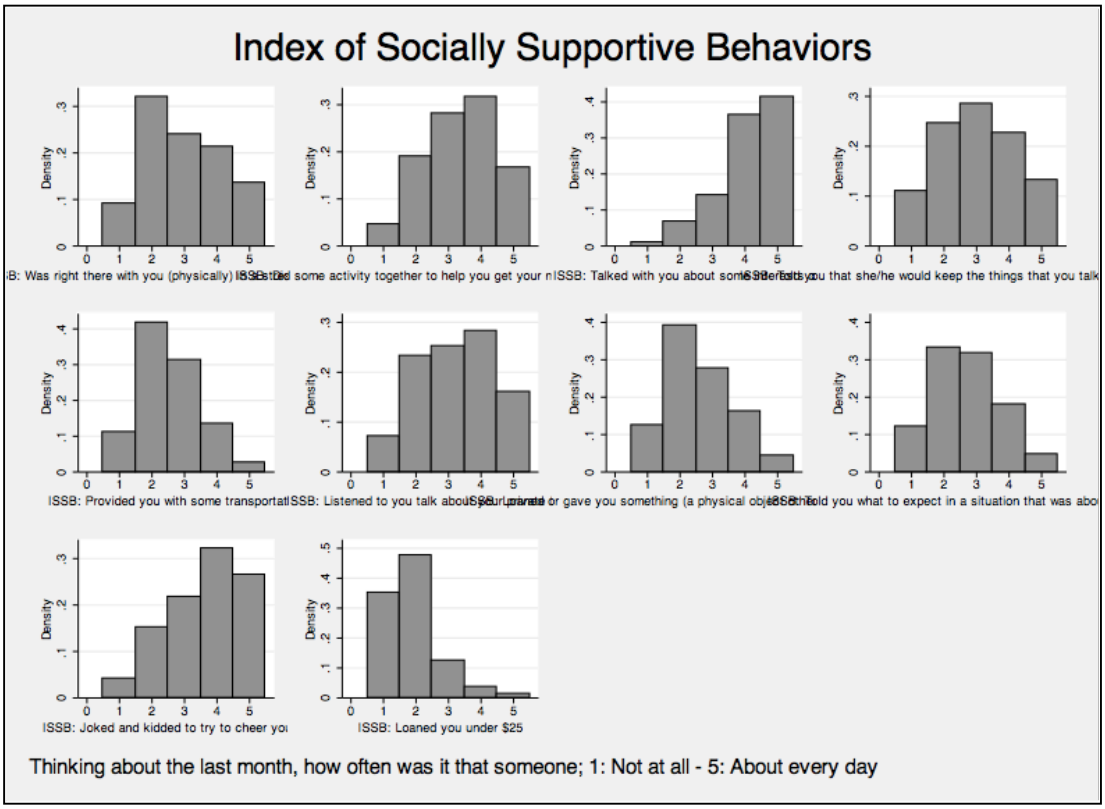


Table 2: Correlation Matrix

s6_f1_q1	s6_f1_q1	s6_f1_q2	s6_f1_q3	s6_f1_q4	s6_f1_q5	s6_f1_q6	s6_f1_q7
s6_f1_q1	1.0000						
s6_f1_q2	0.6039*	1.0000					
s6_f1_q3	0.4453*	0.5346*	1.0000				
s6_f1_q4	0.5321*	0.4695*	0.4538*	1.0000			
s6_f1_q5	0.2228*	0.2517*	0.1569*	0.2978*	1.0000		
s6_f1_q6	0.5052*	0.4357*	0.4804*	0.6038*	0.2573*	1.0000	
s6_f1_q7	0.4388*	0.4320*	0.3526*	0.4450*	0.3674*	0.4441*	1.0000
s6_f1_q8	0.4801*	0.4449*	0.3709*	0.4647*	0.2936*	0.4612*	0.5820*
s6_f1_q9	0.4748*	0.5265*	0.4350*	0.4599*	0.2411*	0.4893*	0.4681*
s6_f1_q10	0.2772*	0.2334*	0.1564*	0.2312*	0.2621*	0.2468*	0.4091*

	s6_f1_q8	s6_f1_9	s6_f1_10
s6_f1_q8	1.0000		
s6_f1_q9	0.5195*	1.0000	
s6_f1_q10	0.3335*	0.2485*	1.0000

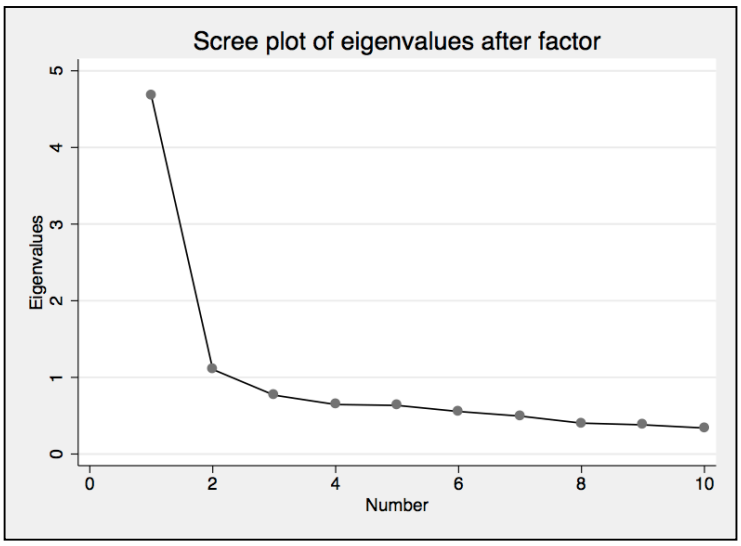
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a two factors, the first responsible for .4675 of the variance, the second for .1104 of the variance. Upon inspection, I see that the second factor is primarily composed of items 5 and 10. These items might be considered "exceptional" forms of support (provision of transportation, lending money), and thus it makes sense that they load together, and apart from the everyday components of the scale.

Table 3: Principle Components Analysis for ISSB.

Variable	Factor1	Factor2	Uniqueness
s6_f1_q1	0.7505	-0.1777	0.4052
s6_f1_q2	0.7410	-0.2374	0.3945
s6_f1_q3	0.6594	-0.3975	0.4072
s6_f1_q4	0.7476	-0.1321	0.4236
s6_f1_q5	0.4469	0.5385	0.5102
s6_f1_q6	0.7425	-0.1674	0.4206
s6_f1_q7	0.7264	0.3263	0.3659
s6_f1_q8	0.7405	0.1572	0.4270
s6_f1_q9	0.7314	-0.1090	0.4532
s6_f1_q10	0.4548	0.6159	0.4138

Figure 2: Screeplot for ISSB

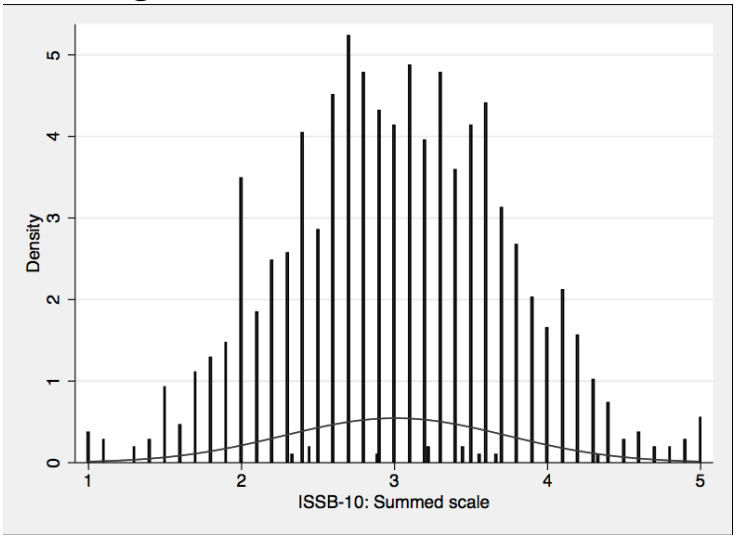


Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 10-item factor scale is high, at .8713. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .4665).

Summed Scale for ISSB

Finally, the ten items are summed to create the summed scale for ISSB. This scale has a mean of 3.005 and a standard deviation of .7317. A histogram is provided in Figure 3.

Figure 3: Histogram for Summed Scale for SNS Self-Efficacy



Scale E.7: Student Adaptation to College

Some components of adaptation to college will be assessed using Baker and Siryk's (1989) Student Adaptation to College Questionnaire (SACQ). This questionnaire has been extensively validated, and has been used in a range of similar studies (cf. Buote et al., 2007; Hurtado et al., 1996; Lanthier & Windham, 2004; Wintre & Yaffe, 2000; and others). The SACQ is significant questionnaire, with 74 items (notably, in electronic environments, completion time is approximately 8 minutes due to its simple form). It allows the measurement of adaptation on many levels including academic, social, personal-emotional and attachment.

Because the scale has been verified and the psychometric properties have been explored by Baker and Siryk (1989), this appendix will not duplicate effort. Rather, it will provide an overview of modifications to the scale, and it will provide a limited report on the psychometric properties of the results.

The original scale by Baker and Siryk is comprised of four subscales. They are: academic achievement, social adjustment, personal-emotional adjustment, and attachment. Because the scale is very long, the following decisions were made in order to reduce length.

- First, it is in the opinion of the researcher that any causal link between SNS use and academic achievement is fairly weak, when compared to use of a range of other academic services provided on campus. Nor does the author feel a string link exists between motivation, application, and performance (three key factors of the scale). Because the Academic Adjustment section is very long (over 30 items) it was dropped in favor of more direct measures of academic achievement, such as GPA.
- Second, the component that deals with personal-emotional adjustment is measured by other scales (CES-D and PSS), and is therefore dropped.

The remaining components of the SACQ are the social adjustment and attachment scales. These scales are both theoretically and empirically linked to SNS use, and are therefore retained in full, with one exception. In the Social Adjustment scale, question 48 is dropped for its heteronormative orientation. The authors of the SACQ caution dropping more than three items, so the dropping of a single question should not be problematic.

Finally, a note on measurement. The SACQ, when administered in whole, is normalized to a T-Score that is semester-dependent. This normalization allows the comparison of progress between two semesters. Because the scale is not administered in full, and because the study does not occur between semesters, I will use raw scores. For all items on the scale, higher scores correspond to better adjustment to campus.

Scale Properties

The following section provides information on properties of SACQ scales. Because the scales have been previously validated, I will present descriptive measures, factor loadings, alphas, and histograms for the summed scale.

Social Adjustment Scale, Complete

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_1	980	7.106122	1.796309	1	9
sacq_4	979	6.269663	2.204942	1	9
sacq_8	979	6.055158	2.180275	1	9
sacq_9	979	7.186925	1.760389	1	9
sacq_14	979	5.678243	2.241468	1	9
sacq_16	978	7.758691	1.801015	1	9
sacq_18	970	6.284536	2.273704	1	9
sacq_22	975	6.209231	2.350525	1	9
sacq_26	959	6.485923	2.061062	1	9
sacq_30	970	7.379381	1.577835	1	9
sacq_33	914	6.888403	2.379314	1	9
sacq_37	977	7.328557	1.72658	1	9
sacq_42	978	6.208589	2.207609	1	9
sacq_46	977	5.958035	2.208701	1	9
sacq_51	977	5.918117	2.401214	1	9
sacq_56	976	6.452869	2.225685	1	9
sacq_57	978	6.936605	2.18445	1	9
sacq_63	977	7.55783	1.922415	1	9
sacq_65	976	6.760246	2.067055	1	9

Factor Analysis and Alpha

Retained Factors: 3

Factor 1: .4190 of Variance

Factor 2: .0915 of Variance

Factor 3: .0647 of Variance

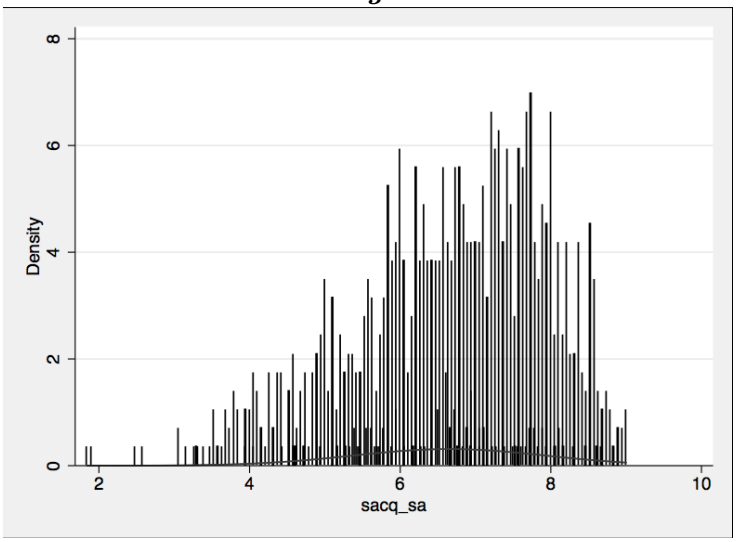
Alpha: .9073

Average interitem covariance: 1.4929

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_sa	980	6.65177	1.283166	1.842105	9

Histogram



Social Adjustment Scale, General

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_1	980	7.106122	1.796309	1	9
sacq_8	979	6.055158	2.180275	1	9
sacq_9	979	7.186925	1.760389	1	9
sacq_18	970	6.284536	2.273704	1	9
sacq_37	977	7.328557	1.72658	1	9
sacq_46	977	5.958035	2.208701	1	9
sacq_65	976	6.760246	2.067055	1	9

Factor Analysis and Alpha

Retained Factors: 1

Factor 1: .5943 of Variance

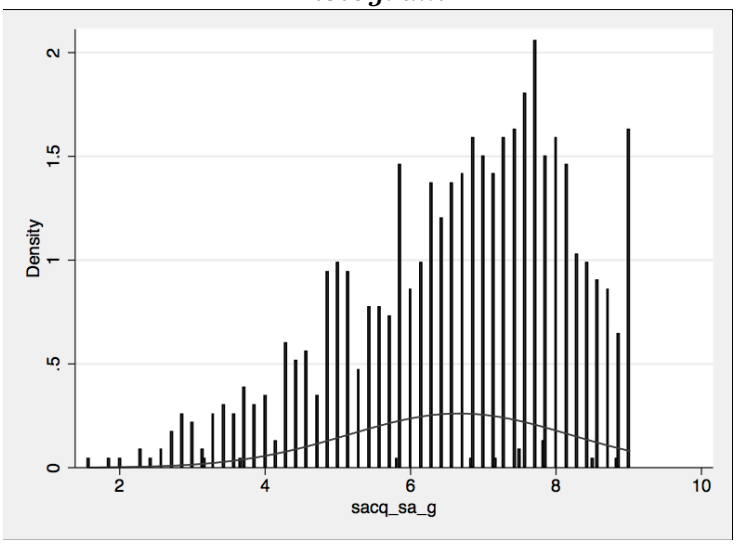
Alpha: .8770

Average interitem covariance: 2.044

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_sa_g	980	6.668989	1.529336	1.571429	9

Histogram



Social Adjustment Scale, Other People

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_4	979	6.269663	2.204942	1	9
sacq_14	979	5.678243	2.241468	1	9
sacq_33	914	6.888403	2.379314	1	9
sacq_42	978	6.208589	2.207609	1	9
sacq_56	976	6.452869	2.225685	1	9
sacq_63	977	7.55783	1.922415	1	9

Factor Analysis and Alpha

Retained Factors: 2

Factor 1: .3932 of Variance

Factor 2: .1671 of Variance

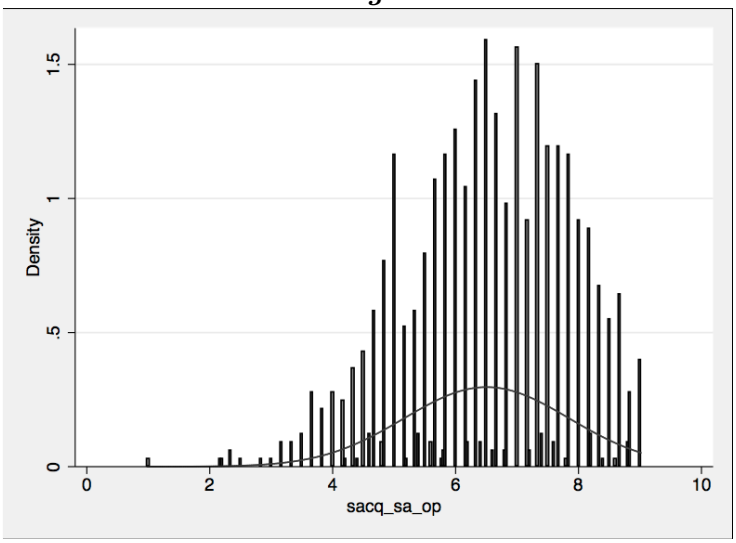
Alpha: .6634

Average interitem covariance: 1.195

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_sa_op	980	6.504371	1.345006	1	9

Histogram



Social Adjustment Scale, Nostalgia

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_22	975	6.209231	2.350525	1	9
sacq_51	977	5.918117	2.401214	1	9
sacq_57	978	6.936605	2.18445	1	9

Factor Analysis and Alpha

Retained Factors: 1

Factor 1: .6691 of Variance

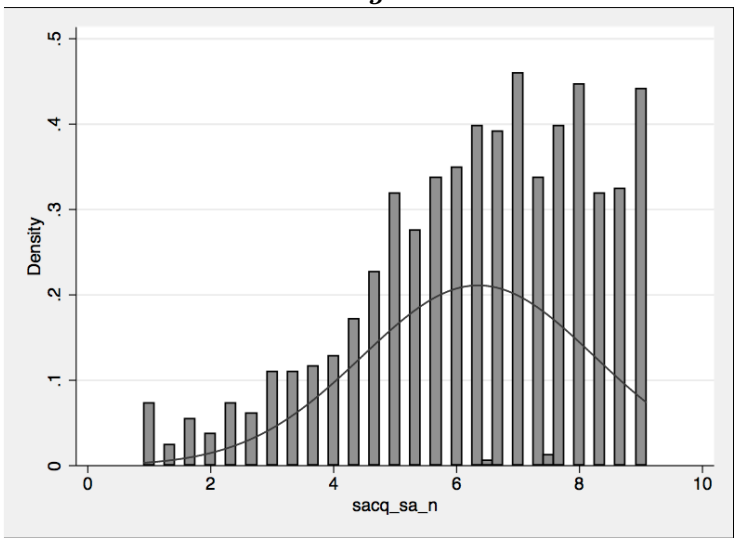
Alpha: .7489

Average interitem covariance: 2.669

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_sa_n	980	6.352551	1.889601	1	9

Histogram



Social Adjustment Scale, Social Environment

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_16	978	7.758691	1.801015	1	9
sacq_26	959	6.485923	2.061062	1	9
sacq_30	970	7.379381	1.577835	1	9

Factor Analysis and Alpha

Retained Factors: 1

Factor 1: .5978 of Variance

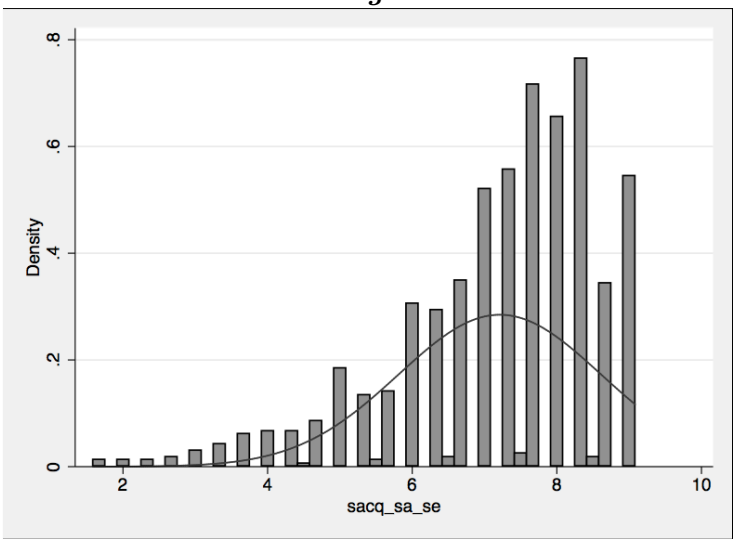
Alpha: .6518

Average interitem covariance: 1.276

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_sa_se	980	7.211735	1.401632	1.666667	9

Histogram



This completes the Social Adjustment Scale, and the four subscales of social adjustment.

Attachment Scale, Complete

The attachment scale is "designed to measure a students degree of commitment to educational-institutional goals and degree of attachment to the particular institution the student is attending, especially the quality of the relationship or bond that is established between the student and the institutions" (Baker & Siryk, 1988, p.15).

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_1	980	7.106122	1.796309	1	9
sacq_4	979	6.269663	2.204942	1	9
sacq_15	979	8.230848	1.384928	1	9
sacq_16	978	7.758691	1.801015	1	9
sacq_26	959	6.485923	2.061062	1	9
sacq_34	975	7.130256	2.26446	1	9
sacq_42	978	6.208589	2.207609	1	9
sacq_47	972	8.348765	1.299912	1	9
sacq_56	976	6.452869	2.225685	1	9
sacq_57	978	6.936605	2.18445	1	9
sacq_59	979	7.57712	2.2133	1	9
sacq_60	979	8.439224	1.436856	1	9
sacq_61	976	8.145492	1.838991	1	9
sacq_65	976	6.760246	2.067055	1	9

Factor Analysis and Alpha

Retained Factors: 3

Factor 1: .4375 of Variance

Factor 2: .1222 of Variance

Factor 3: .0796 of Variance

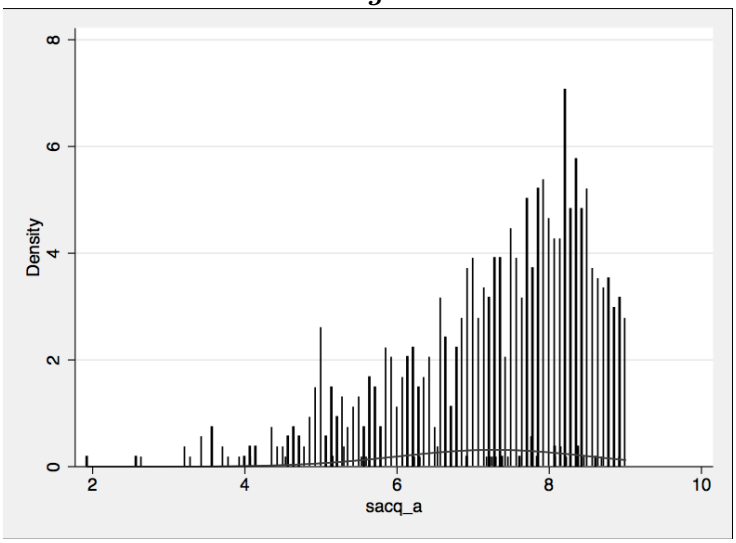
Alpha: .8935

Average interitem covariance: 1.433

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_a	980	7.272993	1.267875	1.928571	9

Histogram



Attachment Scale, General

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_15	979	8.230848	1.384928	1	9
sacq_60	979	8.439224	1.436856	1	9
sacq_61	976	8.145492	1.838991	1	9

Factor Analysis and Alpha

Retained Factors: 1

Factor 1: .7200 of Variance

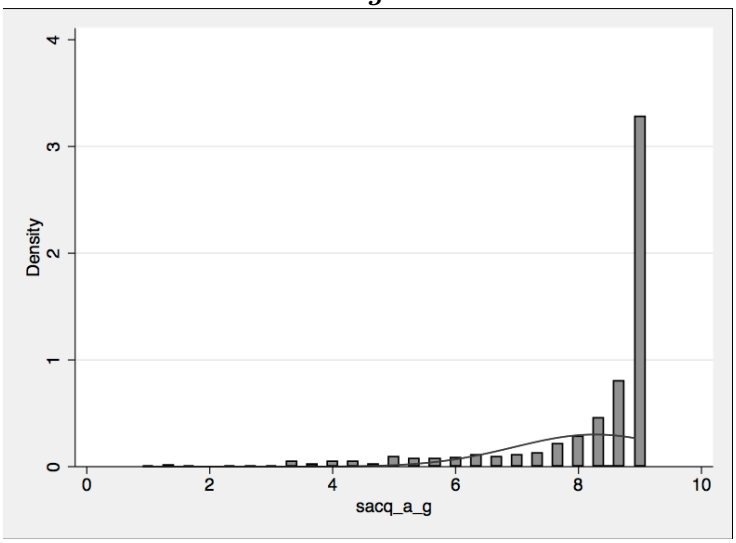
Alpha: .7891

Average interitem covariance: 1.395

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_a_g	980	8.269898	1.324441	1	9

Histogram



Attachment Scale, This College

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_16	978	7.758691	1.801015	1	9
sacq_34	975	7.130256	2.26446	1	9
sacq_47	972	8.348765	1.299912	1	9
sacq_59	979	7.57712	2.2133	1	9

Factor Analysis and Alpha

Retained Factors: 1

Factor 1: .6431 of Variance

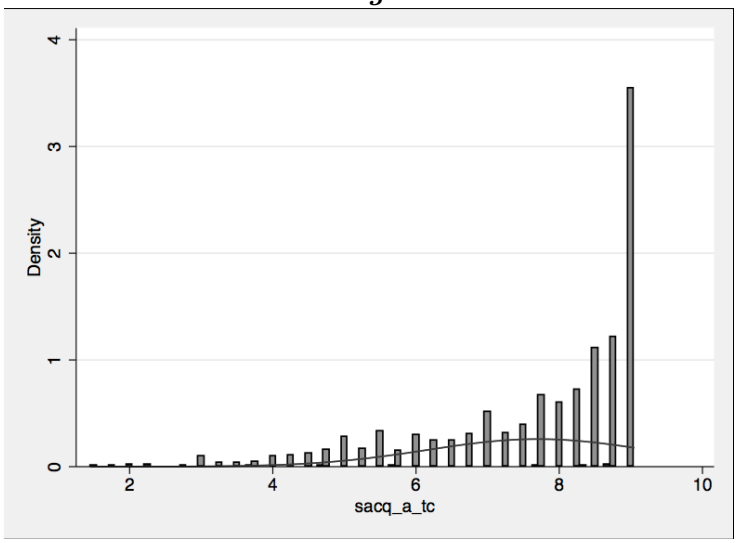
Alpha: .8093

Average interitem covariance: 1.926

Summed Scale

Variable	Obs	Mean	Std. Dev.	Min	Max
sacq_a_tc	979	7.701822	1.544943	1.5	9

Histogram



Scale E.8: Center for Epidemiologic Studies Short Depression Scale (CES-D)

The CES-D is a ten-item scale designed to measure depression, one of the key indicators of stress during the transition to university. Individuals are asked how often in the last week they have felt or behaved the following ways:

- **s7_f1_q1:** I was bothered by things that usually don't bother me
- **s7_f1_q2:** I had trouble keeping my mind on what I was doing
- **s7_f1_q3:** I felt depressed
- **s7_f1_q4:** I felt that everything I did was an effort
- **s7_f1_q5:** I felt hopeful about the future
- **s7_f1_q6:** I felt fearful
- **s7_f1_q7:** My sleep was restless
- **s7_f1_q8:** I was happy
- **s7_f1_q9:** I felt lonely
- **s7_f1_q10:** I could not "get going"

The scale is scored according to (Radloff, 1991), with questions 5 and 8 reverse coded.

Table 1: Descriptive Statistics for CES-D

Variable	Obs	Mean	Std. Dev.	Min	Max
s7_f1_q1	976	.6752049	.794881	0	3
s7_f1_q2	975	1.433846	.9469952	0	3
s7_f1_q3	974	.6016427	.8244948	0	3
s7_f1_q4	976	1.086066	.9297204	0	3
s7_f1_q5	977	1.051177	.8704161	0	3
s7_f1_q6	972	.6512346	.8224255	0	3
s7_f1_q7	975	.945641	.9176117	0	3
s7_f1_q8	976	.7418033	.742093	0	3
s7_f1_q9	978	.7658487	.8326619	0	3
s7_f1_q10	974	.9425051	.8807524	0	3

Figure 1: Histogram for CES-D

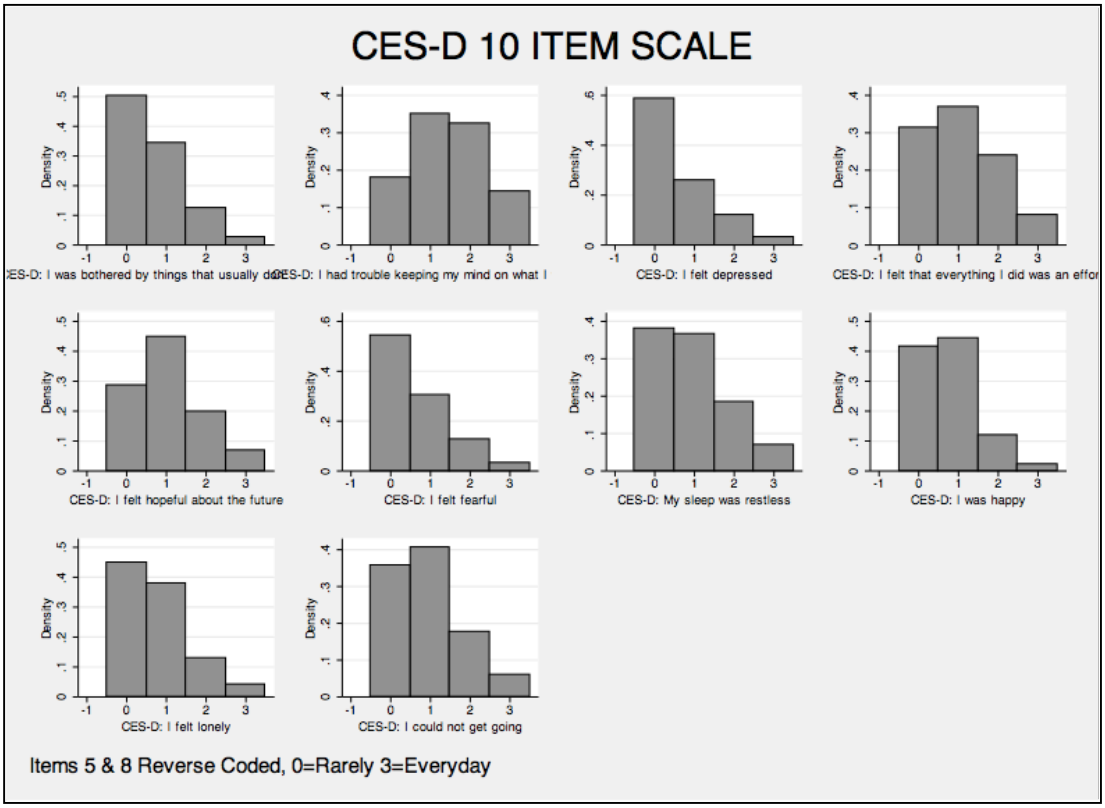


Table 2: Correlation Matrix

	s7_f1_q 1	s7_f1_q 2	s7_f1_q 3	s7_f1_q 4	s7_f1_q 5	s7_f1_q 6	s7_f1_q 7
s7_f1_q1	1.0000						
s7_f1_q2	0.3435*	1.0000					
s7_f1_q3	0.4506*	0.3613*	1.0000				
s7_f1_q4	0.2774*	0.3286*	0.4131*	1.0000			
s7_f1_q5	0.2074*	0.1413*	0.3078*	0.0644*	1.0000		
s7_f1_q6	0.3011*	0.3004*	0.4337*	0.3049*	0.1818*	1.0000	
s7_f1_q7	0.2274*	0.2536*	0.2831*	0.2331*	0.0780*	0.2183*	1.0000
s7_f1_q8	0.2733*	0.2316*	0.4441*	0.1926*	0.5347*	0.2442*	0.1649*
s7_f1_q9	0.3607*	0.3038*	0.6274*	0.3244*	0.2582*	0.4056*	0.2319*
s7_f1_q1 0	0.2843*	0.4761*	0.4156*	0.3389*	0.2063*	0.3234*	0.2669*

	s7_f1_q8	s7_f1_q9	s7_f1_10
s7_f1_q8	1.0000		
s7_f1_q9	0.4283*	1.0000	
s7_f1_q10	0.2883*	0.3851*	1.0000

Correlations significant at the $p<.05$ level are starred.

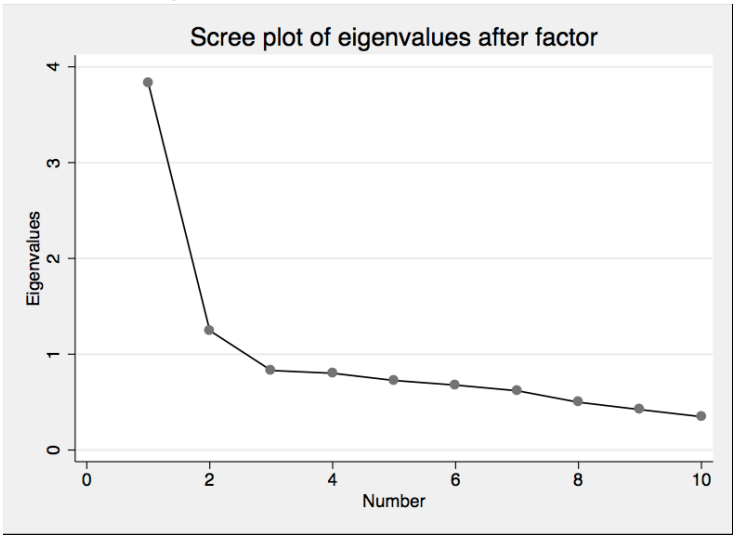
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a two factors, the first responsible for .3831 of the variance, the second responsible for .1246 of variance. The second factor is primarily comprised of questions 5 and 8, the reverse coded questions.

Table 3: Principle Components Analysis for CES-D.

Variable	Factor1	Factor2	Uniqueness
s7_f1_q1	0.6071	-0.0702	0.6265
s7_f1_q2	0.6078	-0.3232	0.5261
s7_f1_q3	0.8012	0.0511	0.3554
s7_f1_q4	0.5699	-0.3635	0.5431
s7_f1_q5	0.4585	0.7158	0.2774
s7_f1_q6	0.6072	-0.1348	0.6131
s7_f1_q7	0.4494	-0.3026	0.7064
s7_f1_q8	0.6175	0.5764	0.2865
s7_f1_q9	0.7335	0.0933	0.4533
s7_f1_q10	0.6524	-0.1983	0.5350

Figure 2: Screeplot for CES-D



Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 10-item factor scale is high, at .8109. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .2211).

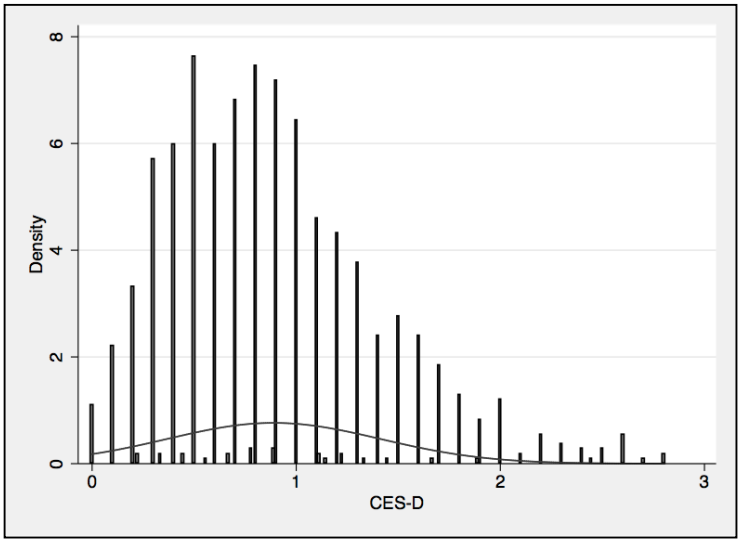
Summed Scale for CES-D

Finally, the ten items are summed to create the summed scale for CES-D. In a diagnostic setting, the CES-D is simply added together (so scores range from 0-30). This scale is averaged so scores range from 0-3. Scores above 1 are considered depressed. This scale has a mean of .8897507 and a standard deviation of .5223. A histogram is provided in Figure 3.

Table 4: Descriptive Statistics for CES-D.

Variable	Obs	Mean	Std. Dev.	Min	Max
s7_sum	978	.8897507	.5223921	0	2.8

Figure 3: Histogram for Summed Scale for CES-D



Scale E.9: Perceived Stress Scale

The PSS is a 10-item scale designed to measure perceived stress, a direct measure of stress. Individuals are asked about their feelings and thoughts in the last month, and how often the felt the way each item describes. The response scale asks "*On a scale of 1-5, with 1 being never, 2 being almost never, 3 being sometimes, 4 being fairly often, and 5 being very often:*" and the questions are:

- **s8_f1_q1:** In the last month, how often have you been upset because of something that happened unexpectedly?
- **s8_f1_q2:** In the last month, how often have you felt that you were unable to control the important things in your life?
- **s8_f1_q3:** In the last month, how often have you felt nervous and "stressed"?
- **s8_f1_q4:** In the last month, how often have you felt confident about your ability to handle your personal problems?
- **s8_f1_q5:** In the last month, how often have you felt that things were going your way?
- **s8_f1_q6:** In the last month, how often have you found that you could not cope with all the things that you had to do?
- **s8_f1_q7:** In the last month, how often have you been able to control irritations in your life?
- **s8_f1_q8:** In the last month, how often have you felt that you were on top of things?
- **s8_f1_q9:** In the last month, how often have you been angered because of things that were outside of your control?
- **s8_f1_q10:** In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

The scale is scored according to (Cohen et al., 1983), with questions 4, 5, 7 and 8 reverse coded.

Table 1: Descriptive Statistics for PSS

Variable	Obs	Mean	Std. Dev.	Min	Max
s8_f1_q1	975	2.610256	.8797852	1	5
s8_f1_q2	977	2.662231	1.018545	1	5
s8_f1_q3	976	3.635246	.9819643	1	5
s8_f1_q4	977	2.305015	.9093692	1	5
s8_f1_q5	976	2.563525	.8805951	1	5
s8_f1_q6	976	2.695697	1.05957	1	5
s8_f1_q7	977	2.428864	.8656148	1	5
s8_f1_q8	974	2.604723	.8854298	1	5
s8_f1_q9	976	2.729508	.9427674	1	5
s8_f1_q10	973	2.687564	1.104154	1	5

Figure 1: Histogram for PSS

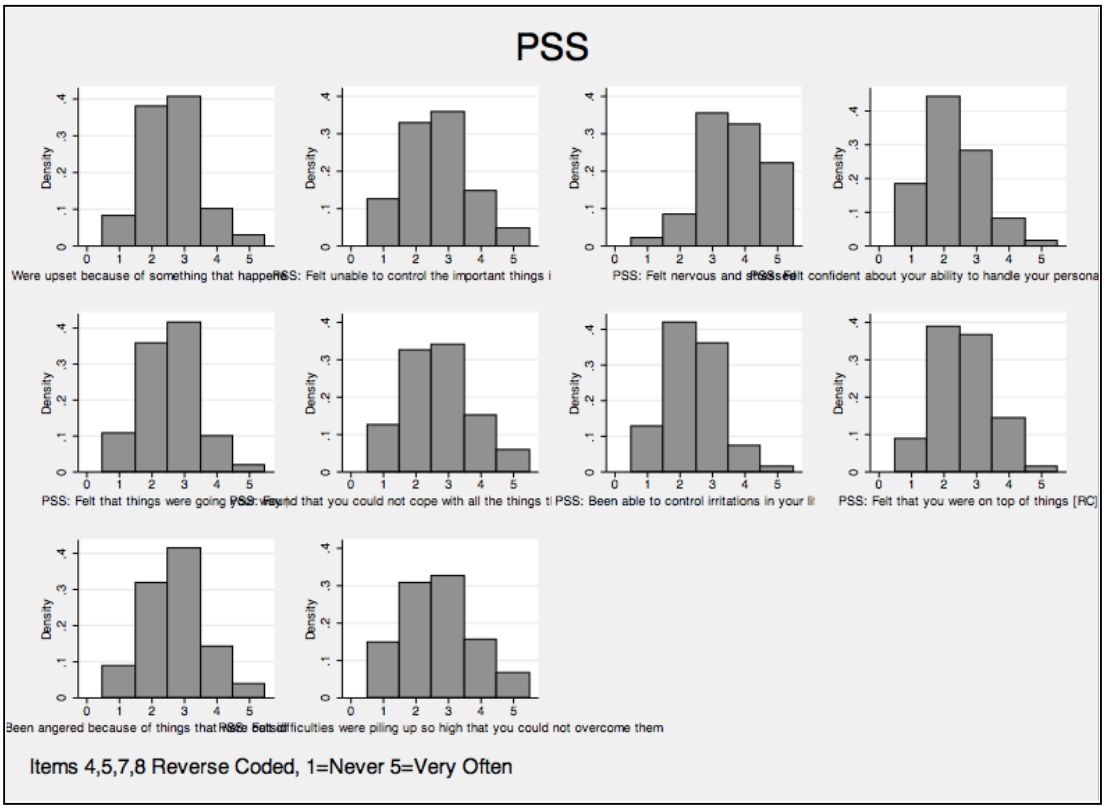


Table 2: Correlation Matrix

	s8_f1_q1	s8_f1_q2	s8_f1_q3	s8_f1_q4	s8_f1_q5	s8_f1_q6	s8_f1_q7
s8_f1_q1	1.0000						
s8_f1_q2	0.6003*	1.0000					
s8_f1_q3	0.4806*	0.4962*	1.0000				
s8_f1_q4	0.2967*	0.3801*	0.1856*	1.0000			
s8_f1_q5	0.3022*	0.3935*	0.2936*	0.5799*	1.0000		
s8_f1_q6	0.4345*	0.5101*	0.5155*	0.3110*	0.3145*	1.0000	
s8_f1_q7	0.2720*	0.3179*	0.1936*	0.4949*	0.4391*	0.3076*	1.0000
s8_f1_q8	0.2449*	0.3795*	0.2970*	0.5040*	0.5569*	0.4313*	0.4358*
s8_f1_q9	0.5022*	0.5029*	0.4420*	0.2494*	0.3034*	0.4716*	0.2790*
s8_f1_q10	0.4466*	0.5794*	0.5575*	0.3345*	0.4131*	0.6528*	0.2995*

	s8_f1_q8	s8_f1_q9	s8_f1_10
s8_f1_q8	1.0000		
s8_f1_q9	0.2393*	1.0000	
s8_f1_q10	0.4268*	0.5620*	1.0000

Correlations significant at the $p<.05$ level are starred.

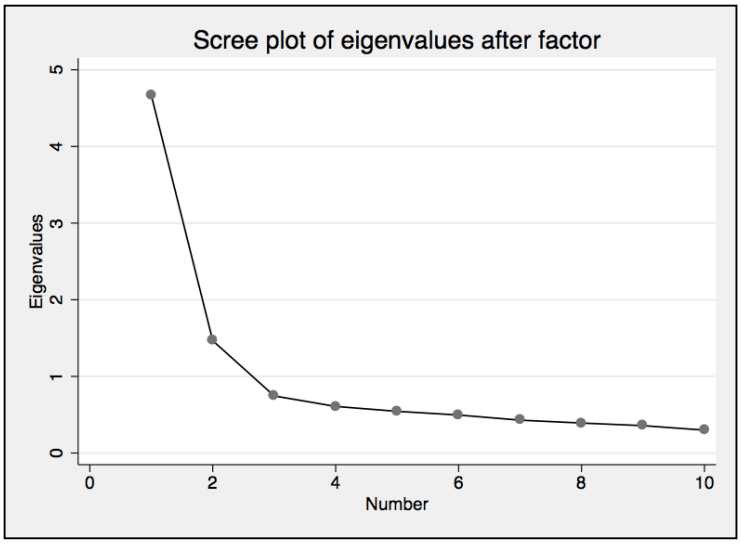
Factor and Reliability Analysis

Next, I explore factor loadings and measures of reliability for the scale. To accomplish this, I conduct principle components analysis (in Stata, principal components factors) and examine the Scree plot. I find that the scale loads on a two factors, the first responsible for .4666 of the variance, the second responsible for .1466 of variance. The second factor is primarily comprised of questions 4, 5, 7 and 8, the reverse coded questions.

Table 3: Principle Components Analysis for PSS.

Variable	Factor1	Factor2	Uniqueness
s8_f1_q1	0.6746	-0.3137	0.4466
s8_f1_q2	0.7700	-0.2010	0.3667
s8_f1_q3	0.6612	-0.4001	0.4028
s8_f1_q4	0.6153	0.5564	0.3119
s8_f1_q5	0.6610	0.4699	0.3423
s8_f1_q6	0.7361	-0.2237	0.4081
s8_f1_q7	0.5658	0.4749	0.4543
s8_f1_q8	0.6526	0.4382	0.3821
s8_f1_q9	0.6742	-0.3385	0.4309
s8_f1_q10	0.7892	-0.2330	0.3229

Figure 2: Screeplot for PSS



Finally, Reliability is assessed with Cronbach's alpha. Alpha for the 10-item factor scale is high, at .8732. Therefore, this scale appears to be reliable. I see evidence of this in the acceptable correlation (average inter-item covariance is .3727).

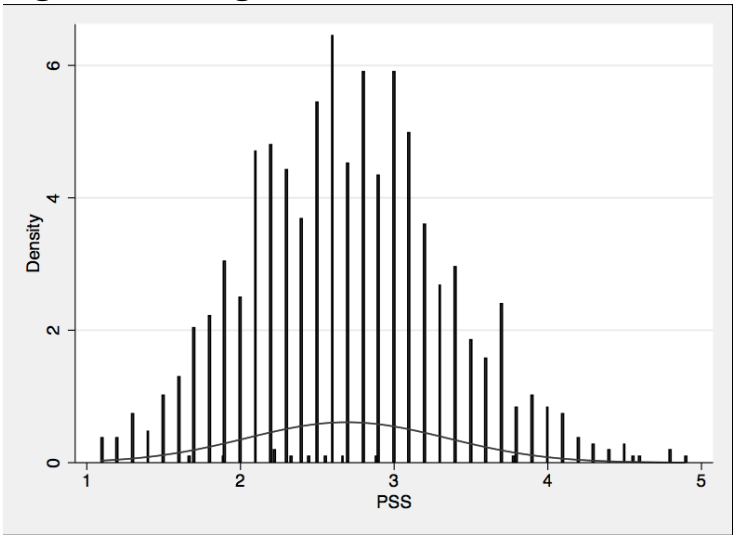
Summed Scale for PSS

Finally, the ten items are summed to create the summed scale for PSS. This scale is averaged so scores range from 0-5. This scale has a mean of 2.692244 and a standard deviation of .6536. A histogram is provided in Figure 3.

Table 4: Descriptive Statistics for PSS.

Variable	Obs	Mean	Std. Dev.	Min	Max
s8_sum	977	2.692244	.6536903	1.1	4.9

Figure 3: Histogram for Summed Scale for PSS



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