AMERICA ONLINE AND OFFLINE:

THE RELATIONSHIP OF PERSONAL NETWORKS TO EMAIL AND OTHER COMMUNICATION MEDIA

by

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ABSTRACT

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This dissertation examines email's utility for maintaining contact with large numbers of ties. I argue that although email lacks the rich sensory feedback that is available through synchronous communication, this apparent weakness makes it a useful medium for those who are highly connected. Email's asynchronous nature helps these people avoid scheduling conflicts and keeps them in close contact with their many social ties. I further argue that the extent to which highly connected individuals use email is shaped by the kinds of ties that they have in their networks, the extent to which they use email in conjunction with other communication media, the strength of their ties, and their demographic characteristics. I examine these issues by analyzing data collected from a national telephone survey of 2,200 Americans. In general, my analysis shows that the more ties people have in their networks, the more they use email. However, the association between the number of ties that people have and their use of email is stronger when ties permit high amounts of choice in determining who is contacted and how that contact takes place. For example, friendship and work ties tend to be more strongly associated with email use than do kin ties, and ties that live outside of the neighborhood are more strongly associated with email use than are neighbor ties. This analysis also suggests that when ties permit high amounts of choice, email is used both as the primary mode of contact and as a supplement to contact that takes place in-person and by telephone. By contrast, when ties do not permit high amounts of choice, email is used mainly as a supplement. Finally, this analysis shows that although demographic characteristics lead people to become email users, it is network size that affects the extent to which they use email. I conclude by discussing the implications of these findings for the social affordance approach, the concept of media multiplexity, and digital inequality.

To my mother

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It is fitting that by earning my Ph.D. in Sociology I have discovered the immense importance of relationships - especially my own. Without the time, effort, and love of the people in my personal network, this dissertation could not have been written.

This dissertation is dedicated to my mother with good reason. Like many women of her generation, my mother worked a double shift. In addition to her full time job, she spent many hours cooking, cleaning, and keeping a watchful eye on my brother and I. The time and effort she put into these tasks was immense, and would have been enough to completely exhaust most people by the end of the day. Nevertheless, she always found the energy to help me with my homework, nearly every night and every weekend. As I grew older, our routine faded. Still, my mother was always available to proof read my papers, correcting my spelling and giving suggestions for improvement. This went on throughout high school, and even into university. I remember at one point telling her that I really should be proof reading my own papers, to which she responded, “it’s okay, I like to read your papers; it gives me a chance to see what you’re doing.” It is fair to say that the existence of this dissertation – which has been diligently proof read by my mother, from start to finish – is a testament to the constant love that she has given me.

Along with my mother, my father worked hard to provide me with a good home. More than that, his work ethic and passion for learning are values that I have come to adopt in my own life. Without these values in place, it is unlikely that I would have entered graduate school. My brother has also been one of my oldest and closest friends,

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Introduction

Email is one of the most popular applications on the internet today (Pew 2006a). Yet, despite its widespread popularity, little is actually known about the extent to which people use email to connect with their personal networks. In this dissertation, I theorize that email is especially useful for people who have large networks. The more ties people have, the greater the amount of time and effort it takes to contact those ties in-person and by phone. This is especially true in America, where people often maintain loosely knit networks of ties that often live outside of the neighborhood. Rather than relying on routine interaction with large groups, Americans often contact their ties on an individual basis (Wellman & Potter 1999). The time and effort required to contact ties on an individual basis is especially high for those with large numbers of ties, because these people are more prone to having scheduling conflicts (Gibson 2006). Even when people do find common times to meet in-person, time and effort are required to travel to meeting places. Nevertheless, as ties increase in number, people actually have greater amounts of contact on average, per tie (Wellman & Gulia 1999). Overall, this means that those people who are most connected, also spend the greatest amounts of time and energy making contact happen, both in the aggregate and on a per tie basis.

The asynchronous nature of email makes it especially well suited for the needs of highly connected individuals. Because email does not require that people communicate at the same time, highly connected individuals can contact their ties without concern of

schedule conflicts. For this reason, those with many ties to contact may opt to use email as their primary mode of contact, using other media less often. However, the asynchronous nature of email and the automatic record of information that it leaves also helps highly connected individuals arrange for future in-person or telephone contact. Moreover, these people might use email to contact the same ties that they often contact in-person or by telephone at times when those ties might not be free for synchronous communication, helping them stay ultra connected. In these ways, email also has the potential to supplement contact. Given these advantages of email, I pose the following research question: is there evidence that the more ties Americans have, the more they use email?

I will argue that answering this question requires specific attention to the type of ties that people have in their networks, and the many kinds of communication media that they use to contact those ties. Literature about the nature of social relationships in contemporary society shows that certain kinds of relationships permit greater choice in determining who is contacted and how that contact occurs, than is experienced with extended kinds of relationships. Those relationships that permit high amounts of choice in these regards will be more open to using email. Moreover, email's utility may also depend on the extent that it helps arrange contact in-person or by the telephone. I will argue that although people with many ties may use email to supplement these extended kinds of contact, they may also use it as the primary medium for connecting with some of their ties.

This dissertation examines these issues using survey data collected from a random sample of 2,200 Americans. This data is well suited to address this question because it

contains information about the extent to which people use email and other media to connect with many kinds of ties. I will use descriptive and multivariate statistics to show the extent to which various kinds of relationships are prevalent in America, and the extent to which they are associated with contact that occurs by email and other forms of communication.

The first chapter starts by discussing the potential utility of email for those who have many ties. It then reviews literature about the social implications of internet use to better understand factors that may affect the relationship between the number of ties that people have in their networks and their use of email. Using the concept of social affordance, I argue that although email may be useful for connecting with large numbers of ties, certain kinds of ties may be open to email contact than other kinds of ties. I review literature about contemporary social life to better understand how tie type, tie distance, and tie strength may influence the use of email by those who have many ties. I end this chapter by stating a set of hypotheses regarding the relationship between the number of ties that people have in their networks and email use.

The second chapter focuses on the Social Ties survey data, which will be used to test the theory presented in the previous chapter. I explain why this data is well suited to test the theory, how key variables were measured, and how the data was collected. I also compare key demographic variables from the Social Ties survey to similar variables from US census data to search for evidence of sample collection bias.

The third chapter will show the extent to which email and other media are used to contact personal networks. This chapter will show: a) the variety and the number of

different kinds of ties in the American population, and, b) the typical amount that email and other forms of contact are used to contact ties. These descriptive statistics show the relative prevalence of different kinds of ties and media in American social life. It is found that communication networks are complex, drawing on a variety of media to contact a variety of ties. Compared to other media, email is used to contact a smaller percent of these ties, showing that is a small part of a more complex communication system.

Chapter four focuses more narrowly on the relationship between the number of ties that people have in their networks and their use of email. Although the descriptive statistics presented in the previous chapter show that email is not typically used to the same extent as other media, this chapter shows how the use of email may be dependent on the number of ties that people have in their networks. Using multivariate statistics, I test each of the hypotheses stated in Chapter 1. This analysis shows three important findings: 1) although email is used to connect with many kinds of ties, it is especially useful when people have high amounts of choice in determining who is contacted and how that contact occurs. This is especially true when considering the influence of in-person and telephone contact. 2) The relatively strong core ties are less likely to use email as a supplement than weaker significant ties (core and significant ties are defined in more detail in Chapter 2). 3) Attainment leads people to become email users, but ties cause them to use it. I end this chapter by discussing these findings in greater detail, explaining how they relate to the theory presented in Chapter 1.

Chapter five concludes this dissertation by discussing the implications of the findings presented in the previous chapters. I argue that although email is weak in the sense that it is asynchronous and does not provide real-time feedback through verbal or

non-verbal gestures, this weakness may also be its strength. Because people with many ties are not always able to contact their ties through synchronous means as often as they might prefer, email's asynchronous nature helps them make connections that they might not have been able to make otherwise. Nevertheless, the characteristics of the ties themselves affect the use of email. As expected, the number of neighbor ties that people have is not strongly associated with email use, although those with large numbers of distant ties are more likely to use email than those with smaller numbers of distant ties. I also find that tie strength affects the use of email, as does the use of other media. I discuss how these findings have important implications for theories of media multiplexity, social affordance, and digital inequality. I conclude by discussing future research directions.

Chapter 1
Theoretical Framework

1.1 Introduction

A number of studies have shown that social ties help people improve their lives by providing valuable information and support. Nevertheless, one downside of having social ties is that contacting them often requires substantial time and energy. This may be especially true in present day America, where people maintain personal networks of loosely knit ties, rather than relying on routine interaction with local groups. Maintaining in-person contact with loosely knit networks of non-local ties often requires that people first arrange mutually convenient times to meet, and then travel to those meetings.

Fortunately, the rise of loosely knit networks has been accompanied by new ways of staying connected. If not for the widespread availability of the locomotive in the 19th century, followed by the adoption of the telegraph, telephone, and automobile in the 20th century, frequent social interaction would be more often limited to interaction with the small groups of people living nearby. Common to all these technologies is their ability to transcend space, helping people connect with others more easily. As we enter the 21st century, there is a new communication technology that has quickly been integrated into the everyday lives of millions: the internet. Like the technologies of the 19th and 20th centuries,

the internet has the potential to lower the cost of social connection. Email may help people more easily arrange in-person and telephone contact, thereby supplementing contact that occurs through other media. Moreover, email may serve as the primary mode of contact, eliminating the need to travel and find mutually convenient meeting times all together.

Despite a growing interest in the social implications of internet use, the social utility for helping people stay connected to their ties remains unclear. This is because writers and scholars often opt to focus on the internet's more novel forms of communication, such as virtual communities. Although these forms of internet based social interactions are interesting, internet users typically do not participate in such communities. Diffusing as quickly as the internet itself, text based mail – what is currently known as email – has consistently been one of the internet's most socially oriented and widely used applications. It is perhaps for this reason that researchers often overlook its importance – its rapid incorporation into everyday life have made it seem mundane in comparison to other forms of online interaction. Yet, it is exactly because of this popularity that email is one of the most important communication devices in existence today. Understanding the sociological significance of internet use and its role in contemporary social life necessitates an understanding of email's social utility.

Although email has not been well studied, existing internet research could be interpreted as showing that the internet is a relatively weak communication medium. The literature I review in this chapter shows that internet use has not radically altered social life; people still have just as much in-person and telephone

contact as they did before using the internet. Moreover, the more that people contact their ties by email, the more they contact their ties in-person or by telephone. Given that email lacks the rich and instant sensory feedback of real time conversation, this research could be interpreted to mean that email is not a useful medium for maintaining social contact. Perhaps its only useful social function is to supplement more engaging communication that occurs in-person or by telephone.

However, I expect that email's weakness may also be its strength. Not everyone is able to engage in in-person or telephone contact as often as they would like, with all of their ties. This may be especially true for those who are the most highly connected. Research that I review in this chapter shows that the more ties people have, the more contact they have per tie. Moreover, the more ties people have, the more difficult it is for them to arrange mutually agreeable times to meet their ties. For these reasons, I expect that highly connected individuals will find the lean nature of email particularly useful. Because email is asynchronous and can be quickly sent over great distances, email may help these individuals stay in close contact with a greater number of their ties, avoiding scheduling conflicts and reducing travel time.

Given the potential utility of email for those who are highly connected, I ask the following research question: is there evidence that the more ties Americans have, the more they use email?

In this chapter, I draw in a variety of literature to construct a theoretical framework that will be used to answer this question. Using the concept of social affordance, I argue that the characteristics of ties make them more or less open to email. Those ties that permit a high amount of choice in determining who is contacted and how contact occurs will be most open to email. In regards to tie type, this leads me to expect that email will be more heavily used for contacting friendship and work ties than for contacting kin ties. Further, when email is used to contact kin ties, I expect that it will largely be used to supplement contact that occurs in-person and by telephone. In regards to tie distance, I expect that email will be more heavily used for contacting mid-range (living between the neighbourhood and one hour's travel) and distant (more than one hours travel) ties than it will for contacting neighbour ties.

I also argue that two other factors may affect email's utility for connecting with ties: demographics and tie strength. First, I argue that factors such as education, occupation type, gender, and age will affect both the odds that people are email users, and the extent to which they use email to contact their ties. I further expect that the relationship between the numbers of ties that people contact and their use of email will account for the association between demographic factors and email use. Second, I argue that tie strength may affect the extent to which people use email to contact their ties. I expect that people will be more likely to use email to contact their relatively strong core ties than their weaker significant ties. I also expect that they will tend to use email more as a supplement with their core ties than their significant ties.

1.2 The Demands of Being Connected

A large body of research shows that relationships – what I will refer to as 'ties' – help people improve their lives. They provide emotional support that improves emotional well-being and helps buffer the effects of stress (e.g., Cohen & Wills 1985; Thoits 1983). They provide people with useful information that can help them find jobs (Granovetter 1973; Lin 2001) and make strategic decisions (Burt 2004; Ruef 2002). And, ties can provide important support during stressful life events (Haines et al. 1996; Hurlbert et al. 2000). People draw on different kinds of ties to provide different kinds of support. For example, strong tie relationships provide emotional support, parents provide financial aid, and physically proximate ties provide services (Wellman 1990). Drawing on a variety of support from a variety of ties helps people get by and get ahead in a variety of situations.

However, as Alejandro Portes and Patricia Landolt (1996) point out, social ties have their downsides. Sometimes, interaction hinders more than it helps, having a negative impact on psychological well-being (Rook 1984). However, even when an interaction with ties is positive, the events leading up to that interaction can be demanding. David Gibson (2006) has shown that those with many ties have more difficulty scheduling synchronous contact, on a per tie basis, than those with a relatively small numbers of ties. This is due to scheduling conflicts that arise when many of those ties may want to meet at the same time. Consequently, the more ties people have, the more difficult it is to schedule contact with those ties.

Despite the fact that those with large numbers of ties spend considerable effort making contact with their ties Barry Wellman and Milena Gulia (1998) find that people with large numbers of ties actually have greater amounts of contact on average, per tie, than people with smaller numbers of ties. There are two possible reasons for this finding. First, people who have large numbers of ties may derive satisfaction from being in a constant state of interaction, fulfilling their extroverted tendencies. Second, people with many ties are imbedded in networks of obligation, causing them to have more contact than they would prefer. In either case, Wellman and Gulia's findings show that people with relatively large numbers of ties have more contact, per tie. Given that the more ties people have, the more difficult it is to arrange contact, those with large numbers of ties have a greater social demands for making synchronous contact than those with smaller numbers of ties.

This social demand has real consequences for their ability to leverage the social support from those ties. If people are not able to contact their ties as often as they would like, they may not be able to access resources from those ties. For example, it has been shown that the more frequently ties are contacted, the more likely they are to provide support (Marin 2005). Moreover, as the frequency of contact with any given tie increases, that tie will have a better knowledge of the ego's specific needs, making it easier to provide helpful information.

In the section that follows, I will discuss various strategies that may lower the cost of social connection. Using these strategies, people may obtain a greater frequency of contact with each of their ties.

1.2.1 Strategies for Coping with Communication Demand

There are at least a few ways that people with many ties may cope with their communication demand.

a. They may choose to form ties with those living in close geographic proximity. This reduces the travel time needed for in-person interaction to occur. It also increases the opportunity to contact ties while carrying out daily activities, minimizing the need to schedule contact.

b. They may contact ties by mobile or landline phone. This also negates the need to travel.

c. They may participate in group activities. This saves people the effort of co-ordinating a time and place to make contact with each individual in that group. It also allows them to quickly jump between individual group members, contacting many people within a relatively short period of time.

d. They may use asynchronous means of communication. Asynchronous communication may allow people to more easily arrange for mutually convenient times when in-person or telephone contact can occur.

Moreover, asynchronous communication can be used as a primary mode of contact, eliminating the need for scheduling or travelling.

Some of these methods of contact are only feasible with particular types of social network structure. For example, reducing contact burden by participating in group activity is only feasible when network members know each other. Moreover, ties need to be living nearby if people have the option of reducing the burden of travel. For this reason, the methods of reducing contact burden depend on the structure of social networks.

In the section that follows, I will review literature about the structure of social networks in America today. I will begin by reviewing the long-standing debate about the nature of contemporary social life. This review will be used to argue that people in contemporary society typically do not take part in densely knit local groups. Instead, it consists of loosely knit networks of geographically dispersed individuals.

1.3 The Nature of Contemporary Social Life

1.3.1 Debating the Existence of Community in the 19th Century

As early as the late 19th century, scholars began to worry about the social and psychological consequences of increased urbanization, industrialization and bureaucratization. They recognized that the complex division of labour and the rise of the modern metropolis would cause increased contact between people of

differing social backgrounds and life experience. With the exception of Emile Durkheim, most of these scholars thought that changes brought on by the industrial revolution would lead to the loss of community. They argued that formal rules and laws would govern interactions in modern society, with the consequence of widespread social isolation and alienation.

The German scholar Ferdinand Tönnies (1887) was one of the first to typify this change, viewing it as a shift from *gemeinschaft* community to *gesellschaft* society. He argued that the *gemeinschaft* community of pre-industrial society was based on communally organized norms of interaction. Ties were typically with sets of kin and neighbours located within walking distance of each other. Under this model, networks were densely knit, with clear boundaries between groups. Norms of interaction were informally enforced by the collective, rather than through formal legal procedures. By contrast, Tönnies characterized the *gesellschaft* society of the industrial era as consisting of sparsely knit networks of friends and acquaintances. Unlike *gemeinschaft* communities, these ties would be more rational in nature, relying on contractual obligations rather than informally reinforced norms of conduct.

Following Tönnies, a number of influential social theorists grappled with the transformation of social life that began to occur at the end of the 19th century. Their discussion of this transformation typically involved a debate about its psychosocial effects. Some theorists felt that the transformation involved a decline in the quality and quantity of ties, leading to isolation and alienation. Although alienation was often defined only in vague terms, they generally

described it as a feeling of disconnection and disengagement.

Karl Marx (1998) mostly attributed alienation to the detachment from the goods produced by labour. He further argued that the social isolation caused by the proletariats' working conditions prevented them from improving their quality of life. Long workdays led to a division between home and work, such that people were not at work when they were at home, and not at home when they were at work. The nature of their work also prevented them from forming meaningful ties with their co-workers.

> [The Worker] works next to others, but not with others. This is, in the last analysis, the alienation of man from man; individuals are isolated from and set against each other… Man's alienation from himself is simultaneously an estrangement from his fellow men (Marcuse 1941: 279).

Like Marx, Max Weber (1968) also felt that workplaces of industrial societies were the source of alienation and social isolation. However, he differed somewhat from Marx in his description of how this alienation and disconnection came about. While Marx argued that alienation and social isolation were caused by the separation of work from home and the separation of goods from producers, Weber thought that alienation stemmed from the rise of bureaucratic rationalization. He argued that the rise in bureaucracy necessitated by the division of labour separated people from each other, forcing them to interact only as rule obeying automatons (1968). Nevertheless I should not over empathize the differences between Weber and Marx. Both of these social theorists shared the

opinion that social isolation and alienation were directly linked to the social transformation accompanying the industrialization of the West.

Contrary to Marx and Weber, Durkheim argued that modern institutions did not destroy ties. Stressing the positive effects of the division of labour, Durkheim (1945) argued that specialization of labour made people more dependent on each other for survival. While people living in pre-industrial mechanical societies were able to produce enough food, clothing and shelter to live independent and autonomous lives, those living in industrialized organic societies depended on each other for survival. These dependencies provide the fundamentals of life – food, clothing and shelter – which lead to feelings of social connection among the general society. Thus, while Durkheim acknowledged that people in modern society are diverse, he believes this diversity is the driving force behind widespread social connection. Durkheim further argued that this sense of social connection created a collective conscience that allowed people to act together as a single unit, influencing each other at a level that could not be attributed to any specific group of individuals.

Simmel (1903) also had a positive view of the division of labour common to industrialized metropolitan centres. He felt that the specialization of ties brought about a new kind of autonomy that wasn't possible in *gemeinschaft* society. He argued that people living in metropolitan areas could easily form and terminate ties, according to their interests at any given time. For this reason, they need not feel obligated to continue interactions that were no longer of benefit.

Despite Simmel's somewhat positive outlook on the new forms of social ties emerging at the end of the 19th century, he sided with Marx and Weber by arguing that this specialization leads to social isolation, not to connection. Simmel's concept of "the stranger" is particularly important to issues of social diversity and social isolation in modern society, because it points to the existence of people that are both geographically close, yet socially distant. In his words: "Distance means that he, who is close by, is far, and strangeness means that he, who also is far, is actually near" (1950, p. 402). Simmel unambiguously saw social distance as being more common in modern societies, as typified by the social reserve he claims exists between people in metropolitan areas: "…the inner aspect of this outer reserve is not only indifference but, more often than we are aware, it is a slight aversion, a mutual strangeness and repulsion, which will break into hatred and fight at the moment of a close contact, however caused" (Simmel 1950, p. 409). Simmel's work in this area was influential in the development of the Chicago School of Sociology, causing future sociologists to take seriously the issue of social connectivity in modern society (Rogers 1999).

1.3.2 Reviving Community in the 20th Century

Classical theorists generally agreed that the interaction of people from different backgrounds and the reliance on explicitly institutionalized rules of contact would cause widespread social isolation and alienation. This view of modernity continued into the 20th century, but changed considerably in the 1960s.

Influenced by Simmel, during the first half of the 20th century scholars at Chicago School of Sociology focused on the social consequences of diversity in the modern metropolis. They theorized that city dwellers tended to collect as distinct groups that were socially and physically separate from each other. Although each of these groups existed within the boundaries of a single city, they were segregated by neighbourhood, each group having their own distinct institutions in which to congregate. Robert Park concisely summarizes this view, when he said the modern metropolis contains, "a mosaic of little worlds that touch but do not interpenetrate" (pp. 40, 1925). According to Park, the social segregation of cities results in moral decay, leading to a deterioration of even the most intimate ties that exist within these segregated groups (1925). Louis Wirth, a colleague of Park at the Chicago School, agreed with Park's assessment, arguing that ties of city dwellers were superficial and transitory, in comparison to those living in towns and villages.

With the notable exception of Durkheim, the general consensus among 19th and early 20th century scholars was that ties in modern society were lacking in quality and quantity. By comparison to pre-industrial small town society, it was generally felt that the diversity of modern society prevented people from forming nurturing ties.

In opposition to the pessimism of the 19th and early 20th century, a new perspective emerged during the 1950's. Proponents of this perspective argued that the densely-kit communities of pre-modern society continued to flourish in contemporary cities. These scholars argued that although people moving to cities

might initially have more transitory networks of sparse ties, they quickly sussed out communities of similar others. These communities were typified as consisting of supportive and relatively stable ties, similar to those of pre-industrial society. Barry Wellman (1979) termed this the "community saved" perspective, because it focused on the existence of old forms of community that previous scholars believed to have been lost in modern times. This perspective seriously took hold in the 1960's when a number of serious and empirically based studies were widely published. For example, Jane Jacobs showed that neighbourhood communities could thrive in urban centres (1961), and Herbert Gans drew clear parallels between urban networks and village communities (1962).

1.3.3 Redefining Community – The Network Approach

While community saved perspective successfully challenged the doom and gloom perspective of earlier scholars, Wellman points out that it was still hindered by past assumptions about the nature of community (1979). Rather than looking for new forms of community in modern society, these scholars assumed that older forms – those that existed as densely knit groups of local ties – were the only means of accessing meaningful, long-term, and supportive ties. By focusing only on this type of community, the scope of their argument was fundamentally limited. It precludes the possibility that new forms of ties – those common to the modern metropolis – might also provide these kinds of positive ties.

To challenge these assumptions, Wellman took a new approach to studying social connection in urban centres. Rather than looking only for the existence of densely knit local groups in urban areas, Wellman examined personal networks of intimate ties, as they existed in any form. By focusing on the individual network of ties, he did not need to make the assumption about the structure of these networks. Only after the ties were identified did he ask about the connections between them – whether they existed as dense and local groups, or as sparse and distant networks.

By taking this approach in his 1968 study of people living in Toronto's East York neighbourhood, he discovered that the majority of intimate ties did not exist within the neighbourhood's boundaries (1979). Instead, most ties were with people outside of the neighbourhood, but still within city limits. Moreover, a significant portion of these intimate ties did not have contact with each other, meaning that they did not exist as part of a single solitary group. By showing that the intimate networks of East Yorkers did not take the form commonly assumed by previous generations of scholars, Wellman challenged the notion that community could only exist in the form of local groups. Instead, he argued that these ties are better conceptualized as personal networks. This approach defines community by its function (the existence of intimate ties), rather than its form.

About a decade after Wellman studied the intimate networks of East Yorkers, Claude S. Fischer studied the personal networks people living in rural and urban California (1982). Fischer studied both urban and rural networks, reasoning that rural networks resembled those of pre-modern society, while urban

networks were modern. Like Wellman, Fischer studied the networks of his respondents, without assuming that they necessarily existed as groups. Like Wellman, Fischer's research focuses mostly on core ties – an average of 20 people that provided different kinds of support. Using this approach, he too challenged the assumptions that community could exist only as membership in local groups. His findings indicated that people living in rural areas had about the same number of social ties as those living in the city. He also found that people living in urban areas sometimes participated in specialized subcultures that did not exist in rural areas. However, the quality of their ties did not differ from the quality of ties maintained by people living in rural areas, suggesting that personal community was alive and well in modern times.

Using the network perspective, Wellman and Fischer showed that social changes accompanying industrialization in the West had changed community, without destroying it. People still maintain intimate ties of supportive ties, but they existed as networks, rather than groups.

Although the network perspective shows how community can exist in contemporary society, fears of widespread social isolation persist. For example, Robert Putnam (2000) argues that people are seeing friends and relatives much less than they were in the mid-1960s. He shows, for example, that picnics decreased by 60 percent between 1975 and 1999, and card playing went down from an average of 16 times per year in 1981, to 8 times per year in 1999. Using General Social Survey data collected in America, McPherson, Smith-Lovin and Brashears (2006) also argue that relationships have been on the decline in recent

years. Their results show a reduction in the mean number of core discussion partners that Americans have, from 2.9 in 1985, to 2.1 in 2005.

These results show a decline in some forms of social contact. However, they do not indicate an isolating decline in all forms of contact for at least three reasons. First, the measures used by Putnam typically focus on traditional forms of group-oriented socializing. Although group involvement may have decreased, it is possible that more informal friendship ties have increased. Moreover, although the geographic dispersion of ties might explain why people less often get together for picnics or to play cards, these ties may continue to flourish online, by telephone, and through less structured in-person activities.

Second, the ties measured by McPherson, Smith-Lovin and Brashears, only include confidants with whom important matters are discussed. Although these core ties are important, social networks include many other ties that improve mental health and well-being, thereby helping people feel socially connected. For this reason, it is important to have a less restrictive definition of social ties, that includes more than just those ties with whom people discuss important matters.

Third, and perhaps most importantly, even if ties have been decreasing in number, these decreases do not necessarily indicate that people are socially isolated. It may be that Americans still keep in close contact with their social ties, even if their total number of ties has declined during the past few decades. For this reason, it is important not only to focus on the number of ties that people have, but also the amount of contact that they have with their ties. Because this

contact may occur through multiple media, it is further important to consider the role of new media in helping people stay in close connection with their ties.

In this dissertation, I will argue that email is particularly useful for keeping people socially connected in contemporary society, because it helps them stay in close contact with their loosely knit and geographically dispersed personal communities. In the section that follows, I will explain in more detail how email may be an important tool for connecting with contemporary social networks.

1.4 Lowering the Cost of Communication Demand

Given that people in contemporary America typically maintain loosely knit personal networks, what is the best strategy for them to reduce the burden of connecting with these networks? Recall the possible methods of reducing contact burden, discussed in section 1.2: a), maintaining physically proximate ties, b) using landline or mobile phone, c) participating in group based activities, and, d) using asynchronous communication. As argued above, some of these strategies can only be used when social networks are structured in particular ways. I will now review each of these methods, explaining if it is a feasible strategy for reducing contact burden given the structure of contemporary social networks.

Is it likely that Americans with many ties reduce the cost of connecting by interacting with ties located in close geographic proximity? The social network approach has shown that many supportive ties exist beyond neighbourhood

boundaries. This means that the second method of reducing contact burden – forming many ties located in a geographically proximate space – is not a useful strategy for most Americans.

Do Americans with many ties reduce the cost of making contact by using landline or mobile phones? Fischer (1992) finds that the introduction of the telephone into America did not reduce the amount of in-person contact with ties. Instead, it allowed people to communicate more intensely with the ties that they also saw in-person. On the one hand, this means that the telephone was not used to reduce the time spent travelling to in-person meetings. On the other hand, it may indicate that the telephone is used to contact ties at times when the burden of travel would have made that contact too difficult. In any case, there is little evidence that the telephone was used more by people who had large numbers of ties to contact. This is probably because telephone contact is synchronous, making it difficult to connect to the loosely knit networks. Loosely knit networks are often with people from different social groups, who often work in different occupations and have different lifestyles (Granovetter 1973; Burt 2004). This means that the possibility of getting these ties on the phone at a time that is mutually convenient for discussion may be difficult.

Do Americans with many ties reduce the cost of making contact by interacting with their ties as groups? Given that Americans typically have loosely knit networks, this option is not a feasible way of reducing the burden of connection. Because people in loosely knit networks do not know each other, it is unlikely that they actually meet as groups. Nevertheless, at least some Americans

do meet with their ties as groups, when they participate in voluntary associations. Nevertheless, despite the efficiency of contacting many ties through routinized participation in large groups, involvement in group activity is becoming increasingly uncommon in America today. Robert Putnam has found that membership in voluntary associations has declined significantly during the past 50 years (Putnam 2000). This reduction is emblematic of the shift from groups to networks, which the network theorists suggest has been occurring since the industrial revolution.

Given the loosely knit nature of social networks today, I will argue that the fourth method of reducing the burden of initiating contact – using asynchronous communication media – is the most feasible. Because networks in contemporary America are loosely knit, people often need to connect with their ties on a one-on-one or small group basis. Asynchronous methods of communication are particularly well suited to maintaining contact that takes place one-on-one or between small numbers of people. An important advantage of asynchronous contact is that people need not synchronize their schedules for contact to occur. Moreover, because asynchronous contact can easily occur over distance, people need not travel to particular locations in order to make contact. This makes email a more feasible way of maintaining dyadic (one-on-one) contact with large numbers of loosely knit ties.

There are at least three ways that people can communicate asynchronously today: by leaving phone messages, sending mail by post, and using email. Of all

of these ways, I will argue that email is the most efficient and least burdensome way of communicating asynchronously.

When compared to postal mail, email does not require walking to a mailbox. This reduces the amount of time people need to spend initiating contact. Moreover, the instantaneous transfer from the sender to the receiver makes it easy for individuals to stay in frequent contact. Finally, because email may often be used to transfer information, it is easier to selectively cut and paste information from computer text to email text than from paper documents to letters.

Sending email is also more efficient than leaving telephone messages. Email allows people with busy schedules to give only the information that is most relevant. For example, if they want to set up an in-person meeting, email allows them to send information about setting up the appointment. By contrast, when leaving a telephone message, there is always the possibility that the ring of the telephone will interrupt the activities of the person on the other end. If the person on the other end actually answers the phone, there is the further possibility that they will want to engage in a discussion that is time intensive and outside of the original intent of the call. When people don't answer the phone and a message is left, there is always the possibility that people will return calls at inconvenient times. This way of interaction often ends up as a game of 'phone tag,' which is generally burdensome.

Although email is the most efficient asynchronous medium for connecting with loosely knit networks, it is also useful for contacting densely knit groups.

While email can be sent from individual to individual, it can also be used to contact many ties at one time. This further reduces the burden of contact. Using just a CC function or a listserv (the CC function allows people to copy the same email message to more than one person; a listserv is a service that allows people to email others who belong to a common emailing list), it is possible to write just one message and send it to many people. This makes email useful for contacting small and informal sets of individuals, as well as large groups of individuals, such as those known through voluntary associations. In these ways, email has the potential to allow contact with all kinds of ties, helping people more easily connect both to loosely knit networks and more tightly bound groups.

In sum, email is a potentially useful way of reducing the burden of connecting with the loosely knit personal networks of today. Moreover, it also allows for contact with densely knit groups of individuals, making it a useful tool for those who have many ties.

1.5 Statement of Research Question

At this point, I will review the argument and state my main research question. I have argued that making in-person contact with ties is burdensome, because it takes time and effort to schedule meetings and travel to those meetings. The more ties that people have, the greater the time and effort that is required to contact ties in-person, both on a per tie basis and in aggregate. Among several possible ways of reducing the cost of making contact, I have argued email is the most feasible.

Given the benefits of using email to connect with social ties, my main research question is as follows: *is there evidence that the more ties Americans have, the more they use email?*

As a first step to understanding the relationship between the number of ties that people have in their networks and the number of ties that they email, I will review evidence regarding the social implications of internet use. Although few of the studies reviewed measure email use as the number of ties contacted by email, they do provide insights that I will use to frame this question more precisely.

1.6 The Social Implications of Internet Use – A Review of Literature

Although email may be well suited for reducing the cost of connecting with contemporary networks, few studies examine the relationship between social networks and email use directly. There are a number of reasons for this. Early writing about the social implications of internet use wrongly assumed that the internet would either destroy ties by pulling people away from their existing relationships, or create a new world of online social interaction. By assuming that the internet had the power to radically alter social life, these writers often ignored the simple fact that people were emailing their existing ties. Instead of examining how people were using email, these writers typically discussed the implication of virtual communities and other online-only forms of interaction.

Fortunately, a growing number of studies have examined the more common ways of using the internet. Unfortunately, few of these studies actually measure the number of ties contacted by email, or even the number of ties in social networks. These studies typically measure email use as frequency (i.e., the number of emails sent or received during a given period of time), or duration (i.e., the amount of time spent emailing during a given period of time). Because these studies do not measure the number of ties contacted by email, they do not speak to the issue that is of central concern to this dissertation - how the number of ties in a personal network may be associated with the number of ties contacted by email. To my knowledge, only three studies examine the connection between the number of ties that people have in their networks and their use of the internet. Despite the lack of network measure in these studies, they do provide valuable knowledge about internet use.

In this section, I will first review early writing about internet use, arguing that both utopian and dystopian writings wrongly assumed that the internet had the power to radically alter relationships. I will then review more recent and empirical research to discuss the insights that they provide regarding the relationship between email and social networks.

1.6.1 Utopianism & Dystopianism

Early accounts of the internet's role in personal ties tended to be overly simplistic. Utopian writers argued that the internet contained an enormous potential that

would revolutionize society for the better. They praised the internet's ability to bring together disparate people from around the world into what Marshall McLuhan called the global village. They thought that the internet would allow ties to flourish in an environment of equality and respect. This world would be so immersive that people would be able to escape the mundane routine of everyday life, becoming at one with collective intelligence (i.e., Barlow 1995; de Kerckhove 1997).

At the same time as these utopian writers were praising the internet, another group of dystopian writers were taking the opposite position. Dystopian writers argued that the internet destroys community, leaving individuals isolated and alienated. This camp found life online to be problematic, arguing that online ties would never measure up to face-to-face ties of real life. Online life would only take time away from the more emotionally satisfying ties that could be found offline. In doing so, it would erode the fabric of community life, leaving individuals isolated and alienated (i.e., Kroker & Weinstein 1994; Stoll 1995). Along these same lines of reasoning, Sherry Turkle (1995) argued that the ability to create multiple personalities in this online world would be so emotionally engaging that it would fraction personal identity, leading to multiple personality disorders.

Many of these utopian and dystopian accounts were written by a relatively small number of highly educated and well-off academics. By focusing only on internet use common to their lifestyles and personal interests, they failed to consider how most of the population actually uses the internet. In doing so,

they lost perspective of the internet's true potential for society at large, often relying on hyped conjecture rather than informed theorizing. This failure to contextualize internet use into a broader pattern of common social tendencies means that utopian and dystopian writers share an overly simplistic view of internet use. Both assume that the internet actually *does* have the power to pull people away from their everyday lives and immerse them in a world that is radically different from the one in which they actually lived. This assumption – often referred to as technological determinism – attributes a large amount of causal power to the technology itself, ignoring the complex array of social factors that determine how the internet is actually used by the general population.

The lack of this contextualization by utopian writers is most evident when examining their arguments about the internet's ability to break down physical barriers. By arguing that the internet has caused the breakdown of physical constraints, allowing people to connect all over the world, utopian writers fail to acknowledge that this has already been happening for decades. By way of mass transportation and the telephone, people have been maintaining a significant number of their ties with people who are not located within the neighbourhood locale (Wellman 1979; Wellman & Gulia 1999). While it is true that the internet enables people to communicate around the world at a relatively low cost, the point being made here is that these geographic networks already existed before the internet was invented. For this reason, it was not internet technology that caused the breakdown of physical barriers, but rather the social need for long-distance communication that helped lead to widespread adoption of the internet. Contrary

to technologically deterministic assumptions, internet use has been the effect and not the cause of distant communication with spatially dispersed relations.

Both utopian and dystopian writers also fail to consider social context when they assume that the internet offers an experience immersive enough to pull people away from the kinds of interactions that routinely occur in everyday life. They rarely acknowledged that many ties did not rely exclusively on "real" in-person contact before the advent of the internet. Instead, most personal ties are somewhat geographically dispersed, relying on a mixture of telephone and only intermittent face-to-face contact (Gulia & Wellman 1999). Moreover, there is evidence that a large majority of the social interactions that occur online are between people who also know each other offline (Quan-Haase & Wellman, 2003). By ignoring the reality of present day ties, they falsely assume that the internet is actually responsible for this shift, and that it would continue to amplify these social tendencies to the point where individuals no longer socialized in-person at all. While it may be true that some of these writers were never intending to give an account of how the internet is really used, much of the hype they created has spilled over into the media stories and common perceptions about the internet's impact on society.

Attempting to add empirical rigour to these rhetorical debates, a body of scholarly research about internet use has been accumulating. While these studies do much to shed light on the ways that the general population is actually using the internet, they too share common theoretical assumptions with both utopian and dystopian thinkers. Many of these studies frame their research questions as

addressing the *effects* of internet use. By way of example, one of the most comprehensive and informative summaries of this kind of research is titled *The Social Consequences of Internet Use* (Katz & Rice 2002). These "consequences" are often conceptualized in terms of interaction with friends and kin, formation of new online friendships and neighbouring relations. By making internet use appear causally prior to certain outcomes, this research often does not include other social factors that play a fundamental role in shaping internet use.

Although the theoretical justification for these studies may attribute more causal power to the internet than necessary, these empirical studies do much to enrich our understanding of internet use. These projects often drew on large samples of people, asking questions about internet habits, mental health, and social interaction with friends and kin. The rest of this section will be devoted to discussing the results of these studies. These results will be divided into studies that focus on the internet's role in: a) connecting with kin and friends, b) connecting with neighbours, c) forming new ties, and, d) contacting social networks.

1.6.2 Contact with Friends and Kin – Online and Off

In 1998, the dystopian perspective gained some empirical support when a group of researchers at Carnegie Mellon published a paper entitled: "Internet Paradox: A Social Technology That Reduces Social Involvement and Psychological Well-Being?" (Kraut et al. 1998). Using systematic evidence, Kraut and colleagues

argued that despite the internet's function as a social tool, people who went online experienced lower levels of face-to-face communication with close friends and kin. They also found that their respondents displayed symptoms of depression, stress, and loneliness, after going online. The results of this study captured widespread media coverage, confirming in the minds of many that the internet is detrimental to social ties and mental well-being.

These same respondents were asked a similar set of questions on three follow-ups after the initial observation, results of which were reported in the paper, "Internet Paradox Revisited" (2002). These results showed that the negative effects of internet use had dissipated three years later. Moreover, they found generally positive effects of internet use on social ties and psychological well-being, especially among people who were highly extroverted. Earlier findings of negative social and psychological outcomes were explained as an effect of inexperience when people first go online. These findings also suggest that internet use itself does not necessarily cause strictly positive or negative outcomes, but rather that internet use is very much tied to pre-existing dispositions, such as extroversion.

Research that measures internet use as the time spent online shows somewhat mixed results, but it generally indicates that although internet use may be associated with low levels of offline socializing, it is not the fundamental cause of these low levels of offline socializing. Instead, lifestyle appears to be the more fundamental reason for the association between internet use and low levels of offline socializing.

Two studies that show conflicting results are by Robinson et al. (2002) and Nie et al. (2001). Using time diary data collected from a sample of 948 Americans, Robinson, et al. finding few differences between internet users and non-users in terms of the time that they spend communicating offline, in-person and by telephone. By contrast, Nie et al. found that time spent online is largely asocial, and detracts from time spent communicating offline. The differences between the findings of Nie et al. and Robinson et al. may be the result of sample selection. Although both Robinson et al. and Nie et al. used samples that mirrored the demographic composition of the general American population, Nie et al.'s sample included only those people that were willing and able to access the internet using a Microsoft Web-TV set-top box. Although the demographic composition of Nie's sample is similar to the demographic composition of the general US population, his respondents were atypical by virtue of the fact that they were probably more prone to be early adopters of new technologies and were using a device that typical internet users would shun as too primitive.

Results from the Canadian General Social Survey (Veenhof 2006) are consistent with the view that individual dispositions and lifestyles shape both internet use and offline social activity. The findings of this study are similar to Nie et al.'s findings, because they show that heavy internet users typically spend less time engaging in offline social activity than do non-users. Heavy internet users – defined as those spending more than one hour on the internet for personal use during a typical day – spend about two hours more time alone than non-users, during a typical day. However, they also show that heavy internet users tend to

have different lifestyles than non-users. For example, heavy internet users spend less time sleeping, relaxing, and working for pay than do non-users. Moreover, this study shows that although heavy internet users may spend less time than non-users interacting with people offline, heavy users report having as many friends, neighbours, work colleagues, and kin, as non-users. Heavy users also say that they value their social time just as much as non-users.

These findings suggest that although heavy internet users may spend less time interacting with people offline, the time that they spend online is not causing their relationships to deteriorate. It may be that although heavy internet users spend less time being social offline than non-users, the social time that internet users do spend offline is of a higher quality than non-users. It is also possible that heavy internet users spend their time online interacting with their offline relationships – for example, doing email or sending instant messages to their friends and family. This online contact may help them maintain quality relationships with their offline ties.

A longitudinal study by Anderson and Tracy (2001) also indicates that internet use does not cause people to change their offline social tendencies, but that other factors such as lifestyle instead play a much more important role shaping offline social interaction. Anderson and Tracy use longitudinal time-use diary data drawn from 2,600 individuals living in 1,000 U.K. households, along with qualitative interviews, to examine internet use in daily life. They found little change in time spent socializing offline once people gained internet connections. It was major lifestyle changes, such as changing jobs, which often triggered both

the adoption of the internet and changes in daily activities. This implies that associations between internet adoption and changes in lifestyle are caused by more fundamental events over the life course. Contrary to the musings of both utopian and dystopian pundits, the internet does not have the power to significantly alter people's daily activities.

While these studies by Robinson et al., Nie et al., Veenhof, and Anderson and Tracy, all measure offline social interaction and internet use in terms the time that these activities take during a typical day, other studies have measured offline interaction and internet use in terms of its frequency. When measured in this way, these studies generally show little association between internet use and offline social interaction. Findings from a representative sample of 1,800 Americans in 2000 found no difference in levels of telephone use between users and non-users of the internet (Katz & Rice 2002). Another survey by the same researchers compared the levels of involvement in religious organizations, leisure organizations and community organizations, of internet and non-internet users. They found no association between levels of involvement in these activities and internet use (Katz & Aspden 1997). Another large-scale sample of 3,533 Americans collected by the *Pew Internet & American Life Project* indicated that internet users were significantly more likely to visit with friends and kin, even when controlling for demographic factors (Katz & Rice 2002). Quan-Haase et al. (2002) also examined this issue using the results of a survey that was posted on the National Geographic website during the fall of 1998. Their analysis showed that the amount of reported contact through email was not related to decreased

amounts of in-person contact or telephone contact. Findings from these studies all indicated that internet use does not detract from amounts of contact with people offline.

A number of studies have examined this issue of how time spent on the internet may displace time spent on activities that are not social, often comparing measures of time spent online with measures of time spent using tradition media, for example TV watching. A special issue of the journal *IT & Society* includes articles on 11 such studies (see the introduction by Robinson, 2002, for a summary of the results). As with many studies in social science, differing sources of data, methodology and measurements, often lead to discrepancies in results. However, in general these papers showed moderate evidence that internet use was associated with a decrease in the amount of time spent watching TV (Nie & Hillygus 2002; Robinson et al. 2002; Pronovost 2002) and sleeping (Nie & Hillygus 2002; Robinson et al. 2002; Fu et al. 2002; Veenhof 2006).

A few longitudinal studies have examined what activities are displaced once people go online. Longitudinal studies are especially apt to answer this question, since having survey data for two points in time allows researchers to see how fluctuations in internet use are temporally associated with changes in time spent on other daily activities during a period of time. Findings from a large scale Swedish study of approximately 1,000 respondents between 1997 and 2001 indicated that going online leads to a decrease in hours spent watching TV (Franzen 2000; Franzen 2003). Similar, but qualified results were found in a random-sample U.S. panel survey of 1,222 persons in 2001 and 963 of those same

people in 2002 (Kraut 2006). Rather than lumping all kinds of internet activity into a single measure of internet use, this survey distinguished among a number of different kinds of online activities, such as “communicating with friends”, “getting news online” or “playing games”. Using the internet to meet new people was associated with declines in watching TV, while using the internet for entertainment or commerce was not. In using this more refined measure of internet use that discerned between different kinds of activities, there is evidence that not all internet use is equal. Instead, these results indicate that those who use the internet for social purposes will be less likely to watch TV, while those using the internet for entertainment purposes will continue to seek entertainment through TV watching. This indicates that the needs of the individual must be understood in order to make sense of how the internet is used in everyday life. Again, this is in contrast to utopian or dystopian perspectives that assume the internet itself has the power to alter lifestyles.

While many studies have generally shown that internet use does not cause people to become less social, they typically do not examine if using the internet to contact offline ties affects these relationships. A research by the *Pew Internet and American Life Project* reports that 91 percent of those with internet access send email (2006a). As much of this email could be sent to close friends and kin, it is quite possible that this added contact may strengthen ties and lead to more contact offline. Then again, this contact may simply add on to offline contact, but not increase the frequency or amount of time spent with close fiends and kin offline.

Longitudinal studies tend to indicate a positive association between internet use and offline interaction with close friends, but not with kin. This finding comes from a recent meta-analysis of 16 data sets which all include measures of internet use and offline social interaction with friends and kin (Shklovski et al. 2006). These studies were all conducted between 1995 and 2003, some of them using cross-sectional sampling design and others using longitudinal design. While measures differed somewhat between studies, they all shared common conceptions of internet use and offline interaction, making comparisons possible. Rather than comparing each measure directly, the total effects of associations between internet use and offline interaction with friends and kin for each study were standardized by using a Fisher's Z transformation. These effects were then compared using predictors such as the year that the study was conducted and survey design (longitudinal or cross-sectional). Surprisingly, the effects did not differ substantially by the year in which the survey was administered. However, results did vary significantly, depending on the survey design. Cross-sectional surveys generally showed a negative association between internet use and interaction with friends. In contrast, longitudinal surveys found a positive association between internet use and interaction with friends. Longitudinal studies found little association between internet use and interaction with kin.

The authors of this analysis argue that longitudinal studies are better indicators of the tie between internet use and social interaction, as they control for individual factors that are difficult to control in surveys that are cross-sectional.

When people are surveyed more than once, they effectively control for their own unique characteristics. Further, collecting information at more than one point in time allows researchers to see how introduction of one factor (e.g., internet use) is associated with changes in other factors (e.g., social interaction) over time. For these reasons, the positive association between internet use and interaction with friends is likely the most reliable result that can be pulled from this body of internet research.

While friendships are more fluid and often require active tie maintenance, kin ties more often involve routine interactions. This would be especially true for household members by virtue of their shared living space. These ties would tend to benefit less from email exchange, as much interaction could occur during everyday routine. Kin ties are often more stable, requiring less active maintenance. As email may be suited for affirming the existence of a tie, increasing its strength and arranging offline events, it would be less useful in kin ties that are mostly involuntary and reliant on routine interaction.

1.6.3 Neighbouring and the Internet

Typically, neighbouring ties tend to compose only a small proportion of personal ties. Early studies in the Toronto suburb of East York show that most social interaction occurs with people who live outside of their neighbourhoods but within their metropolitan area (Wellman, 1979; Wellman, Carrington & Hall 1988). However, a recent study in another Toronto suburb has indicated that

internet use may be associated with an increase in contact between neighbours. This suburb was dubbed “Netville” by Hampton and Wellman (2001), due to the high-speed internet service that was offered to all of the homes. However, 35 percent of the 109 homes did not receive the service, creating a convenient comparison group. This internet service differed from dial-up internet connections, as it could be on 24/7, without tying up the household telephone line and at no additional cost. It was also faster than most of the present day “broadband” connections, such as cable or DLS, as it used 10 megabit “asynchronous transfer mode”.

Of all the internet based services offered to those living in Netville, the neighbourhood listserv was used most heavily. On this listserv, neighbourhood members could broadcast email messages to their neighbours about a variety of topics, often soliciting services such as child care or lawn maintenance. These email messages increased overall levels of neighbourhood contact, increasing the number of neighbourhood ties, the amount of regular contact between neighbours and the number of household visits to a neighbour’s house. “Wired” residents knew the names of 25 neighbours, while the “non-wired” residents only knew the names of 8. This increase in online contact resulted in more informal offline, in-person contact, where wired residences talked to an average of 6 neighbours on a regular basis, while the non-wired residents talked to an average of only 3. Moreover, the wired residents made 50 percent more visits to their neighbours’ homes, in comparison to the non-wired residents (for more detail, see Hampton 2001).

While the high-speed internet connection and community oriented message board helped residents increase their contact with local neighbourhoods, it also helped them maintain ties with friends and kin who were more geographically distant. By virtue of being in a new neighbourhood, Netville residents had left friends and kin behind when they moved. Only the wired residents used the internet to maintain levels of contact with these friends and kin that were similar to levels of contact before the move. Maintaining personal ties that are both local and non-local is a social phenomenon that Hampton and Wellman refer to as “glocalization”.

A study of two Israeli suburbs by Gustavo Mesch and Yael Levanon (2003) also found similar results, although not to the same extent. Their study indicated that while membership in neighbour based mailing lists did not increase the total amount of neighbourhood interaction, it did increase the number of people known in the community. As with the studies of online tie formation, many people who first met on these mailing lists were likely to move their ties offline and meet in-person.

Findings from these two studies indicate that internet based email systems do have the potential to enhance neighbourhood ties. There may be two factors that explain why this is the case. First, of all the internet software offered to those in Netville, it was the email based system that was used most often. Similarly, it was use of an email based system in the Israeli study that led to an increased awareness of other neighbours. It is likely the familiarity of email software that helped lead to its wide-spread adoption in these communities. Second, these

emailing lists were used because they offered the potential to fulfill instrumental purposes that would exist in any neighbourhood. It was not the intrinsic appeal of an online world that lured these people to talk to their neighbours. It was the fact that these email lists fulfilled a need that was lacking in offline life. Again it is apparent that online activity is best understood when considering needs that exist offline in the realm of everyday life.

1.6.4 Forming Ties Online

Although a great deal of research shows that the internet is very often used to contact pre-existing ties, there has been a fair amount of interest in the potential of the internet to create new ties. Indeed, much of the hype surrounding the internet has been about the possibility of people becoming immersed in ties with people who they have never seen or touched in "real" life. Very often, people writing about the internet assume that users would be so taken with these ties that they would lose touch with their existing friends and kin (e.g., Turkle 1995). Although it has been argued above that internet use is not associated with declines in contact with friends or kin, I still have yet to explore the issue of the internet's role in the formation of new ties.

The current body of internet research indicates that the internet has not caused a wide-spread flourishing of new ties that are disembodied, existing only in the realm of an immersive online world. In reality, only a relatively small proportion of internet users have ever met someone new online. Findings from

two large-scale national surveys done in 1995 and 2000 indicate that only about 10 percent of internet users have ever met someone new online (Katz & Rice 2002; Katz and Aspden 1997). It is probably safe to assume that at least some of these ties were short lived, fizzling over time. Many of the ties that do continue to exist for a longer duration tend to migrate offline. Evidence for this has been found in two different studies of ties formed through online newsgroups (Parks & Floyd 1996; McKenna et al. 2002). Both studies indicated that the desire to meet internet friends in-person is quite common among those who make new friends online. This is not to deny that an online forum might be important to making new friends, especially when physical or psychological barriers make in-person meetings difficult (McKenna et al. 2002). For example, this research indicted that people who felt physically isolated or dissatisfied with their own self image were more prone to use an online forum for making friends. Nevertheless, once the friendship was established, there was a common desire to meet in-person, implying that online interaction was not immersive enough to maintain the tie for any long period of time.

1.6.5 Using Email to Connect with Social Networks

At the time my dissertation research began, I was not aware of any research that discussed the potential relationship between the number of ties that people have in their networks and their use of email. However, three papers have recently been published on this topic.

The first paper by Shanyang Zhao (2006) uses data from the 2000 American General Social Survey. Respondents reported the number of friends or relatives they contact at least once a year, as well as the number of these people that they stay in contact with by email. Findings show that people who use email have an average of 24 friendship and kin ties, while non-email users have an average of 18 friendship and kin ties. When controlling for demographic factors such as education and ethnicity, there is a positive relationship between that number of friends or relatives that people have and the adoption and use of email.

Although this study provides some evidence that the number of ties that people have in their networks is positively associated with email use, some questions remain unanswered. First, demographic variables and email use were not separated in the analysis. It is unclear to what extent demographic variables influenced the relationship between the number of ties that people have in their networks and email use. Second, the analysis did not control for contact that occurs through other media. The extent to which email is used in conjunction with other media to maintain ties is unclear. Third, as the research reviewed above indicates, internet use may be positively associated with friendship ties, but not kin ties. However, because the tie measure used in Zhao's analysis did not distinguish between friendship and kin ties, the relationship between friendship ties and email use may be obscured. Fourth, because the friends and kin measure does not break down the number of friends and kin into smaller categories, it requires that respondents be able to accurately total a large number of ties. These estimates may not be as accurate as they could be if ties were broken down into

smaller categories. Fifth, by only focusing on friendship and kin ties, the use of email in reducing the burden of contact with extended kinds of ties is unknown. Sixth, the extroversion of respondents was not controlled for in this analysis. Because it has been found that extroversion is association with internet use (Kraut et al. 2002), and extroversion may also be associated with the number of ties that people have in their networks, it is unclear if the relationship between number of ties and email would remain when controlling for extroversion.

The second paper by Valentian Hlebec et al. (2006) uses data collected from a representative sample of the general Slovenian population, and a convenience sample of internet users in Slovenia. In the representative survey, a name generator approach to measure the number of relationship that provide different kinds of support, including those ties that provide small favours and more time intensive kinds of support. Results from the representative survey show that internet users have larger numbers of supportive ties, especially among those who were educated and employed. When using multivariate analysis to control for demographic factors, there was still a significant association between number of supportive ties and internet adoption. However, this association decreased drastically when controlling for these demographic factors, suggesting that education and employment are major contributors both to number of support ties and email. Using the convenient sample survey, the authors followed up on these results by asking respondents to report the extent to which they use email as well as other forms of communication. The results of this convenience sample indicated that email was often supplemental to other forms of communication.

This Slovenian study gives some important insights about the relationship between the number of ties that people have in their networks and email. This study shows that demographic variables have a substantial impact on the relationship between the numbers of ties that people have in their networks and email adoption. Moreover, although it is difficult to generalize a non-representative convenience sample to America, it suggests that the relationship between the number of ties that people have in their networks and email use may be contingent on contact that occurs through other media. In other words, although it is true that the number of ties that people have in their networks may be an important determinant of email use, email will only be used in conjunction with other media.

These first two studies show that those with many ties may be more likely to use email than those with fewer ties. However, it is unclear if these findings will remain robust when tested using a sample that includes more comprehensive measures of tie type and contact that occurs through other media use.

The third study measures the number of ties that people have in their networks more comprehensively than the pervious two studies, distinguishing between very close ties that are immediate kin, extended kin, neighbours, work colleagues, and other friend ties. This study was conducted by Statistics Canada as part of the 2005 Canadian General Social Survey (Veenhof 2005), and it shows that heavy internet users have as many ties as non-users, after adjustment for demographic factors.

This study is consistent with the Slovenian study because it demonstrates the importance of controlling for demographic factors when examining the relationship between number of ties and internet use. However, like the Slovenian and American studies, it only measures internet use in general, and does not examine email use in particular. This limits the utility of this study for examining the relationship between the number of ties that people have in their networks and the number of ties that they email. Moreover, the findings of this study did not indicate how email might be used in conjunction with other media to contact ties.

1.6.6 Summary of Literature Review

Up to this point, I have drawn on a number of empirical studies to argue that the internet is not detracting from ties or radically altering the way people live their lives. The findings from these studies can be summarized as follows:

1) Internet use is not associated with decreases in time spent on social activities. Internet use is associated with relatively high levels of offline contact with friends, but not kin.

2) Internet use does not decrease sociability with neighbourhood ties, and it has the potential to enhance it.

3) Only a small percentage of internet users meet new people online. Ties formed online rarely stay there.

4) The number of ties that people have in their networks may determine if people become email users, but demographic factors contribute significantly to this relationship. The relationship between the number of ties that people have in their networks and email use may also exist, but it may be influenced by the use of other media.

What do these findings imply for the potential use of email in modern social life? In the section that follows, I will discuss two possible ways that email might be used to connect with social ties.

1.6.7 Insights Gained From the Literature Review

Although the great majority of the research reviewed above does not measure network size or the number of ties contacted by email directly, it does provide some valuable insights about the relationship between the numbers of ties that people have in their networks and their use of email. Drawing on this literature, I will discuss several insights that it provides regarding the relationship between email use and network size in contemporary America.

Ties are causally prior to email use. The research reviewed above indicates that email does not cause Americans to increase or decrease the number of ties in their networks. Because Americans rarely use the internet to form new relationships, there is little evidence that people use email to form completely new ties. This shows that Americans typically form their relationships offline, and

only then do they contact them by email. Although email may be used as ties develop, contacting those ties by email is not what caused them to exist in the first place. In this way, email typically does not cause relationships to increase in number. Moreover, the research reviewed above shows that people do not spend less time or interact less frequently with their ties after they begin using email. Because email does not cause people to decrease the number of their ties, this shows that email does not lead to a decline in the number of relationships.

While email does not cause ties to increase or decrease in number, there is reason to believe that number of ties in a network determines the extent to which people use email. As discussed above, the asynchronous nature of email makes it ideal for decreasing the burden of making contact. Those with relatively large numbers of ties may find the asynchronous nature of email especially useful, because they might have difficulty connecting synchronously with their many ties. This gives good reason to believe that ties are causally prior to email use.

Certain kinds of ties may be more open to email contact than extended kinds of ties. For example, findings reviewed above show that email may enhance contact with friends, but not kin. Moreover, evidence shows mixed results regarding the extent to which email is used to contact neighbours, while it shows that more distant friendship ties are often contacted by email. When taken together, these results show that the sheer number of ties that people have may not be the only determinate of email use. Instead, particular kinds of ties may not be open to email contact, even when that email contact would lower the cost of interaction.

Email is just one part of a complex communication system. As the research reviewed above shows, email is often used to contact the same people that are contacted in-person or by telephone. In this way, email is just one part of a larger communication system. This means that understanding how people use email to contact their ties necessitates understanding the extent to which they use other modes of contact.

I will argue that the social affordance approach is consistent with these insights. This approach treats relationships as being causally prior to email use, emphasizes the importance of tie type, and allows other media to be incorporated into an explanation of email use. In the section that follows, I will explain this approach in detail.

1.7 The Social Affordance Approach

The literature reviewed above indicates the internet alone has not radically changed social ties. But why would people use email in addition to the other ways that they keep in touch? To answer this question, I draw on the concept of 'affordance', originally developed by James Gibson (1977). Gibson argued that people have the ability to recognize the function of objects based on their physical characteristics. Bradner, Kellogg, and Erickson (1999) modify this concept to make it more socially oriented, defining "social affordance" as "the tie between the properties of an object and the social characteristics of a group that enable particular kinds of interaction among members of that group" (p.153). According

to the logic of social affordance, a communication technology will be used if it affords people the opportunity to socialize in ways that fit their existing social tendencies. This way of explaining the use of communication technology makes human needs and norms of socialization casually prior to technology, viewing it as an "extension of man" (McLuhan 1964). Although social needs are the fundamental reason technology will be adopted and integrated into everyday life, technology will only be used if it contains technological characteristics that better enable people to fulfill their needs. The characteristics of a technology are a necessary but not sufficient condition of its use.

The social affordance approach is consistent with the "use heuristic" advocated by Claude Fischer (1992), insofar as both approaches view the use of communication technology as being determined by the purposeful social ends of its users. According to Fischer, this way of explaining the adoption and use of technology "emphasizes the users rather than the imperative properties of the technology, stresses social ends and social contexts, and denies the determinism of the billiard-ball metaphor" (p. 19). Fischer takes his approach a step further, arguing that a complete understanding of the social implications of a technology also necessitates an understanding of how the purposeful adoption of new technologies leads to unintended consequences for the less immediate aspects of social life and culture. Although it is important to understand these less immediate implications, this dissertation will focus on the first step of simply understanding why individuals with many ties might choose to use email to contact their ties.

It should be noted that the social uses of email, of interest to this dissertation, apply to typical email users. These users are distinct from the small minority of people who are willing to try new technologies because they find them intrinsically interesting, or because they want to receive respect from their peers (Rogers 1995). These early adopters will tend to drive the initial use of new technologies when there is not the critical mass of users needed to make these technologies available to the general population. For example, a great number of early internet users immersed themselves in virtual communities, where participants rarely had offline contact (see Castells 2001 for a detailed account). Despite the initial popularity of these communities among early adopters, email has remained the most popular application on the internet. This is because virtual communities did not fit within the lifestyles of typical internet users. By contrast, email provides technical properties that facilitate common forms of interaction among typical internet users. For technologies to become as widely adopted as the automobile, telephone, or email, they must appeal to the sensibilities of a much larger population.

The social affordance approach is consistent with the insights gained from the literature reviewed above. This approach makes ties causally prior to email use. Moreover, by giving weight to the social characteristics of ties, it allows for the fact that certain kinds of ties may be more open to the use of email than other kinds of ties. It also does not rule out the possibility that email may be used in conjunction with other forms of communication.

Having discussed the social affordance approach, I will now specify a set of social affordances that are unique to email. To do this, I will compare the quality of each affordance to similar affordances in other media. Although not every social affordance mentioned is unique to email, it is the combination of these affordances that make email different from other media. I will then explain how these affordances may make email useful both as a supplement to contact that occurs by other media, and as the primary mode of contact.

1.7.1 The Social Affordances of Email

This section will focus a set of social affordances that are unique to email. Many of these affordances have already been discussed by Barry Wellman (1999). To highlight how these affordances are unique to email, I compare them to similar affordances in other media. I summarize these comparisons in Table 1.1, which is based on my estimates. The important affordances of email are as follows:

a) *Asynchronous*. Unlike contact made in-person or by telephone, email interaction need not occur at the same time (synchronously) between two or more individuals. However, it should be noted that email is not the only form of contact to be used asynchronously. Contact that occurs through snail mail and courier mail also occurs asynchronously.

b) *Travel time before interaction begins*. Unlike snail mail or even courier mail, people receive email messages as soon as they are sent.

By contrast, even courier mail requires at least a day. The travel time spent contacting people in-person can also be high, depending on the location of the interaction partner.

c) *Autonomy over time*. Email affords high levels of control over the amount of time that is spent interacting. In comparison to in-person, telephone, and instant messaging (IM) contact, email allows for more discretion over the amount of time spent interacting. While social norms guiding in-person interaction may cause individuals to spend more time interacting than they would prefer, email loosens these demands. For example, unlike interaction that occurs in-person or by the telephone, email does not require that much time be devoted to introductory small talk. Instead, the bulk of a message can be devoted to the actual purpose of the interaction. Moreover, initiating the contact does not require travel time, unless an internet connection is not readily available.

d) *Record of information*. Unlike contact in-person or by telephone that require the receiver to manually record information, information communicated through email is recorded directly by the sender. This eliminates the possibility that the receiver will incorrectly record the information that is given to them. Moreover, these records are conveniently stored in email inboxes, making them accessible for future reference. The ability to search through email text also makes it

easier to find particular kinds of information than hard copy text sent by snail mail or courier.

e) *Deliberation*. The combination of asynchronous and recordable communication affords email users the ability to give deliberate thought to exactly what they want to say and how they want to say it. While in-person and telephone contact do not often allow people much time to think about a response to a query or interject a new idea, email loosens these constraints considerably. Moreover, the written record of the email gives people the ability to substantially edit their communication, unbeknownst to the respondent.

f) *Minimal social cues*. Kiesler and Sproull (1991) have argued that electronic text is a "thin medium," because it lacks social cues, such as facial expression or vocal intonation. In this way, it is similar to messages sent by snail mail, courier and even IM.

g) *Selection of interaction partners*. Writing email allows for discretion over who is to be included in the interaction. This is different than in-person interaction that occurs within a shared common space or an office, where it is often difficult to make interactions private. Even if the interaction occurs on the telephone, people in the house or office are often aware that the interaction is occurring. By contrast, people log on to email as individuals. Although they can choose to include more than one conversation partner in a particular email, this choice is

voluntary. Moreover, even when email conversations include multiple partners, it is possible for private back channelling sessions to occur between select individuals.

h) *Low cost of distant communication*. It costs the same amount of money to email someone in the same room as it does to email someone on the other side of the world. By contrast, in-person meetings require increasing amounts of money and time, as they grow distant. Although telephone communication is increasingly dropping in price and new internet based telepathy programs are becoming more commonly used, at the time of this study it is still markedly more expensive to make a long distance call than to send an email.

In sum, email affords people the opportunity to communicate asynchronously, requires no travel time, allows people to easily choose their interaction partners, automatically records information, allows people to deliberate during interaction, yields few social cues, and is relatively inexpensive. When compared to other common ways of communicating, this combination of affordances makes email unique.

Table 1.1 The Social Affordances of Various Media

	Email	In-Person	Landline Phone	Mobile Phone	IM	Snail Mail	Courier
Timing of Interaction	Asynchronous	Synchronous	Synchronous; but leaving messages is asynchronous	Synchronous; but leaving messages is asynchronous	Synchronous	Asynchronous	Asynchronous
Travel Time Before Contact Begins	Minimal	Variable	Minimal	Minimal	Minimal	High; at least three days	Variable; between one and three days
Amount of Control over time spent interacting	High	Variable	Variable	Variable	Variable	High	High
Automatic record of information	Yes	No	No; only with answering machine messages	No; only with answering machine messages	Sometimes	Yes	Yes; including a record that the message was received
Deliberation	High	Low	Low	Low	Low	High	High
Interaction cues and back channeling	Few	Many	Some	Some	Few	Few	Few
Choice of interaction partners	High	Variable	High	High	High	High	High
Monetary cost of distant communication	Low	High	Medium	Medium	Low	Low	High

17.2 How Email Affords Supplementary and Primary Contact

The social affordance approach does not exclude the possibility that email may be used in conjunction with other forms of contact. In fact, using the social affordance approach it is possible to see how the affordances of email may facilitate contact that occurs through other media. I will now discuss more

specifically how the affordances of email make it useful as a supplement to contact that occurs in-person or by telephone. I choose to focus on in-person and telephone contact because they are common ways that Americans communicate (Chapter 2 will show the extent to which they are used to contact ties in greater detail). I do not include IM in this discussion because only a small minority of Americans uses IM on a regular basis. Preliminary analysis of the Social Ties data showed that Americans use IM so seldom to contact their ties that a variable for IM use was not included in the analysis that follows.

Although email may be used in conjunction with other media, it may also be used as the primary mode of contact. After discussing the affordances that make email a potentially useful supplement, I will discuss the affordances that make it useful as the primary mode of contact. It should be noted that these two kinds of uses are not necessarily at odds with each other - people may use email as a supplement for contact that occurs with some of their ties, and they may also rely on email primarily when contacting other ties in their networks.

1.7.2.1 How Email Affords Supplementary Contact

As argued above, those with many ties have more contact demand, both per tie and in the aggregate, than those with fewer ties. This is because having a larger number of ties means more potential scheduling conflicts, and more time spent travelling. The more ties people have, the more likely it is that scheduling conflicts will make it difficult to get a hold of people by telephone.

The social affordances of email make it well suited for staying in contact with ties that are also contacted in-person and by telephone. In this way, email may help supplement contact that occurs through other media. These affordances that allow people to supplement contact will now be discussed in turn.

Co-ordinating In-person and Telephone Interaction: Email has two technical characteristics that make it a more flexible means of co-ordinating interactions that occurs through other media. First, the *asynchronous* nature of email means that it is possible to arrange appointments at mutually convenient times, without interrupting daily activities. This makes it more attractive than the telephone or in-person contact, which may interrupt daily activities. Second, while notes jotted down during a telephone conversation or in-person meeting might be easily misplaced, the *record of information* left by email allows people to easily reference important information about the time and place of planned meetings.

It should be noted that using email to arrange contact that occurs through other media does not mean that email *causes* contact to occur through other media. Rather, the desire to connect in other media is primarily what motivates the use of email. It is the efficiency of email coupled with the desire to connect through other media that motivates people to use email.

Ultra-Connection: By adding email to communication that occurs through other media, there is the potential to supplement ties, providing a sense of ultra connection. When studying the use of mobile phones to send text messages in

Japan, Mizuki Ito (2001) found that adolescents were constantly sending short messages to friends that they would see everyday. She argued that this extra phone contact increased feeling of connection, leading to "ultra-connectedness." Although email sent on clunky North American computers may not be as convenient as text messages sent by Japanese mobile phones, it is possible that people who spend most of their days in front of computers send email to others that they often contact offline, thereby maintaining a sense of ultra-connectedness.

Although contact with formal ties or ties located in close geographic proximity may require that interaction occur through a particular medium (e.g. weekly in-person meetings that occur in voluntary organizations), contemporary ties provide more autonomy in selecting the medium through which contact occurs. This autonomy allows people to more freely choose the medium of their interaction, increasing the possibility that they may connect through multiple media. It is through this media multiplexity that ultra-connectedness may be achieved (Haythornthwaite 2000).

The *asynchronous* property of email affords supplementary contact, because it enables people to send and receive messages at mutually convenient times. This makes it possible for people to maintain frequent contact, even if they are on different schedules. For example, email allows friends and kin that often contact each other in-person to maintain constant contact even while they are working on other tasks or while they are at their workplaces.

1.7.2.2 How Email Affords Primary Contact

Email may also be used as the primary mode of contact. As argued above, if email is used to transfer a message directly, then there is no need to arrange or travel to future in-person meetings. This is not to imply that ties will *only* be contacted by email – it only implies that email use does not depend on contact to occur in-person or by phone.

The ability to *asynchronously* send messages may be particularly useful for maintaining contact with ties that might be difficult to connect with in-person or by phone, perhaps because they are on very different schedules or live far away. Email's *low cost of distant communication* is also useful when maintaining contact with distant ties.

Because email enables a high amount of *autonomy over time,* it is especially useful for highly social individuals who do not have the time to actively contact each of their ties in-person or by phone.

When there is a genuine interest in initiating contact with a particular person, the autonomy that email allows in *selection of interaction partners* proves useful. This affordance allows people to maintain active ties with specific individuals that they might not otherwise contact as often in-person or by phone.

Email contains a number of social affordances that allows for the efficient sending of information directly, rather than by way of in-person or telephone contact. Because email produces a *record of information*, it allows people to

easily archive and retrieve pertinent information. This also ensures that the information transferred is recorded exactly as the sender intends, not being unintentionally changed as sometimes happens when the receiver needs to copy the information verbatim. The *asynchronous* contact offered by email enables people to send information at convenient times, without concern that they will interrupt the receiver. This may be especially useful to co-workers that are working on different schedules and carrying out different tasks. These affordances are not found in other communication media, making email an appealing, rational method for transferring information.

Maintaining active contact with ties primarily by email may also be motivated by the desire for impression management. The *lack of social cues* in email might make it particularly attractive for people who wish to avoid the personality adjustments that are sometimes needed when interacting with people from different social groups. The *deliberation* permitted by email also gives people a high level of impression management, allowing them to carefully think about their presentation of self.

Having discussed a set of affordances that make email different from other kinds of media, I will now discuss the characteristics unique to contemporary social ties.

1.8 The Characteristics of Contemporary Social Ties

According to the social affordance approach, email will only be used if its social affordances are useful for the kinds of social interaction that occurs with different kinds of ties. For example, although email affords low cost distant communication, this affordance will only be of use if ties are distant. In this way, the tie characteristics are more fundamental determinants of email use than just the number of ties that people have in their networks. If the characteristics of ties are not congruent with the affordances offered by email, then email will not be used.

Given the fundamental importance tie characteristics to understanding email use, I will now review literature with a focus on two characteristics of ties: tie type and tie distance.

Drawing on literature about the nature of contemporary community, I will review how tie type and tie distance have changed during the shift from groups to networks. A major advantage of using this literature to characterize contemporary ties is that it directly discusses the characteristics most relevant to understanding why people might use email. This is because it characterizes contemporary social ties in regards to the way that they are contacted. It shows that contemporary ties are generally characterized as permitting high amounts of choice when determining who is contacted, and how that contact occurs.

After discussing this literature regarding tie type and tie distance, I will explain its relevance for email use. I will argue that those ties that permit the most

choice when determining who is contacted and how that contact occurs will be most open to using email. I will then discuss in more detail the social affordances of email that make it particularly useful for contacting different kinds of ties. I will conclude each section by stating the hypotheses that will be tested throughout the remainder of this dissertation.

1.8.1 Tie Type and Choice in Contemporary Social Networks

By showing that modern community existed as geographically and socially dispersed networks of individuals, those using the network perspective demonstrated that ties need not exist as spatially and socially bounded groups. The move away from such communities has meant that ties more often depend on individually initiated communication, rather than affiliation through kinship. The literature reviewed below indicates that this social change has meant contemporary ties permit for a greater range of choice in determining with whom, and how interact occurs. There are a number of factors are responsible for this increase in choice.

The kin was typically the primary mode of production in pre-industrial societies, making it the source of most social interaction (Ogburn and Nimkoff 1955). The industrial revolution drew people way from this mode of production, leading to the separation of work and kin life (Thornton and Fricke 1987). This increased peoples' opportunity to form ties with non-kin members. This increased

the opportunity to form ties without necessarily seeking the consent of extended kin members, or relying on them to provide introductions.

Georg Simmel (1922) argued that contemporary ties are unique because they are often with people from outside of the kin groups that they are born into. He argues that allows people greater choice when formatting of ties, insofar as people are not restricted to forming ties with given groups of kin. According to Simmel, these voluntarily formed relationships are often based on common inclination, talents, and activities. Moreover, having a greater variety of interaction partners to choose from means that ties were both easily formed and also terminated.

Anthony Giddens (1990, 1991, 1992) points to another factor that helps explain the rise of voluntarily formed friendships: the ability to co-ordinate complex sets of interaction through a more abstract understanding of time and space. Instead of routinely interacting at particular times and places, Giddens argues that people have become better at co-ordinating their interactions. This allows people more greater choice when determining when, where, and if, they interact with their friends. He argued that this improvement in social co-ordination came about through the more precise and abstract measurement of time and space, enabled by the adoption of new technologies such as the clock and standardized geographic maps. These tools allowed people to organize their daily lives such that they could juggle more complex social interactions. He further argued that this led to a more reflexive engagement in relationships, allowing them to be more intimate, but also increasing the possibility of their termination.

Along similar lines, Ulrich Beck and Elizabeth Beck-Gernsheim (1995, 2002) argue that modernization has meant that ties are more often formed through autonomous and conscious choice, rather than ascribed by membership in local community or kin obligation.

Scott Feld's (1981) theory of network focus helps explain how the increased choice granted by these social and technological changes manifested in the sparsely knit networks observed by Wellman and Fischer. Feld argues that shared activity, or 'focus', is an important dimension of social networks, because it heavily influences their composition. Using data collected by Claude Fischer (1977) he found that when strong ties tend to come from kin or workplace foci, social networks tend to be densely knit. However, when strong ties are with informal friends, they tend to be more sparsely knit. This is because the foci of work or home life tend to bind people together as part of densely knit groups, restricting their choice of interaction partners. By contrast, informal friendships tend to be maintained through activities that are voluntarily chosen, enabling individuals to weave more loosely knit networks of interaction partners that fit their diverse sets of interests.

In sum, social and technological changes occurring during the previous two centuries have enabled people to maintain an increasing number of loosely knit ties. For this reason, contemporary social ties are characterized as allowing a high level of choice when deciding: a) with *whom* interaction occurs, and, b) *how* – time, place, and medium – interaction occurs.

1.8.2 The Implications of Tie Type for Email Use

Literature about the nature of contemporary ties characterizes ties as permitting high amounts of choice when determining which ties are contacted, and how that contact occurs. This section will now apply those characteristics to different types of ties, developing testable hypotheses.

I focus on three main types of ties: friendship, work, and kin ties. I will argue that all three types of ties make them at least somewhat open to email contact. However, I expect that friendship and work ties are more open to email contact than kin ties. I will discuss each type of tie in turn.

1.8.2.1 Friendship ties

The literature reviewed above shows that contemporary relationships are highly flexible, because they provide high amounts of choice when determining *who* is contacted and *how* that contact occurs. Friendship ties exhibit high amounts of choice in both of these regards. I will argue that this makes them open to the possibility of contact that occurs by email.

Friendship ties demonstrate high amounts of choice when determining with whom contact occurs. Although they may sometimes be formed through membership in formal foci, such as the workplace or formal education, the existence of friendship ties does not depend on these formal foci. Even if membership in formal foci comes to an end, friendship ties will remain. Moreover, it is often possible that friendship ties will not be formed through foci

at all, but rather through introductions made by common friendship ties. In this way, friendship ties are not as limited in number as are ties that depend on formal foci. Having the choice to decide who is contacted may be well suited to the affordances of email. Email allows for a high amount of choice over the *selection of interaction partners,* making it well suited for actively contacting specific friendship ties.

Friendship ties also permit high amounts of choice when determining how (when, where and through what medium) contact occurs. Although interaction that occurs with formal ties typically occurs at pre-determined times and places, the time, place, and medium of interaction with friendship ties is often freely determined. Because the medium of contact is not determined by particular foci, there is greater potential of using email to contact friendship ties. Because the time and place is often undetermined, the *asynchronous* nature of email makes it well suited for arranging mutually convenient times. This makes email well suited for maintaining synchronous contact with friendship ties. Moreover, permitting more choice in determining the time and place of interaction also opens up the possibility of interacting directly through email, negating the need for synchronous contact altogether. In this way, email may be used as the primary mode of contact.

1.8.2.2 Work Ties

At work, the declining significance of hierarchical structures has meant that people now have more choice when deciding who to interact with, and how that interaction takes place. Rather than relying on the authority of a central body, workers are often required to form collaborative networks to carry out their objectives (Castells 1996). This means that people often have a high amount of choice when selecting who is contacted for work related purposes. For this reason, the *selection of interaction partners* may be useful for communicating with specific work ties on particular jobs. The *deliberation* and *lack of interaction cues* also makes email useful for impression management that workers often maintain with their customers (Quan-Haas 2004).

Moreover, when working with large numbers of people, there is often a need to actively decide how contact occurs. Many jobs require that people trade information that is relevant to accomplishing specific tasks with fairly short notice (Castells 1996). This 'just in time' method allows for the complex co-ordination of information, making it possible for producers to deliver highly specialized goods and services. Because workers are often on different schedules, it may be difficult to connect synchronously. For this reason, the *asynchronous* nature of email makes it well suited for contacting fellow workers. It can be used to arrange mutually convenient meeting times, thereby supplementing contact. However, it may also be used to share communication directly. Given that many jobs in America require the sharing of information, the *automatic record of information* afforded by email may be particularly advantageous. This affordance makes email

well suited for acting as the primary mode of contact when information is being transferred directly between workers.

1.8.2.3 Kin Ties

For the purposes of this dissertation, kin ties refer to those ties living outside of the home. Although kin ties living inside of the home may be emailed, the data used in this dissertation does not have information about these ties. Because these ties live outside of the home, there is often some choice available in how these ties are contacted. People often need to actively choose when and where to meet these kin ties. Moreover, kin ties may often be on different working schedules, making it difficult for them to connect using synchronous modes of communication. The *asynchronous* nature of email may be particularly well suited for arranging in-person or telephone contacts, thereby acting as a supplement. The *record of information* left by email may also make it well suited for clearing communicating and storing information about when and where future contact will occur.

The high prevalence of divorce indicates that people have at least some choice in their kin members. Nevertheless, kin ties are constrained for fairly apparent reasons. People have no choice over the families they are born into, and they often remain in contact with these ties over the course of their lives. While the amount of contact that occurs between parents and children may significantly decrease as children mature, kin obligations often cause kin members to maintain at least some regular contact.

Although email may be useful for supplementing contact with kin members, research reviewed above shows mixed results with regards to the extent to which people use email to contact their kin members. Nevertheless, these studies typically do not examine how email may be used in conjunction with other media, perhaps underestimating its utility in this regard. Given email's potential utility for supplementing contact, I expect that it may be used to supplement contact that occurs in-person and by telephone. However, because there is little reason or evidence to support the assertion that email may be used to contact kin members directly, I expect that email's role in contacting kin members will be largely supplemental.

1.8.2.4 Tie Type and Email Use - Hypotheses

The characteristics of friendship, work, and kin ties all make them at least somewhat open to the possibility of email contact. Moreover, there are many reasons to believe that the affordances offered by email would help people contact their ties, especially when they have many ties to contact. For this reason, I expect that:

H 1 ***The greater the number of friendship, work, and kin ties, the greater the number of ties that are emailed.***

However, because friendship and work ties provide greater choice in determining who is contacted and how that contact occurs than kin ties, I further expect that:

H 2 Friendship and work ties are more strongly associated with the number of ties that are emailed than are kin ties.

I have argued that people will use email to supplement their in-person and telephone contact with kin ties, however they will not use email as the primary mode of contact. For this reason, people will only email their kin ties to the extent that they contact these same ties in-person or by telephone. I expect that the more kin ties people have, the more of these ties they will contact in-person and by telephone. I also expect that the more kin ties they contact in-person and telephone, the greater their use of email. For this reason I expect that controlling for the effects of in-person and telephone contact on email use will significantly reduce the positive association between the number of kin ties and email use.

In contrast to kin ties, I have argued that friendship and kin ties may use email both as their primary mode of contact, as well as a supplement to contact that occurs in-person and by telephone. Because people may use email as a supplement, I expect that controlling for in-person and telephone contact will reduce the positive associations between friendship ties and email use, as well as between work ties and email use. However, because these ties may use email as their primary mode of contact, I do not expect that controlling for in-person and telephone contact will reduce these positive associations as much for friendship and work ties as it does for kin ties. Stating this in the form of a hypothesis, I expect that:

H 3 ***When controlling for the effects of in-person and telephone contact on the number of ties that are emailed, the positive relationships between the number of friendship, work, and kin ties that people have in their networks and the number of ties that they email will disappear for kin ties but not for friendship and work ties.***

Having discussed how tie type affects the use of email, I will now discuss how tie distance affects the use of email.

1.8.3 Tie Distance and Choice in Contemporary Social Networks

As discussed above, findings by Wellman and Fischer show that modern community typically exists outside of neighbourhood boundaries. More distant interaction has been made possible through the development of modern communication and transportation systems. The locomotive played a key role in enhancing contact with distant ties during the 19th, while the telegraph, phone, and automobile continued to enhance and intensify this tendency during the 20th century. Common to all of these technologies is that they allowed people to maintain geographically dispersed ties with greater ease and frequency.

Paradoxically, while these technologies help liberate social networks from the constraints of geography, individuals themselves are now more rooted in their homes than ever before. Mobile bands of hunter-gatherers have roamed the earth for much of human history, following food sources that led them to populate most

parts of the globe. It was only with the rise of agrarian society thousand years ago that humanity began setting down roots, staying close to their farmland and stored food supplies. Nevertheless, dependence on particular pieces of farmland did not completely limit geographic mobility. Food surplus led to the emergence of trade networks, allowing people to travel great distances. This surplus also allowed for a division of labour, which enabled mobile armies of foot soldiers to take over neighbouring societies. Through conquest, empires emerged, sometimes spanning entire continents.

A recent study by Claude Fischer (2002) shows that residential mobility declined between the 19th and 20th century, and has continued to decline between 1950 and 1999. Although people are more rooted in local homes, modern transportation and communication technology has increased their ability to maintain geographically dispersed social networks. The speed and convenience of trains, automobiles, and airplanes has enabled people to maintain regular contact with distant ties. It may have also decreased the likelihood that ties will be lost or weakened due to a lack of contact. Paradoxically, networks have expanded beyond neighbourhood boundaries, at the same time that people are increasingly more likely to stay rooted in their neighbourhoods.

The widespread proliferation of the telephone increased the intensity of contact with both local and distant ties. Claude Fischer's (1992) study of the telephone in the first half of the 20th century indicated that people would typically telephone the same people that they saw in-person. By actively incorporating this technology into their everyday lives, people increased the total volume of their

social activity. Although this communication often existed within city limits, it also increased the intensity of interaction with distant ties that could not be seen as frequently. This likely had the long-term effect of diminishing the loss of ties over time.

While these geographically dispersed ties sometimes exist at great distances, they often exist between neighbourhoods and city boundaries. Telecommunications has been vital to urban environments, where specialized communities and knowledge intensive businesses set the demand for constant communication (Moyer 1977; Graham & Marvin 1996). The telephone has also been an important part of social life within cities and also towns, because it has helped people living in suburban neighbourhoods stay connected. Despite the lack of contact within neighbourhoods, people still use the telephone to socialize a great deal with those in more distant neighbourhoods (Keller 1977). In addition to the telephone, public transportation and roads within cities allows individuals to easily maintain ties in different parts of the cities and towns (Fischer 1982).

In addition to the increased amount of network dispersion within cities and towns, communication and transportation technologies have also helped people maintain active contact with ties at even greater distances. Although the mobility of hunter gatherers, traders and soldiers, meant that ties could sometimes be dispersed over great distances without the use of modern technology, it was impossible to have any regular amount of contact with ties that exist more than a few miles away. Donald G. Janelle (1969) and others have argued that the rise of these technologies has allowed for a convergence between space and time, in that

they reduce the amount of time taken to travel between two points. For example, in 1800 it took approximately 3 days to travel between Boston and New York City by stagecoach. With the installation of rail transit in 1860, that time was decreased to 10 hours, and it was further decreased to about 5 hours in 1950 when the automobile became widely available (Janelle 2002). The continual development of communication and transportation infrastructures has lowered prices, making it possible for many people to maintain distant networks (Pool 1990). Overall, this technology has enabled people to maintain frequent contact with distant ties.

Despite the greater ability to maintain regular contact with extremely distant ties, most evidence suggests that such ties are rare. A study of 29 adults living in a Toronto suburb during the late 70's showed that the telephone was used to maintain regular contact with only immediate kin living further than 50 kilometres (Wellman & Tindall 1992). The findings also showed that the telephone was primarily used in conjunction with in-person contact that most often occurred within city limits, but outside the neighbourhood. A more sophisticated analysis of the same data (Mok & Wellman 2007) shows marked declines in in-person contact at about 5 miles, and then even further declines at about 50 kilometres and 100 kilometres. By contrast, telephone contact dropped at about 100 kilometres when calls became costly. It should be noted that the data used by Mok and Wellman was collected in the 1980's, when telephone rates were higher than they are today. Overall, this evidence indicates that although

modern technology has allowed people to maintain ties at great distances, most of these ties are not truly global.

In sum, the increasing geographic dispersion of ties has meant that people have increasing range of choice available in selecting: a) *who* they interact with, and, b) *how* they interact. No longer being constrained to interact with the relatively small number of people living in a neighbourhood, the availability of space transcending technologies has led to greater choice when selecting interaction partners. These technologies have also increased the number of places where interaction can occur, thereby increasing the choices available in how people interact. The telephone also increased choice available when determining how to interact, because it provided a new medium through which communication can take place.

1.8.4 The Implications of Tie Type for Email Use

1.8.4.1 Neighbour Ties

When compared to ties that exist within neighbourhood boundaries, more distant ties yield greater choice when determining with whom and how interaction occurs. Because people rarely choose their neighbours, their ability to choose with whom interaction occurs is limited to a relatively small pool of people. However, ties with neighbours may yield some choice when determining how interaction occurs. For example, the research reviewed above by Keith Hampton (2001)

shows that neighbours can use email based listservs to arrange in-person contact. Although the people studied by Hampton may have been unusual, it is possible that this phenomenon is occurring in other neighbourhoods. Moreover, even when neighbourhood listervs are not used, those who contact their neighbours often in-person may find the *asynchronous* and *record of information* affordances of email useful. This is because neighbours may have conflicting schedules, making it necessary to arrange in-person visits ahead of time.

Although email may be useful for supplementing contact with neighbours, it is unlikely to be the primary source of contact. Because neighbours are in close geographic proximity, in-person contact may be expected. Moreover, because people live in such close physical proximity to their neighbour ties, they are likely to meet these ties unintentionally in-person while going about their daily routines.

1.8.4.2 Mid-Range Ties

Mid-range ties are those ties that exist outside of the neighbourhood, but within one hour's travel. These ties allow for the most choice in determining who is contacted, and how that contact occurs.

Having high amounts of choice when determining who is contacted makes email a useful way of connecting. In contrast to neighbour ties, mid-range ties may not necessarily meet because of physical proximity. Moreover, because mid-range ties exist outside of the neighbourhood, they provide a much larger pool of potential interaction partners. The *selection of interaction partners that* email affords helps people choose exactly which individuals they prefer to interact with.

Because mid-range ties are close enough that it is possible to make in-person and telephone contact, email may also be a useful supplement. Because mid-range ties may be on different schedules, the *asynchronous* nature of email and the *record of information* it provides helps people co-ordinate future contact that occurs in-person or by phone.

Although email may be used as a means of supplementing contact with mid-range ties, it may also be the primary mode of contact. Because mid-range ties do not share the same physical proximity as do neighbourhood ties, and because they may be on very different schedules, the *asynchronous* nature of email makes it well suited to act as the primary mode of contact. Moreover, even though it may be possible to see mid-range ties in-person, the *control over time spent interacting* makes it well suited for those who have many mid-range ties to maintain. The *deliberation* afforded by email may also make it useful for acting as the primary mode of contact when people wish to maintain high levels of impression management.

1.8.4.3 Distant Ties

I define distant ties as those ties that live more than one hour's travel away. I will argue that email is used as the primary mode of contact when communicating with these ties. However email may also be used to supplement contact that occurs with these ties by telephone.

Because it may be expensive to contact distant ties by telephone or travel to see them in-person, the *low cost of distant communication* afforded by email

makes email well suited for maintaining contact with distant ties. Because it typically costs less to send an email than to make a long distance telephone call or to travel a great distance, email may be used as the primary mode of communication. Moreover, when distant ties live in different time zones or on different schedules, the *asynchronous* nature of email also makes it well suited for acting as the primary mode of communication.

Nevertheless, email may supplement contact with distant ties to some extent. Its *asynchronous* nature and *record of information* make it useful for arranging mutually convenient times for telephone contact. When people are working on different schedules, email may also be used to maintain contact at times when telephone conversation may not be convenient.

1.8.4.4 Tie Distance and Email Use - Hypotheses

The characteristics of neighbour, mid-range, and distant ties all make them at least somewhat open to the possibility of email contact. Moreover, as discussed above, there are reasons to believe that email offers affordances that would be useful for people who have many of these ties. For this reason, I expect that:

H 4 The greater the number of neighbour, mid-range, and distant ties, the greater the number of ties that are emailed.

However, because mid-range and distant ties provide greater choice in determining who is contacted and how that contact occurs than with neighbour ties, I further expect that:

H 5 ***Mid-range and distant ties are more strongly associated with the number of ties that are emailed than are neighbour ties.***

Just as I expected that people will use email only to supplement contact with kin ties, I expect that people will only use email to supplement contact with their neighbour ties. As with kin ties, neighbour ties typically require more social obligation for in-person contact. With kin this obligation typically comes from social norms surrounding interaction with kin members, while with neighbours it comes from the sharing of physical space. People are more prone to see their neighbours in-person while carrying out their daily routines.

In comparison to neighbour ties, mid-range and distant ties typically allow greater choice when determining who is contacted and how that contact occurs. For this reason, these ties are more open to using email as the primary mode of contact than are neighbour ties. Stated as a hypothesis, I expect that:

H 6 ***When controlling for the effects of in-person and telephone contact on the number of ties that are emailed, the positive relationships between the number of neighbour, mid-range and distant ties that people have in their networks and the number of ties that they email will disappear for neighbour ties but not for mid-range and distant ties.***

1.8.5 Summary

This dissertation began with the idea that the greater the numbers of ties that people have, the more they will use email. I have used the social affordance approach to argue that the extent to which this is true depends on the characteristics of the ties and the social affordances particular to email. To understand more specifically the social characteristics of social ties, I focus on literature about the type and distance of ties in contemporary society.

In regards to tie type, I find that those ties that permit the greatest choice in who is contacted and how that contact occurs will be more open to making email contact. Because friendship and work ties permit more choice in these ways than kin ties, I expect that the number of friendship and work ties that people have in their networks will be more strongly associated with email use than the number of kin ties that they have in their networks. Moreover, I also expect that email will be used more as a supplement to in-person or by telephone contact with kin ties than with friendship or work ties.

In regards to tie distance, the literature reviewed above also shows that contemporary ties tend to have greater choice in who is contacted and how that contact takes place. Mid-range and distant ties exemplify these characteristics more than neighbour ties. For this reason, I expect that the number of mid-range and distant ties that people have in their networks will be more strongly associated with email use than the number of neighbour ties that they have in their networks. Moreover, I expect that email will be used more as a supplement to

contact that occurs in-person for neighbour ties than it will for mid-range and distant ties.

Although this theoretical framework gives a good starting point for understanding the relationship between the number of ties that people have and their use of email, there may be at least two other factors that affect this relationship. First, the strength of social ties may also affect the extent to which people use email. In the sections that follow, I will discuss the significance of these two factors and develop hypotheses regarding their relationship to email. Second, although the social affordance approach does not exclude the possibility that demographic factors may also contribute to the use of email, its does not readily lend itself to incorporating these factors into an explanation of email use. Nevertheless, previous literature has shown that demographic factors play an important role in the use of the internet.

1.9 Tie Strength and Email Use

The concept of tie strength comes from Mark Granovetter's classic paper, "The Strength of Weak Ties" (1973). In this paper, Granovetter argued that tie strength is a "…combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize that tie" (p. 1361). He then went on to argue that weak ties tend to come from different social groups, making the information and ideas they provide more novel that the information and ideas coming from strong ties.

Although Granovetter links tie strength to the ability to access new ideas and information, it has proved to be a useful concept for a variety of issues. Caroline Haythornthwaite and Barry Wellman's (1998, 2000) research on distant learners has found a link between tie strength and media use. They found that people tend to contact their strong ties using a variety of media. By contrast, they tend to contact their weak ties using only the medium that is commonly used though the foci in which they connect. For example, if distant learners typically contact their weak ties through email when they are participating in online courses, then email will tend to be the only medium that they use to contact these ties.

Haythornthwaite and Wellman's findings show that people may be more prone to email their strong ties than their weak ties, simply because they will contact their strong ties by all types of media. By contrast, people will only email their weak ties if email is a medium that they usually use to contact their weak ties. However, the research reviewed above has shown that people rarely maintain contact solely through the internet alone. Haythornthwaite and Wellman's distant learners are exceptional in this regard, given their relatively small prevalence in the population. This implies that most people will most often contact their weak ties in-person, and not by email.

Although the Social Ties data does not have information about all of the weak ties that people have in their networks, it does include information on all of those ties that are more than just casual acquaintances. These ties are divided into two levels of ties strength: core ties and significant (non-core) ties. Core ties are

stronger ties than significant ties. (The exact definition of these ties is discussed in greater detail in Chapter 2.)

Given the potential utility of email for connecting with people's stronger core ties, I hypothesize that:

H 7 ***The positive associations between the number of ties that people have in their networks and the number of ties that they email will be stronger for core ties than they will be for significant ties.***

Haythornthwaite and Wellman's findings also indicate that email may be used more as a supplement to contact that occurs in-person and by telephone among strong ties than among weak ties. This is because people tend to use a variety of media with their strong ties, and the affordances of email make it well suited for arranging in-person and telephone contact. This leads me to hypothesize that:

H 8 ***The relationship between the number of ties that people have in their networks and the number of ties that they email will be more heavily mediated by in-person and telephone contact for core ties than it will be for significant ties.***

1.10 Demographic Factors and Email Use

Although few studies have examined how demographic factors affect people's use of email specifically, many studies have shown that demographic factors affect people's general internet use. It has been found that demographic factors such as education or job type not only affect people's ability to access the internet, but they also affect their ability to use the internet effectively (see DiMaggio et al. 2001; Katz & Rice 2002). For example, Eszter Hargittai (2003) found that the more education people have, the better able they are to find information online using search engines.

It is quite possible that demographic factors also affect the use of email. To start, people may need a certain level of attainment – for example, being well educated or having a high status job – just to become email users. Once they are email users, their ability to use email effectively may also be dependent on these kinds of demographic factors. These same factors may also affect the number of ties that people have in their networks, potentially acting as a source of spuriousness between the number of ties that people have and their use of email. I will now discuss how age, gender, education, and job type may affect both email use and the number of ties that people have in their networks.

Age may affect the extent to which people use email, as well as the number of ties they have. Those above the age of 50 use email less than those who are younger (Lenhart et al. 2003). Moreover, people in their 30s tend to have the largest core discussion networks (Marsden 1987).

Gender may affect email use, especially when contacting certain kinds of ties. Research has shown that women are more likely to use email to contact kin (Horrigan & Rainie 2002). Moreover, gender may be associated with other demographic variables, which in turn lead to email use. For example, business owners and those in professional jobs are still predominantly male.

It has been shown that people who are well educated are more prone to obtain internet access (see Katz & Rice 2002). Education may affect the extent to which people use email by giving them the skills necessary to use it effectively (Hargittai 1999; DiMaggio et al. 2001). Moreover, education has also been shown to affect the number of ties people have, with those who are college graduates having the most ties (Fischer 1983; Marsden 1987).

Occupation type may also affect the use of email. Although few researchers make occupation type and internet use the focus of their studies (one exception is Teo 1998), it is likely that professionals and business owners may be more prone to have email access than people working in lower status occupations. Moreover, people with high status occupations tend to have larger and more diverse networks than those in lower status occupations (Lin 1999, 2001).

The concept of social affordance implicitly applies only to those that are already email users – if people are not email users, then they will not be able to take advantage of the affordances offered by email. By contrast, the research discussed above shows that demographic factors may affect both if people become email users, and if they use email. For example, those who are well

educated are both more likely to obtain internet access, and have the skills necessary to use it effectively.

Given that these demographic factors may affect the likelihood of becoming an email user, I hypothesize that:

H 9 ***Those who are in their late 30s, well educated, working in high status occupations, and women are more likely to be email users than those with different demographic characteristics.***

Because these factors may also affect the extent to which people use email to contact their ties, I further hypothesize that:

H 10 ***Those who are in their late 30s, well educated, working in high status occupations, and women contact a greater number of ties by email than those with different demographic characteristics.***

Moreover, these demographic factors may also be positively associated with the number of ties that people have in their networks. As argued above, I expect that the more ties people have in their networks, the more they will use email. The Slovenian study by Hlebec et al. (2006) discussed above shows evidence that demographic factors and the number of ties both contribute to the odds of having email access. For this reason, I further hypothesize that:

H 11 ***When controlling for the effects of the number of ties that people have in their networks on the likelihood of being an email user, there will be a reduction in the strength of the association between demographics and the likelihood of being an email user.***

Table 1.2 summarizes the hypotheses of this chapter.

Table 1.2 – Summary of Hypotheses

H 1	***The greater the number of friendship, work, and kin ties, the greater the number of ties that are emailed.***
H 2	***Friendship and work ties are more strongly associated with the number of ties that are emailed than kin ties.***
H 3	***When controlling for the effects of in-person and telephone contact on the number of ties that are emailed, the positive relationships between the number of friendship, work, and kin ties that people have in their networks and the number of ties that they email will disappear for kin ties but not for friendship and work ties.***
H 4	***The greater the number of neighbour, mid-range, and distant ties, the greater the number of ties that are emailed.***
H 5	***Mid-range and distant ties are more strongly associated with the number of ties that are emailed than are neighbour ties.***
H 6	***When controlling for the effects of in-person and telephone contact on the number of ties that are emailed, the positive relationships between the number of neighbour, mid-range and distant ties that people have in their networks and the number of ties that they email will disappear for neighbour ties but not for mid-range and distant ties.***
H 7	***The associations between the number of ties that people have in their networks and the number of ties that they email will be stronger for core ties than they will be for significant ties.***
H 8	***The relationship between the number of ties that people have in their networks and the number of ties that they email will be more heavily mediated by in-person and telephone contact for core ties than it will be for significant ties.***
H 9	***Those who are in their late 30s, well educated, working in high status occupations, and women are more likely to be email users than those with different demographic characteristics.***
H 10	***Those who are in their late 30s, well educated, working in high status occupations, and women contact a greater number of ties by email than those with different demographic characteristics.***
H 11	***When controlling for the effects of the number of ties that people have in their networks on the likelihood of being an email user, there will be a reduction in the strength of the association between demographics and the likelihood of being an email user.***

1.11 Conclusion

The more ties that people have, the more difficult it becomes to contact those ties in-person. This is especially true in contemporary America, where contacting loosely knit networks means that people often need to arrange to meet each of their ties individually. Email may reduce the burden of making contact by helping arrange contact that occurs in-person, thereby acting as a supplement to other media. Moreover, email may reduce the need to make in-person contact altogether by acting as the primary mode of contact.

Despite email's utility for contacting social networks, few researchers have examined the connection between social networks and email use directly. The technological deterministic assumptions made by early writers studying the internet tended to ignore the actual use of the internet in the everyday lives of its most typical users. A growing body of internet research has shown little evidence that the internet radically alters life, instead showing that it adds on to contact that occurs through other media. Although most of this research does not measure social networks directly, it provides some valuable insights about how people use email to stay connected. These studies show that social relationships are causally prior to email use, email is just one part of a complex communication system, and that tie characteristics fundamentally affect the potential for ties to be contacted by email.

Using the social affordance approach, I theorize that the more ties that people have, the more likely it is that they will use email. However, I expect that

certain kinds of ties will be more open to email contact than other kinds of ties. The kinds of ties that I focus on in this dissertation vary by type (friend, work, and kin ties) and distance (neighbour, mid-range, and distant ties).

With regards to tie type, I expect that the more friendship and work ties people have, the more they will use email both as a supplement and as the primary source of contact. Although email's utility as a supplement might mean that in-person and telephone contact may mediate the relationship between the number of ties that people have in their networks and their use of email, I expect that this relationship will still remain strong when controlling for in-person and telephone contact. By contrast, the more kin ties people have, the more they will use email to supplement contact that occurs in-person and by telephone. For this reason, I expect that any relationship between number of kin ties and email use will disappear when controlling for in-person and telephone contact.

With regards to tie distance, I expect that the more neighbour ties a person has, the more they will use email as a supplement. For this reason, I expect that the relationship between number of neighbour ties and email will disappear when controlling for contact that occurs in-person and by telephone. By contrast, there is reason to believe that mid-range ties use email both as the primary mode of contact and as a supplement. For this reason, I expect that the relationship between number of mid-range ties and email will remain significant and positive when controlling for contact that occurs in-person and by telephone. Finally, the more distant ties they have, the more they will use email as the primary mode of contact, using it only to supplement contact slightly with telephone contact. For

this reason, I expect that the relationship between number of distant ties and email to remain almost unaltered when controlling for the effects of telephone contact.

I have also argued that tie strength and demographic factors may affect the use of email. Previous research indicates that email may be especially useful for contacting strong ties than weak ties, because strong ties are more open to contact by all kinds of media while weak ties tend to rely on traditional ways of communicating. This research also indicates that email may be used more as a supplement to contact that occurs in-person and by telephone with strong ties than with weak ties. Moreover, people with certain demographic characteristics – especially those who are most advantaged – may be more prone to use email and use it effectively. These people may be more prone to become email users and use email to contact their ties. Nevertheless, the relationship between these demographic factors and email use may be moderated by the number of ties that people have in their networks.

This research has several important implications. First, far from being the cause of social isolation, this research shows how the internet may be a tool that benefits those who are hyper connected. Second, if the extent to which email is used in conjunction with other media depends on the kind and strength of the tie being contacted, this research will show how people tailor their personal communication systems to the kinds of ties they are contacting. Third, if it is true that demographic factors lead people to use email, then this research will have shown that email is a tool that only helps those who are already advantaged.

Chapter 2

Methods and Measures

2.1 Introduction

This dissertation will draw exclusively on data collected through the Pew Social Ties survey. This chapter will discuss the basic sampling methodology, the issue of possible sample bias, as well as conceptual definitions and measures used for key variables.

2.2 Data Collection

The Social Ties survey was sponsored by the Pew Internet & American Life project and administered by Princeton Survey Research Associates. It contains sample of 2,200 adults living in continental United States. All adults sampled had landline telephones (telephones that use physical outlets connected in one place, as opposed to cellular technology) in their households and all interviews were conducted in English. The interviews occurred from February 17 to March 17, 2004.

2.2.1 Sample Design

The sample was designed to represent all continental U.S. telephone households. The sample was drawn using standard list-assisted random digit dialling methodology. Respondents were selected using *Active blocks* of telephone numbers (area code + exchange + two-digit block number) that contained three or more residential directory listings. These were selected with probabilities in proportion to their share of listed telephone households; after selection two more digits were added randomly to complete the number. This method is used to include phone numbers that are not listed in telephone directories. After selection, the numbers were compared against business directories and matching numbers were then purged.

2.2.2 Questionnaire Development and Testing

The questionnaire was first pretested with a small number of respondents. Some minor changes were made to the questionnaire based on the monitored pretest interviews.

2.2.3 Contact Procedures

At least 10 attempts were made to contact sampled telephone numbers. Calls were staggered over times of day and days of the week to maximize the chance of

making contact with potential respondents. Each household received at least one daytime call in an attempt to find someone at home. In each contacted household, interviewers asked to speak with the youngest adult male currently at home. If no male was available, interviewers asked to speak with the oldest female at home. The Princeton Survey Research Associates argue that this selection technique has been shown to produce samples that closely mirror the population in terms of age and gender. To check for the accuracy of this claim, basic demographic characteristics of the Social Ties survey are compared to similar characteristics collected through American census data in section 2.3 below.

2.2.4 Response Rate

Princeton Survey Research Associates report that the response rate for this survey was 35 percent. They calculate this rate based on the following components:

- Contact rate – the proportion of working numbers where a request for interview was made – of 83 percent
- Cooperation rate – the proportion of contacted numbers where a consent for interview was at least initially obtained, versus those refused – of 44 percent
- Completion rate – the proportion of initially cooperating and eligible interviews that were completed – of 96 percent

Table 2.1, created by the Princeton Survey Research Associates, breaks down these components in more detail.

Table 2.1: Sample Disposition	Number	%
Total Numbers dialled	11131	
Business	876	
Computer/Fax	647	
Other Not-Working	1646	
Additional projected NW	769	
Working numbers	7193	64.6
No Answer	184	
Busy	72	
Answering Machine	717	
Callbacks	123	
Other Non-Contacts	147	
Contacted numbers	5950	82.7
Initial Refusals	314	
Second Refusals	3036	
Cooperating numbers	2600	43.7
No Adult in HH	10	
Other Ineligible	0	
Language Barrier	308	
Eligible numbers	2282	87.8
Interrupted	82	
Completes	2200	96.4
Response Rate		34.8

2.3 Data Representativeness

A 35 percent response rate is not ideal. It may mean that certain types of respondents have been over sampled in the population. A sample bias would limit the generalizability of my findings if respondents with certain sizes of networks or certain media use habits were not accurately represented in the sample.

I have theorized that highly connected people may spend great amounts of time making social connection. On the one hand, this might mean that highly social people would be less likely to answer a telephone survey. This would mean that the Social Ties data gives conservative estimates about the number of ties that people actually have in their networks. On the other hand, those who are highly social may be intrigued by this telephone survey, and enjoy answering questions about their many ties.

Moreover, this survey selects on those that have landline telephone in their homes. The report by the *Pew Research Centre* shows that 7 to 9 percent of the American population uses only mobile phones (2006b). This percent may have been lower in 2004, when the Social Ties survey was conducted. This means that the mobile phone use estimates may be conservative, because mobile phone only users likely use their mobile phones more than those who also have landline phones.

Although the relatively new measures of network size and media use in this survey make it difficult to look for further response bias that may affect the results presented in this dissertation, it is possible to at least see if there is any

demographic response bias. In this section, I compare demographic variables of the Social Ties data with similar variables in the American census data, collected through the 2003 American Community Survey.

Gender

In the Social Ties survey, 1,168 or approximately 53 percent of the respondents are female, while 1,032 or approximately 47 percent are male. The American Community Survey finds that 51 percent are male and 49 percent female.

Age

In the Social Ties survey, age ranges from 18 to 95 years, with a mean age of approximately 48 years, a median of 47 years and a mode of 40 years.

Please see Table 2 for a comparison of age between the Social Ties survey and the American Survey. Note that respondents in the Social Ties survey were 18 years or older, while respondents in the American Community Survey were 20 years or older. Also note that age was coded by exact year in the Social Ties survey, while it was coded into 5-year categories in the American Community Survey. For the purposes of comparison, I will use the same categories provided by the American Community Survey. However, these categories will not be used in the final variable coding.

Table 2.2: Age

	Pew Frequency	Pew Percent	Adult Population Percent
Age			
18 to 19	69	3	NA
20 to 24	140	7	9
25 to 34	351	16	19
35 to 44	417	19	21
45 to 54	456	21	20
55 to 64	318	15	14
65 to 74	230	11	9
75 to 84	138	6	6
85 and over	44	2	2
Total	2163	100	100

Missing from Pew = 37

This comparison shows little evidence of sampling bias in the Social Ties data. All age groups are off from the American Community Survey by no more than 3 percent.

While there is no evidence of sampling bias, a histogram charting the frequency of the respondents' ages indicates that the distribution is somewhat positively skewed. This observation is confirmed by a standard skewness test, indicating a positive value of approximately 0.30. To compensate for this distribution the square root of age will be used in the analysis, where it shows significant difference from the original age variable when run against an outcome variable. The square root of age is significantly less skewed, with a skewness test yielding a value of -0.05.

Race

Two questions were used to measure race in the Social Ties survey. The first question asked respondents to report if they were of Hispanic or Latino origin or descent. Responses were coded as: "Yes", "No", or "Don't know/Refuse". The second question asked if they were, "white, black, Asian, or some other race?" If respondents had answered, "Yes" to the first question, the interviewer added, "Do you consider yourself a White (Hispanic/Latino) or a Black (Hispanic/Latino)?" Responses for all respondents were coded as being either: "White", "Black or African-American", "Asian or Pacific Islander", "Mixed race", "Native American/American Indian", "Other", "Don't know/Refuse".

The following table presents comparison of race among the Pew respondents with those estimated for the general population by the 2003 American Community Survey.

Table 2.3: Racial Composition

	Pew Frequency	Pew Percent	Population Percent
Race			
White	1789	83	76
Black or African American	237	11	12
Asian or Pacific Islander	47	2	4
Mixed Race	25	1	2
Native American/American Indian	39	2	1
Other	22	1	5
Total	2159	100	100

Missing from Pew = 41

Employment

In the Social Ties survey, approximately 51 percent (1,116) of the respondents are employed full-time, 12 percent (258) are employed part-time, 22 percent (476) are retired, 12 percent (258) are not employed for pay. An additional 2 percent (45) are disabled, 1.4 percent (30) are students, 0.5 percent (11) report being "other", and 0.3 percent (6) refused or did not know.

Unfortunately, it was difficult to check for over or under sampling of particular populations with this variable, as the employment variables in the American Community Survey were only for those older than 16 years of age. Although the Social Ties survey respondents were only two years older, the low employment rate of people 16 and 17 years old is enough to make comparison tenuous. Moreover, the American Community Survey did not make a distinction between those employed full-time and those employed part-time, and it did not make estimations (?estimates) about the percent of the population that is retied. The American Community Survey estimates about 66 percent are part of the labour force, while 63 percent of the Social Ties respondents report being employed either full-time or part-time.

Education

Respondents were asked to report their highest grade or class completed in school. They were then coded by the interviewer as fitting into one of seven categories. The interviewer read the categories if the respondent asked for clarification.

Approximately 2 percent (47) of the respondents reported that their highest level of education was grade 8 or less, 7 percent (156) completed between grades 9 and 11, 30 percent (657) graduated high school, 11 percent (239) did business, vocational or technical school after high school, 18 percent (391) had some college, but did not complete a four year degree, 19 percent (423) graduated from college, and 13 percent (277) had post graduate training or went to a professional school after college.

The following table presents comparison of education among the Pew respondents with those estimated for the general population by the 2003 American Community Survey.

Table 2.4: Education

	Pew Frequency	Pew Percent	Population Percent
None, or grades 1-8	47	2	6
High school incomplete (grades 9-11)	156	7	10
High school graduate (grade 12 or GED certificate)	657	30	30
Business, Technical, or vocational school after high school	239	11	20
Some college, no 4-year degree	391	18	7
College graduate (B.S., B.A., or other 4-year degree)	423	19	17
Post-graduate training/professional school after college	277	13	10
Total	2190	100	100

Missing from Pew = 10

This comparison indicates that the Pew sample is generally on par with the American Community Survey estimates. Exceptions being a possibility under sampling of people with business, technical or vocational school after high

school, and an over sampling of people who have some college. However, during the analysis these two categories will be collapsed into one category, evening out this discrepancy.

A comparison of sex, age, race, employment, and education variables from the Social Ties survey with the same variables in the American Community Survey indicates that the Social Ties sample is similar to the general American population in its demographic composition. For this reason, a weight variable is not used when analysing this data. I describe the comparison of these variables in the text that follows.

2.4 Key Concepts and Definitions

2.4.1 Defining and Measuring Ties by Their Strength

Before discussing the specific dimensions of tie strength used in this study, I will first say a few words about what a "social tie" actually means. The definition of a social tie is extremely subjective, insofar as it depends on the criteria used to define a relationship as existing. The interests of those who are considering the evaluation often shape these criteria. It may be argued that this subjective evaluation has at least some objective constraints, such as the ability to recall the existence of another individual. However, sometimes people feel socially tied to others they have never met, for example those who consider themselves to be part of the international gay community. At the other extreme, people who are

depressed often feel lonely and socially isolated, even though they may be connected to numerous people who would typically be considered friends.

Despite its subjective nature, this definition of a social tie is not arbitrary. The way in which a tie is defined depends on the context in which it is being discussed. This context is set by the purpose for which a tie is being defined as socially relevant, be it instrumental, emotional, or otherwise. For example, when individuals are thinking of people who might help them find a job, they may consider a social tie to be any individual who could provide information that would be useful in their search. The context in which social ties are defined may instead depend on the emotional intimacy of the tie. Knowing who your friends are at times of emotional distress is the defining feature of a tie.

Given the variety of contexts in which a tie may be deemed a social connection, I define social ties in terms of their strength, as it is one of the most general categorizations of ties. While some may argue that tie strength is too general a concept to be of any use, it is this general nature that makes it most useful for answering the kinds of research questions that I ask in my dissertation. While I am interested in the ability of social ties to provide resources, I choose not to make this the sole criterion by which a social tie is defined. Rather, my interest in media selection leads me to also include frequency of contact and emotional intimacy in my definition of tie strength. By including the criteria of emotional intimacy, frequency of contact, and provision of help, in my definition of a social tie, I provide a more nuanced account of how these three general features relate to specific kinds of network attributes and media selection.

In defining tie strength in this way, I draw on Mark Granovetter's influential paper, "The Strength of Weak Ties" (1973), where Granovetter defines tie strength as being a "…combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize that tie" (p. 1361). While this served as a first proximate definition, the exact combination of these parameters was left undefined. Granovetter leaves this definition to the intuition of the reader, calling on future research to make the exact dimensions of this concept better understood. Although researchers heavily used the concept in the years that followed, it was not until the early 80's that the definition itself was thoroughly studied by empirical means.

Peter Marsden and Karen Campbell (1984) were the first to draw on data collected in three cross-sectional surveys to study how various dimensions of this concept were operationalized. These surveys collected information on respondents' three closest relationships, including measures of closeness, frequency of contact and duration of contact. One of the three surveys also included additional measures about breadth of discussion topics and mutual confiding. These measures were used to operationalize three of Granovetter's four theorized components of tie strength: intensity (closeness), time spent (frequency and duration), and intimacy (breadth of discussion and mutual confiding). They did not have measures of reciprocal services.

Marsden and Campbell argued that the results of this analysis indicated closeness to be the single best measure of tie strength, as it was not contaminated by the influence of certain predictor or indicator variables. They further argued

that frequency was a particularly poor measure of tie strength, as it overestimated the tie strength of friends such as neighbours and co-workers who were in close proximity with the respondent. This result is not surprising, given that people who are physically proximate will be forced to interact on a frequent basis, regardless of their tie strength. While these results are an important first step in measuring tie strength, the measures used in this analysis limit their generalizability. All of the tie strength measures were limited to the respondents' three closest friends. While the authors argue that the variability in the measures make their results somewhat conservative, there are problems with assuming that these measures of tie strength apply to all relationships in a person's social network.

One problem concerns the measure used for closeness. When measuring closeness, respondents were asked to indicate if each of their three closest friends were acquaintances (coded 1), a good friend (2), or a very close friend (3). Over all three studies, the mean score for this measure was 2.5 and the standard deviation was averaged at 0.6. This indicates that much of the variability in this measure is discerning between the closest of discussion partners. This makes it difficult to argue that this measure would be a good indicator of tie strength when dealing with social ties outside a person's three closest friends. Under these categories of tie strength, a majority of a person's social ties would be classified as acquaintances, leaving little room for variability and thus decreasing the use of this variable as an indicator of tie strength among these relationships. By tricotomizing social ties into acquaintances, good friends and very close friends,

there is no category that captures ties that are between good friends and acquaintances.

I will refer to these kinds of in-between ties as "significant ties". These ties may provide important social support and information. Thus, while closeness alone might be an important indicator of tie strength, the way that it is operationalized in Marsden and Campbell's analysis makes it difficult to know the extent to which it really is the strongest indicator of tie strength when measuring large sizeable numbers of social ties.

Given the limitations of the previous research regarding tie strength, I use the Social Ties data because it uses a more inclusive definition that includes most of the dimensions specified by Granovetter. Keeping in the spirit of Granovetter's definition of tie strength, I divide social ties into two groups: "core ties" and "significant ties". My definition for these ties is broad, incorporating emotional intimacy, frequency of contact and the provision of support. Moreover, this definition of tie strength is defined subjectively, relying on an individual's understanding of what these terms mean to them. I exclude all of those people who are only casual acquaintances. While knowing about casual acquaintances may provide a more comprehensive understanding of media selection, time constraints and the possibility of measurement error make their measurement too difficult for this survey. I define core ties as being people with whom the respondent can discuss important matters, regularly keeps in touch with, or who will provide help. Having defined this group, I then define significant ties as

being those people who are more than just casual acquaintances, but not as close as the core ties.

It should be noted that the purpose of this research is not to argue that core ties are more prone to communicate more often, or have more intimate discussions, than significant ties. This may be considered tautological; frequency of interaction is one of the dimensions used to define tie strength in the first place. Rather, I incorporate these three different dimensions into my definitions so that I can better understand *which* media are used to make regular contact.

I will discuss the specifics of how this definition is measured after a discussion of network size.

2.4.2 Measuring Network Size

Large-scale ego centred surveys that measure network size, have often focused on only a few of a respondent's social ties, often 3 of their closest ties. The 1985 and 2000 American General Social Surveys are the most well known of such surveys. However, recent research indicates that this method has significant problems with systematic bias in the elicitation of these names, making generalizations tenuous (Marin 2004). The Social Ties Survey examines these issues by asking the respondent to report on a much larger number of social ties than is typically done with ego centred surveys. This approach should give a better sense of the general properties of the social network.

Because measuring a person's three closest ties will not adequately operationalize the concept of network size, the closeness measure used by Marsden and Campbell will not serve my purposes adequately. The Social Ties survey draws on a method for estimating network size that was originally developed by Chris McCarty et al. (2001). They measure network size by asking respondents to estimate the number of people they know in certain relational categories, such as the number of people that are immediate kin, co-workers, neighbours, etc. They sum these numbers to give a total estimate for network size, dubbing it the summation method.

One potential problem with this method is that certain ties may fall into more than one category, and therefore be counted more than once. For example, a kin tie may also be a work tie. This means that if a significant number of ties belonged to more than one of these categories, the network size estimates would be much larger than the actual network size. However, McCarty et al. show that this type of problem does not inflate the estimated network size to a significant extent. They compare the summation method to another method that asks respondents to report the number of people they know in different sub-populations, such as those that have been in a serious car accident or those with diabetes. These sub-populations are significantly small that they have very little chance of overlapping. When comparing results of this different measure with the summation measure, McCarty et al. found remarkable similarity between the average network sizes generated by both methods, even when it was repeated in a different survey. This indicates that the possibility that ties will exist in more than

one category does not significantly inflate the network size estimated using the summation method.

The Social Ties survey draws on the summation method to measure network size. It repeats this measure twice – once to calculate the number of core ties and once to calculate the number of significant ties. The question used to measure core ties is worded as follows:

> Let's start with the people you feel VERY close to, which might include those you discuss important matters with, regularly keep in touch with, or are there for you when you need help. Thinking about ALL the people who fit this description and who do NOT live with you, how many are…(INTERVIEWER INSERTS FIRST ITEM). How many are… (INTERVIEWER INSERTS THE NEXT ITEM IN ORDER)
>
> a. Members of your immediate kin– parents, siblings, adult children, or in-laws – who you are very close to?
> b. Other relatives you are very close to?
> c. People you know from work who you are very close to?
> d. Neighbours you are very close to?
> e. Other people who are not co-workers or neighbours, who you are very close to?

After the respondent answers these questions, the telephone interviewer uses computer assisted interview software to total the respondent's number of core ties, and then reads this total back to the respondent. If the respondent does not agree with this total, the same question is asked again. If the respondent is comfortable with this estimate, he or she is then asked the following questions regarding his or her significant ties:

> Now think about the other type -- the people you feel SOMEWHAT CLOSE to who do not live with you. They're more than just casual acquaintances, but they're not as close as the friends and relatives we just talked about. Thinking about ALL the people who fit this description, how many are …(INTERVIEWER INSERTS FIRST ITEM). How many are… (INTERVIEWER INSERTS THE NEXT ITEM IN ORDER)
>
> a. Members of your immediate kin – parents, siblings, adult children, or in-laws – who you are somewhat close to?
> b. Other relatives you are somewhat close to?
> c. People you know from work who you are somewhat close to?
> d. Neighbours you are somewhat close to?
> e. Other people who are not co-workers or neighbours, who you are somewhat close to?

The interviewer then totals the number of significant ties, and the respondent is asked if this number sounds about right. If the respondent disagrees, he is asked the same set of questions again. If he agrees, the interviewer then proceeds to ask more questions about these two types of ties, including questions about ethnic diversity, gender diversity, occupational diversity, physical proximity, density, contact through various media and access to a variety of resources.

2.4.3 Measuring Media Use

This dissertation differs from most studies about internet use, which measure only frequency of contact, i.e., the number of email messages sent in a typical day. The approach used in the Pew Social Ties survey instead examines the number of social ties contacted at least weekly, using a variety of commonly used communication media. Approaching communication preference in this way

makes the social uses of this communication more apparent for at least two reasons.

First, knowing only the frequency of communication gives little information about the kinds of social ties that any given medium is being used to contact. If respondents frequently use one medium, it is not known if they are in constant contact with one or two close ties or if they are in less frequent contact with many different ties. In contrast, knowing the number of ties that are contacted on a regular basis gives a better indication of how that medium is being used to regularly connect with particular kinds of ties.

Second, knowing the frequency of communication through only one or two media does not provide enough context about the respondents' general communication practices to understand how these media may complement each other. For example, two individuals might be frequent email users, yet the importance of email for each of these individuals depends on the way that they contact their ties by other means. A person who just moved to a new city might be a heavy email user simply because he doesn't have the ability to contact his network in-person. In contrast, a person who frequently uses email but also sees a number of people in-person might have a much larger network, using all means available to maintain it. By including an array of communication media in my analysis, I am better able to discern the importance of each medium for an individual's social network.

Chapter 3

Communication Networks in America

3.1 Introduction

Although the research reviewed in Chapter 1 shows that Americans have complex communication networks, social scientists do not have definitive knowledge of how prevalent certain kinds of ties and media use are in the general population. This problem is particularly relevant to this dissertation, since it is difficult to understand the social significance of email use in America without first understanding the social network composition and media use of the general population. The data obtained through the Social Ties survey provides new knowledge about social networks and media use in America. Rather than limiting the measure of network size to a maximum of five discussion partners as is done in the General Social Survey, the Social Ties survey asks about those ties that are more than just casual acquaintances. Moreover, rather than measuring the frequency or time spent contacting ties by email and other communication media, it asks about the number of ties contacted by different media. Using these new measures, this chapter will use basic statistics to describe the typical composition of networks and media use in American communication networks. This description helps place email in its proper social context, showing how it is part of a larger communication system.

Although information exists about the prevalence of different types of ties – informal friendship ties, work ties, and kin ties – among the core discussion networks of Americans, their prevalence among the larger set of significant ties that compose the active parts of social networks has not been well documented. This chapter uses the Social Ties data to examine the prevalence of different types of ties among both the core and significant (non-core) networks of Americans.

Previous research also gives little information about the extent to which email is used to maintain contact with social networks in America. Most studies reviewed in Chapter 1, measure email use as the frequency of email sent during a particular period of time (often during a typical day) or as the time spent online. This gives little information about the kinds of ties that are being contacted by email or the extent to which email is used to contact the entire network. This lack of information makes it difficult to gauge the extent to which email is used to contact social networks. Moreover, because little information exists about the extent to which other forms of contact are used to communicate with social networks, the relative importance of email is unclear. This chapter uses the Social Ties data to examine these issues.

In this chapter, I begin by describing the number of ties that comprise the core and significant (non-core) networks of Americans. It then describes the prevalence of these by type, distance, and density. Communication that occurs with these ties by email, mobile phone, landline phone, and in-person contact is then described. Associations between email use and these other communication media are then examined.

3.2 Social Networks in America

3.2.1 Social Network Size

As discussed in Chapter One, there has been a concern that Americans are not as well connected as they have been in the past. This concern has a long history among scholars, starting with 19th century thinkers such as Ferdinand Tönnies (1887), Karl Marx (1998), and Max Weber (1968), and continues until this day in the work of Robert Putnam (2000) and McPherson, Smith-Lovin and Brashears (2006). These current studies are limited because they typically measure network size as either participation in voluntary associations (i.e., Putnam) or as the number of ties with whom people discuss important matters (i.e., McPherson, Smith-Lovin and Brashears). Measuring ties as participation in voluntary associations ignores a substantial number of ties with whom interaction occurs over long distance, or as part of one-on-one or small group interactions. Measuring ties as those with whom people discuss important matters also misses a substantial number of ties that may be important sources of support and social contact.

The Social Ties survey is unique in that it provides a more comprehensive understanding of the social ties that Americans consider significant. These are their active tie networks. These active tie networks are divided into two sets of ties:

- *Core Ties* are the people in Americans' social networks with whom they have very close ties – the people to whom Americans turn to discuss important matters, with whom they are in frequent contact, or from whom they seek help. This approach captures three key dimensions of relationship strength – emotional intimacy, contact, and the availability of social network capital.

- *Significant Ties* are the people outside that ring of "core ties" in Americans' social networks, with whom they are somewhat closely connected. They are the ones with whom Americans discuss important matters to a lesser extent, are in less frequent contact, and are less apt to seek help. They may do some or all of these things, but not as extensively. Nevertheless, although significant ties are weaker than core ties, they are more than acquaintances and they can become important players at times, as people access their networks to get help or advice.

- *Active Ties* are the sum total of core and significant ties. They are the total number of ties that are more than just casual acquaintances.

To estimate the number of core and significant ties in a respondent's network, the respondent is asked to estimate the number of core and significant ties that are: a) immediate kin, b) extended kin, c) neighbours, d) workmates, and e) other friends. After the respondent gives these estimates, the interviewer sums the estimates given for each to calculate the total number of core and significant ties. Using these estimates respondents are asked to report the number of these

ties that are contacted at least weekly by email, cell phone, landline phone, and in-person. This is done twice: once for core ties and once for significant ties. It should be noted that the number of ties contacted by email is based only on those ties to whom the respondent actively sends email. Thus, the passive reception of email from a network member does not count as a contact. For a more detailed description of these measures, see chapter 2, section 2.4, of this dissertation.

Results from the survey give no indication that Americans are socially isolated. They show a mean of 51 active ties and a median of 35 active ties. As noted above, active ties are the total number of ties that are more than just casual acquaintances. Among the core ties, respondents report a mean of 23 ties, and a median of 15 ties. For the significant ties, respondents report a mean of 27, and a median of 16 ties. This shows that the core and significant tie networks have similar numbers of ties. The average number of significant ties is only four greater than the average number of core ties. Furthermore, the median number of significant ties is only one greater in number than the median number of core ties.

These results indicate that Americans maintain a significant number of ties that are more than just causal acquaintances. Even when compensating for the positive skew by looking at the median of distribution (rather than the mean), respondents report a total of 35 ties that are more than just casual acquaintances. The median of 15 core ties further indicates that there is no lack of close ties for the typical American.

The discrepancy between the mean and median scores among the total network indicates that the distribution of network size is positively skewed, meaning that a few respondents have unusually large social networks. For total network size, the skewness score of 6.6 confirms this inference, as does the large standard deviation of 63 ties. When network size is broken down by tie strength, similar distributions occur for ties that are core and significant. Among the core ties, the difference between the mean and median number of ties also indicates that these ties are positively skewed, as does the skewness score of seven. For the significant ties, there also is indication of a positive skew, as verified by a skewness score of 6. The similarity of median values for both core and significant ties, and the larger mean value for significant ties than core ties, indicates that the minority reporting high numbers of ties report higher numbers of significant ties than core ties.

There are at least two possible reasons for this positive skew. The first is that the measure encouraged or misled a sizeable number of respondents to over-report their total number of ties. The second is that a sizeable number of respondents really do have unusually large social networks.

Findings from McCarty et al. (2001) support the second reason. McCarty et al find a similar positive skew using a similar method for measuring network size. (See the methodology chapter of this dissertation for details.) Moreover, they also find a positive skew using a completely different method. Both of these methods were repeated in different surveys, again showing a positive skew. McCarty, et al. also used focus groups to check the validity of these measures.

Even after intensive interviewing with these focus groups, there was no indication that respondents misunderstood, or were misled, by the measure. Claude Fischer also found a positive skew in the distribution of core network members in his well-reviewed study conducted in the late 70's (1982). Although Fischer used a completely different method for generating these numbers – asking respondents about the network members who gave different kinds of support – the distribution is somewhat similar. It is also worth noting that Fischer (1982) found a similar number of core network members, showing an average of 19 ties. Given the consistent appearance of this positive skew over different surveys and with different measures, combined with the evidence from the focus groups, it is safe to assume that the positive skew is not the result of measurement error.

It is also important to note that the average number of core ties found using the Social Ties survey measure is much larger than the average number of core ties found using General Social Survey (GSS) measure, as reported by McPherson, Smith-Lovin and Brashears (2006). The GSS measure shows a mean of 2.1 core ties in 2005, while the Social Ties measure shows a mean of 23 core ties (and a median of 15 core ties) in 2004. This discrepancy is probably due to the different measures used in the GSS and the Social Ties survey. The measure of core ties used in the GSS includes only those ties with whom people discuss important matters, while the Social Ties measure also includes those ties with whom Americans feel very close to, contact frequently, or from whom they seek help. Although the Social Ties measure does not show the longitudinal changes that can be seen in the GSS data, the broader definition of core ties in the Social

Ties study shows Americans to be less socially isolated than does the GSS measure. Moreover, comparing these measures shows that ties with whom people discuss important matters only make up a small slice of the total number of core ties that Americans have in their personal networks.

3.2.2 The Relational Composition of Social Networks

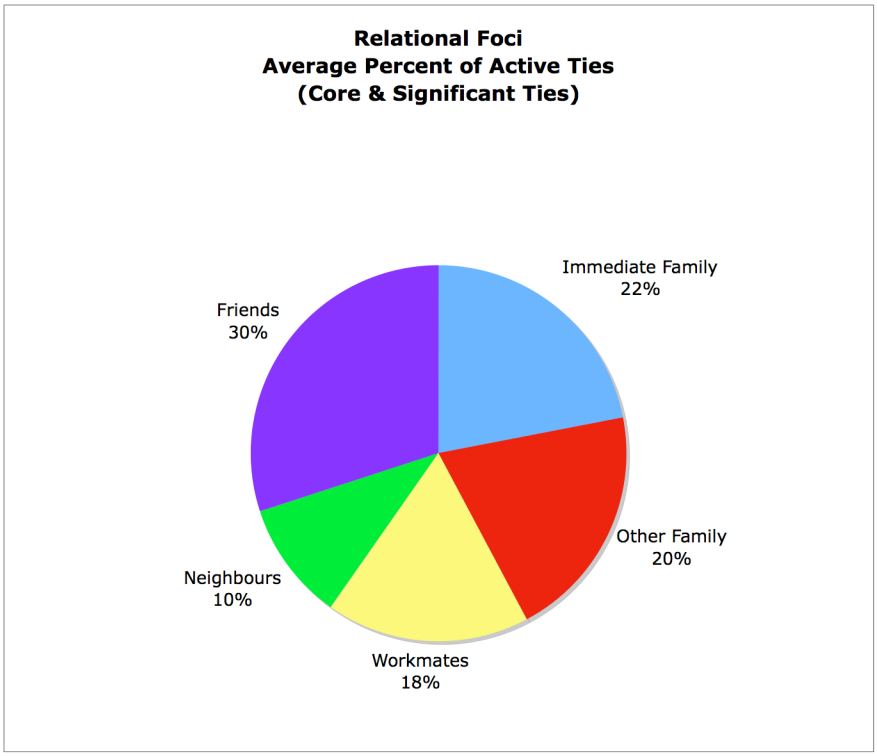
Literature reviewed in Chapter 1 indicates that informal friendships are unique to modern society. Nevertheless, it is not known to what extent these kinds of ties actually exist in social networks. How do they compare in number to the more formal and ascribed ties with kin, workmates, and neighbours?

The Social Ties data show that friendships existing outside of the workplace, kin, and neighbourhood, compose a significant portion of Americans' total active (core and significant) tie networks. On average, friends comprise 30 percent of Americans' total active networks, followed by immediate kin (22 percent) extended kin (20 percent), workmates (18 percent), and neighbours (10 percent). See Figure 3.1. Translated into numbers Americans have an average of: 15 friends, 11 immediate kin members, 10 extended kin members, 9 workmates, and 5 neighbours. However, because the number of friendship ties is more positively skewed than the number of immediate kin members, the number of ties for each focus is in a slightly different order when using their medians. In this arrangement, the median number of immediate kin is slightly larger than the

median number of friends: 8 immediate kin, 7 friends, 6 extended kin, 4 workmates, and 2 neighbours.

These averages are higher than the averages collected through a similar measure in Toronto's Connected Lives Study (2005). This study shows smaller mean numbers of kin and work ties. However, the mean numbers of friendship and neighbour ties are about the same. Overall the Connected Lives data show an average of 14 friends, 6 immediate kin, 7 extended kin, 5 workmates, and 3 neighbours.

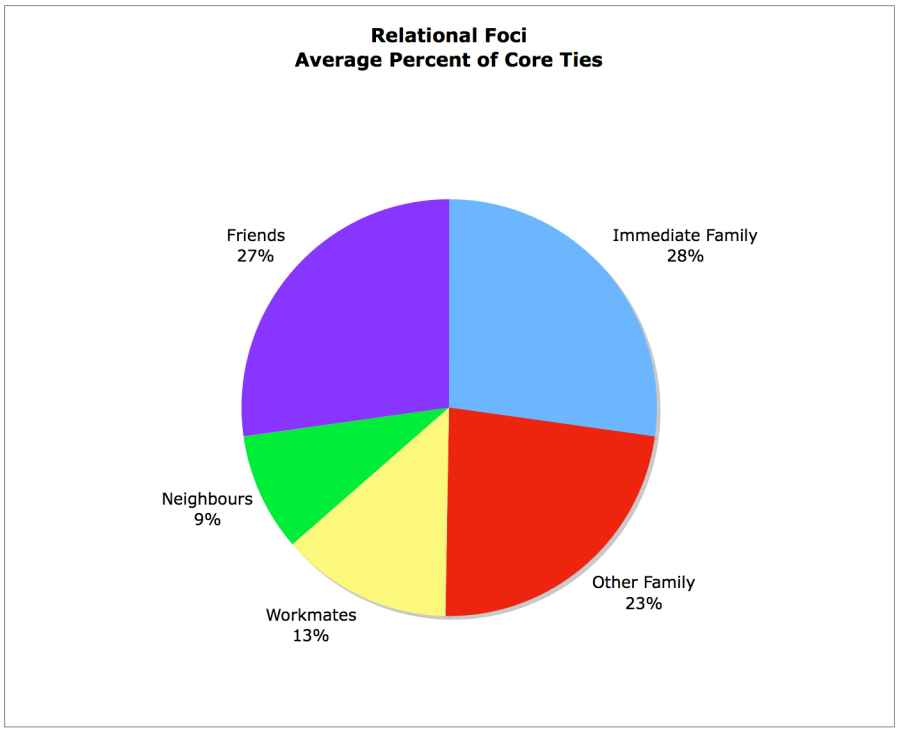
Figure 3.1



The distribution of relational foci is somewhat different when breaking the active tie networks down by tie strength. Kin and friends are the most prominent relational foci among core tie networks. On average, core tie networks are: 28 percent immediate kin, 27 percent extended kin, 27 percent friends, 13 percent workmates, and 9 percent neighbours. See Figure 3.2. In numeric terms, this means there is an approximate average of 6 immediate kin, 6 friends, 5 extended kin, 3 workmates, and 2 neighbours. When ordered by their medians, the numbers are as follows: 5 immediate kin, 3 friends, 2 extended kin, 1 workmate, and 1 neighbour. The differences between the means and medians reflect the fact that immediate kin has less of a positive skew than ties in other foci. This is probably because immediate kin members are limited by natural constraints – the number of children that can be born in one kin – while other relational foci do not face the same limitations.

These results regarding the composition of core networks are somewhat similar to those found through other studies. For example, Claude Fischer's 1982 study of urban and non-urban dwellers also shows a positive skew in the number of ties reported by respondents. However, his data show somewhat fewer kin ties; his data show a mean of 8 kin ties, while the Social Ties data show a total mean of 12 kin ties. Nevertheless, the mean number of non-kin ties is roughly the same; Fischer's data show a mean of 11 non-kin ties, while the Social Ties data also show a mean of 11 non-kin ties.

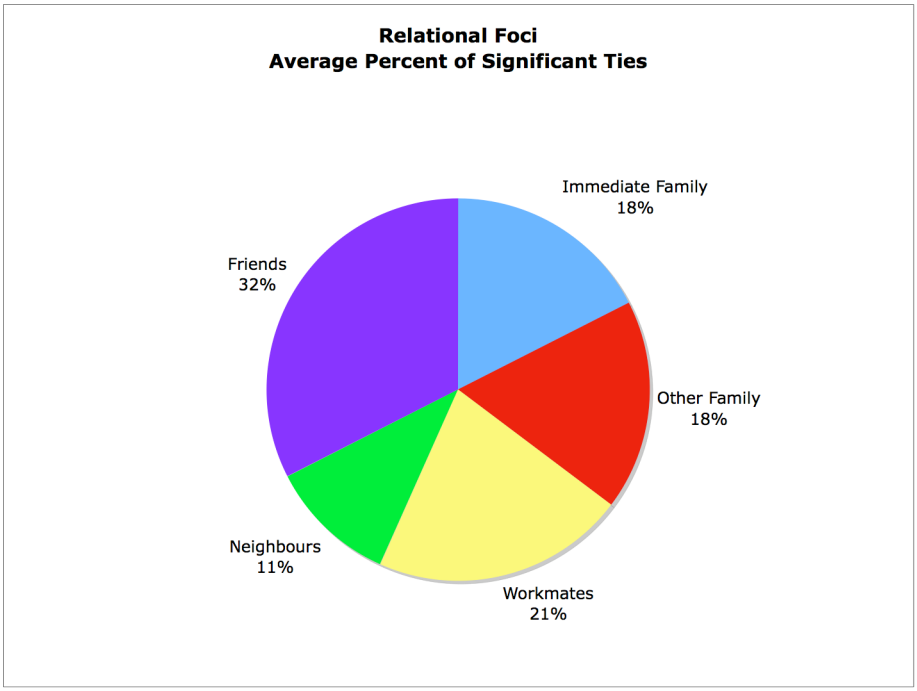
Figure 3.2



As with the core tie networks, on average, friends comprise a large percent of significant tie networks. However, the average percent of significant kin ties is much smaller than the average percent of core kin ties. By contrast, the average percent of ties that are workmates is much larger among significant tie networks than among core tie networks. On average, significant tie networks are: 32 percent friends, 21 percent workmates, 18 percent immediate kin, 18 percent extended kin, and 11 percent neighbours. See Figure 3.3. Significant tie networks have an average of: 9 friends, 6 workmates, 5 immediate kin members, 5 extended kin members, and 11 neighbours. However, because a small percent of Americans report having an extremely large number of friends, the median number of friends

is much lower than the mean. The median number of ties for each focus is as follows: 3 friends, 3 immediate kin members, 2 workmates, 2 extended kin members, and 1 neighbour.

Figure 3.3



In general, these results indicate that friends and kin are an important component of active social networks. This is true even when breaking these networks into core and significant ties. The main difference between core and significant tie networks is the relative prominence of kin and workmates. Kin is more prominent among core tie networks than significant tie networks. By contrast, workmates are more prominent among significant tie networks than core tie networks. Nevertheless, sample distributions for the number of immediate kin

members reported are generally less skewed than sample distributions for the number of people reported in other foci. When using the median values to minimize the effects of the positive skew in other foci, immediate kin becomes somewhat more prominent. Nevertheless, even when taking the positive skew of other foci into account, friends continue to be a prominent focus of active tie networks.

3.2.3 Friendship and Participation in Voluntary Associations

Given the results of the previous section, should we conclude that the informal friendships that are unique to modern society are an important part of contemporary social life? Yes, but with one caveat. The friendship category used above includes friends known both through voluntary associations and friends known more informally outside of these associations.

If most friendships were maintained through participation in voluntary associations, this would mean that the number of completely informal friendships maintained by Americans would be much lower than the estimated 30 percent of active ties found in the previous section of this chapter. In order to better understand the extent to which friendship ties are maintained through voluntary associations, the number of friendship ties reported in the Social Ties survey is correlated with membership in voluntary associations.

The Social Ties survey asked respondents to report their level of involvement in 9 different voluntary associations, and they were additionally given the opportunity to report on another voluntary association that may not have been listed. Membership in these associations was coded as: “not a member,” “a passive member,” or “an active member.” Active membership involves regularly attending meetings, contributing time or money, or holding a leadership position. Passive membership involves simply being a member of an association, but not being an active member.

The number of active friendships held by each respondent was the sum of the number of reported core friendship ties and the number of significant friendship ties. The mean and median number of these ties held by respondents is reported in the previous section of this chapter.

Bivariate Pearson correlations were run between passive membership in each association and the number of active, core, and significant friendship ties. Results show no statistically significant association between passive membership in associations and number of active, core, and significant friendship ties.

Table 3.1

Active Participation in Associations	Number of Friends		
	Active Ties (Core + Significant)	Core Ties	Significant Ties
Business or Professional	0.05 *	0.03	0.05 **
Labor Union	-0.02	0.00	-0.03 *
Sports League	0.01	0.00	0.02
Religious Organization	0.10 **	0.06 **	0.10 **
Hobby Group/Club	0.08 **	0.06 **	0.08 **
Community Group	0.09 **	0.08 **	0.07 **
Political Group	0.06 **	0.01	0.08 **
Other Association	0.04	0.04	0.03
Total Number of Associations in Which Respondent Acitively Participates	0.10 **	0.06 **	0.10 **

** Significant at the 0.05 Level (2-tailed)

Although correlation between passive membership in voluntary associations is not statistically associated with the number of friendship ties that people have in their networks, the results do show a slightly positive and statistically significant association between active membership in associations and the number of friendship ties. See Table 3.1 for a summary of these results. Active participation in religious organizations, hobby groups, and community groups were all positively and significantly associated with number of active, core, and significant friendship ties. Active participation in business/professional organizations and political groups are also positively associated with number of active and significant friendship ties, but not the number of core friendship ties that people have in their networks. Although these associations are statistically significant, none of them are strong – correlations can range from 0 to 1, the strongest correlation is 0.1 for active involvement in religious associations and the number of active friendship ties.

To better understand how overall levels of active participation in more than one of these associations correlated with the number of friendship ties that people have in their networks, the total number of associations in which a respondent actively participated was summed. This summation yielded a total active participation score that ranged from 0 to 10 for each respondent. This score was then recoded to deal with the influence of outliers. The recoded score ranged from 0 to 4. This recoded variable is correlated at: 0.10 with the total friendship ties in the active network, 0.06 with core friendship ties, and 0.10 with significant friendship ties. All three of these correlations are significant at the 0.05 level.

These findings generally indicate that a significant number of friendships are maintained through active participation in voluntary associations. Nevertheless, while these correlations are statistically significant, they are not strong. This means that a large and significant number of friendships are maintained outside the bounded groups of voluntary associations. These friendships are informal in that their existence does not depend on participation in formal groups. Moreover, it further implies that they are not ascribed, but rather maintained through autonomously initiated contact. Given these results, it is safe to conclude that a substantial portion of active social networks in America consist of informal friendships.

3.2.4 The Geographic Dispersion of Social Networks

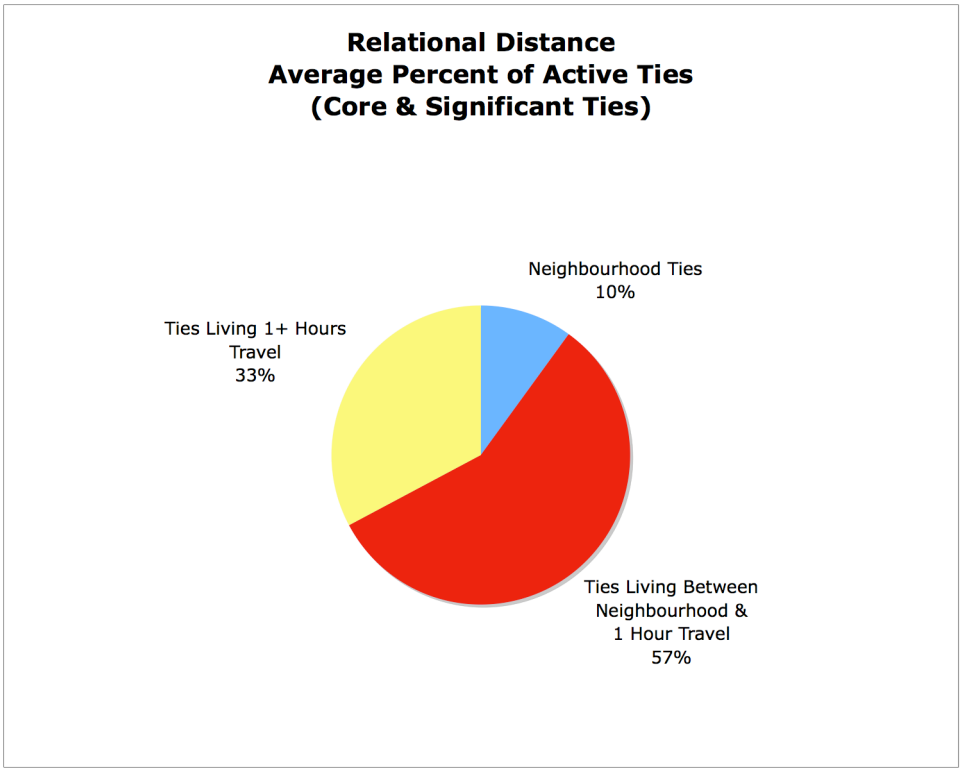
As discussed in the theoretical framework chapter, modern ties have been characterized as becoming increasingly geographically dispersed. The literature reviewed suggests that a substantial portion of social ties exist beyond neighbourhood boundaries, but not further than one hour's travel (Wellman & Mok 2007). Do findings from the Social Ties data square with the results of previous studies? Because the Social Ties survey used a somewhat unique method of estimating network size and distance, and other studies sometimes sampled from different populations, it is important to see how its results compare to other studies.

The Social Ties survey asked respondents to report the number of their core and significant ties that are neighbours. Later, it asked them to estimate the number of core and significant ties that live more than one hour's travel from their homes. Using these answers, distance of ties was coded using three categories: the number of neighbourhood ties, the number of ties living between the neighbourhood and one hour's travel, the number of ties living more than one hour's travel.

In general, the results supported the findings of previous studies – most ties existed somewhere between the neighbourhood and one hour's travel. On average, 58 percent of respondents' active tie network lived between the neighbourhood and one hour's travel. On average, 32 percent of respondents' active ties lived further than one hour's travel, and 10 percent lived within

neighbourhood boundaries. See Figure 3.4. Translated into numbers, there are an average of 5 neighbourhood ties, 30 ties between the neighbourhood and 1 hour's travel, and 17 ties living more than 1 hour's travel from the respondents' homes. As with most social tie distributions, these averages are somewhat inflated by the existence of a positive skew. The median number of active ties per distance are as follows: 2 neighbourhood ties, 19 ties between the neighbourhood and 1 hour's travel, and 7 ties living more than 1 hour's travel away.

Figure 3.4



The distribution of ties per distance increment does not vary greatly when active ties are broken down by tie strength. On average, 9 percent of core ties are

neighbours, 58 percent live between the neighbourhood and 1 hour's travel, and 33 percent live more than 1 hour's travel from the respondents' homes. This means that, on average, 2 core ties are neighbours, 16 live between the neighbourhood and 1 hour's travel, and 8 live more than 1 hour's travel. The average percent of significant ties is distributed almost identically. 10 percent are neighbours, 59 percent live between the neighbourhood and 1 hour's travel, and 31 percent live more than 1 hour's travel.

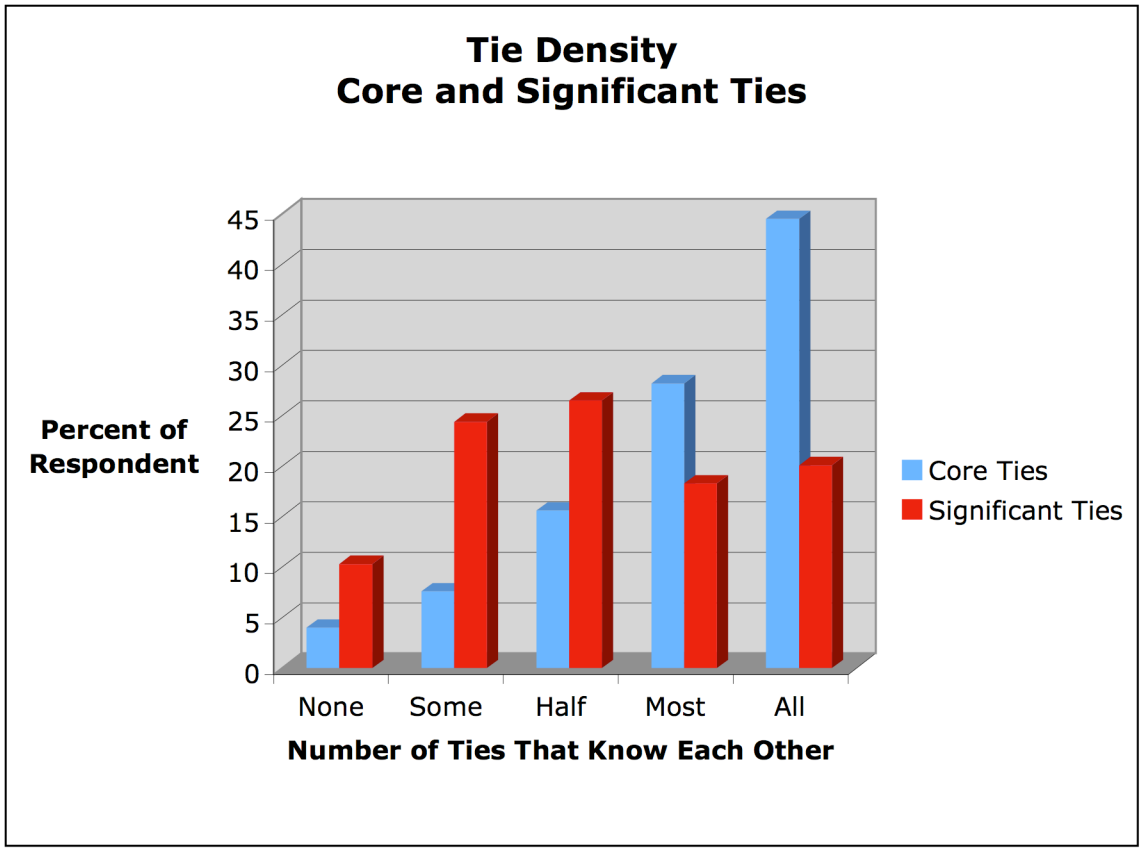
3.2.5 The Density of Social Networks

Literature reviewed in the Chapter One indicates that social networks have become more loosely knit since the industrial revolution. Although it is impossible to go back in time and measure the density of networks 200 years ago, we can know the density of networks today. This gives an indication how many Americans have networks that typify this uniquely modern characteristic.

Due to time constraints when administering the survey, it was impossible to ask about the relationship between each pair of active ties. To get a general measure of network density, respondents were asked to approximate how many of their ties knew each other, choosing one of five possible answers: they *all* know each other, *most* of them know each other, about *half* know each other, only *some* know each other, or *none* know each other. Respondents were asked to give estimates both for their core ties and their significant ties.

The survey results show differences between the density of core and significant tie networks. See Figure 3.5. In general, core ties are typically denser than significant ties. For example, approximately 73 percent of respondents reported that most or all of their core ties know each other. By contrast, approximately 38 percent of respondents reported that most or all of their significant ties know each other. These results strongly support Mark Granovetter's argument that weak ties tend to be less dense than strong ties.

Figure 3.5



Although the density of core and significant ties is quite different, there is one similarity. Only a small percent (approximately 4 percent) of respondents reported that none of their core ties know each other. Similarly, only a small percent (approximately 10 percent) reported that none of their significant ties know each other. This shows that most Americans have at least some network density among their ties, regardless of their strength. Nevertheless, approximately 24 percent of respondents reported that only some of their significant ties know each other, and another 27 percent reported that half of their significant ties know each other. This shows that a large percent of Americans have loosely knit networks of significant ties.

Overall, these findings show that a large percent of Americans have loosely knit networks of significant ties, even though few have networks that are completely fragmented. Nevertheless, core ties tend to be dense, with most, if not all core ties knowing each other. Although data regarding the density of past networks is not available, these results support the claim that a substantial percent of people living in contemporary America have loosely knit networks.

3.3 Media Use in America

3.3.1 Placing Email in Context

This dissertation seeks to understand the extent to which the need to connect with modern ties drives the use of email. But before answering this question, it is

important to first understand the extent to which email is generally used to connect with social networks. Existing literature does not answer this question. Because email use is typically measured as the frequency of email sent, or the time that is spent sending email, little evidence exists about the extent to which it is generally being used to contact ties.

This section uses the Social Ties data to examine the extent to which Americans use email to connect with their core and significant tie networks. To put these results into context it will compare contact by email to contact made by other popular forms of communication media. This will help put email use in perspective by showing the extent to which it is a common form of communication.

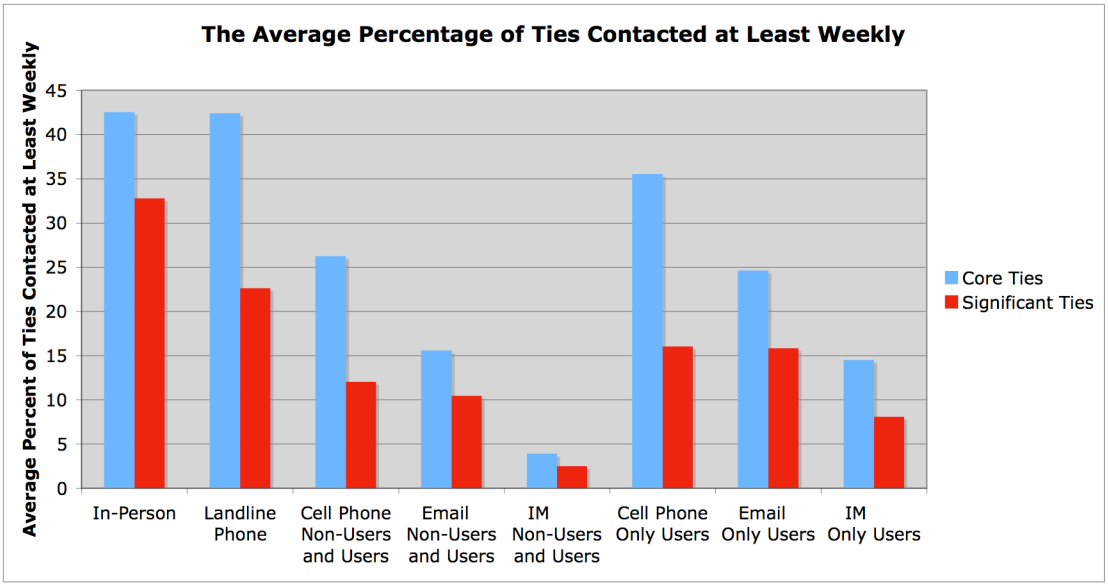
3.3.2 Connecting With Core and Significant Tie Networks

The Social Ties data shows that even with the popularity of email, people still most commonly communicate with their social ties in traditional ways – in person and by landline phone. However, many also use email and cell phone to stay connected. There is an identical order for both core and significant ties for how often each communication medium is used. In-person encounters are most widely used, followed by landline phone, cell phone, and email.

Even though people have a larger number of significant ties in their active tie networks, they are in at least weekly contact with more of their core ties than

with their significant ties. This is true for every communication medium. For example, they are 1.3 times more likely to have an in-person contact with a core tie at least weekly than with a significant tie, 1.8 times more likely to have a landline phone call, 2.2 times more likely to have a cell phone call, and 1.6 times more likely to use email. (The calculations regarding cell phone and email include only respondents that use these technologies.) However, it should be noted that before respondents were asked to report on their number of core and significant ties, they were told that core ties are contacted more frequently than significant ties. This partly explains why these results show that core ties are contacted more often than significant ties. Nevertheless, it does not explain why core ties were contacted more often by *every* medium. This indicates that people do not discriminate between communication media when contacting ties of differing strengths. Instead, they use all media more often when contacting strong tie networks.

Figure 3.6



Communicating with core ties

Americans rely heavily on in-person encounters and telephones—both cell phones and landline phones—to connect with core ties (Figure 3.6). They see slightly less than half (43 percent) of their core ties in-person at least weekly, and they are also in weekly landline telephone contact with slightly less than half (42 percent) of their core ties.

Yet, new communication technologies—cell phones and email—play important roles in connecting people with their core ties. Email users send messages weekly to a quarter (25 percent) of their core ties. Those with cell phones use them to call more than one-third (36 percent) of their core ties at least weekly.

Communicating with significant ties

In-person meetings are the most widespread way in which significant ties are contacted weekly. In comparison to core ties, landline phones, cell phones, and email are not used as much to connect with significant ties.

By contrast, people are much less likely to phone their significant ties than their core ties. Rather, they usually connect with their significant ties in person. One-third (33 percent) of all significant ties are seen in-person at least weekly, while about one-quarter (23 percent) are contacted by landline phone. Lower percentages are in weekly contact by cell phone, and email.

3.3.3 Communication Using Specific Media

Email

Even for those with internet access, email is used less often than in-person encounters or telephoning for connecting with core ties. However, email is used equally as often as cell phones for connecting with significant ties.

When people have internet access, email is important for maintaining contact with both core and significant ties. Email users contact 25 percent of their core ties at least weekly as well as 15 percent of their significant ties. Far from being a medium that connects weaker ties in superficial ways—one of the fears of

the turn towards internet communication—email is actually used more for maintaining core than significant ties.

Landline phones

Landline phone contact is more common for connecting with core ties than it is for connecting with significant ties. Landline phones are the second most widespread way of connecting with both core and significant ties. However, landline phones have a more important role in connecting people with their core ties than with their significant ties. While an almost equal percentage (43 percent) of core ties are contacted in person and by landline phone, a lower percentage of significant ties are contacted weekly by landline phone (23 percent) than in-person (33 percent). People are 1.8 times more likely to connect with significant ties in person than by landline phone. They are also almost twice as likely to use landline phones to connect weekly with their core ties than with their significant ties.

Cell Phones

Cell phones are used to make weekly contact with a greater percentage of core ties than is email. However, cell phones and email are used about equally for connecting with significant ties. People contact a quarter of their core ties weekly by cell phone (26 percent) but only 12 percent of their significant ties. Similarly, they are more apt to use email to contact their core ties weekly (15 percent) than their significant ties (11 percent).

These are the percentages for all of the Americans surveyed. Yet, not all Americans have cell phones or internet access: only 74 percent of the people we surveyed are cell phone users, and even smaller percentages are email users (63 percent). However, even those who have cell phones and use the internet are more apt to contact core and significant ties in-person or by landline phone than by cell phone or email.

From Percentages to Numbers

What do the percentages in this section mean in terms of numbers? They show that Americans on average are in at least weekly contact in-person with a median of 5 core ties and 4 significant ties. They are also in weekly landline phone contact with 5 core ties but only 2 significant ties. They are in weekly cell phone contact with 2 core ties but no significant ties, and do not have any weekly email contact with any core or significant ties.

The numbers given in the previous paragraph refer to all Americans, including those who do not use cell phones or email. When examining only those Americans who use these media, these means rise substantially. On average, cell phone users are in weekly cell phone contact with 4 core ties and 1 significant tie, while email users are in weekly email contact with 2 core ties and 1 significant tie. The data in Figure 3.3 shows that cell phone and email users contact in-person and by phone the same number of core and significant ties as non-users. However, the fact that email is used to contact a significant percent of ties (25 percent of

core ties 15 percent of significant ties) at least weekly shows email has clearly aided contact.

3.3.4 Media Multiplexity in Social Networks

The overall significance of email use in America not only depends on how it compares to other media, it also depends on whether it is used along with other media.

As discussed in Chapter 1, Haythornthwaite & Wellman (1998, 2000) find that the more people contact their ties using one medium, the more they contact their ties using other media. However, the measures used by Haythornthwaite & Wellman examined the frequency with which people contact their ties by email. In contrast, the Social Ties data looks at the number of ties contacted. It is not clear if those who use one medium to contact many ties will also use other media to contact many ties. For example, it may be that people contact many ties in-person, but only contact a few by email.

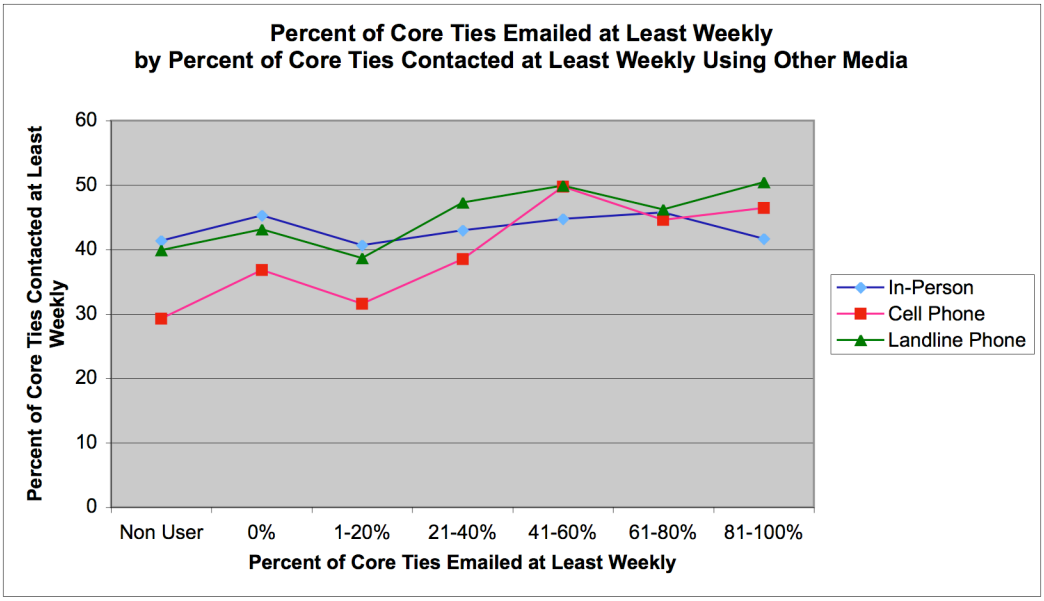
Given that it is unclear if multiplexity will exist when examining the number of ties that are contacted by various media, I now use the Social Ties data to examine the relationship between email use and contact that occurs in-person and by telephone.

3.3.4.1 Core Ties and Media Multiplexity

Generally, the higher the percentages of core ties that are contacted by email, the higher the percentage of core ties that are contacted by mobile and landline phone (Figure 3.7). Those who have weekly email contact with a high percentage of their core ties usually have weekly contact with a high percentage of their ties by phone (landline and cell). For example, people who send weekly emails to the great majority (80 percent to 100 percent) of their core ties are also in weekly landline phone contact with 50 percent of their core ties. By contrast, those who do not send email are in weekly phone contact with 40 percent of their core ties. This is an increase of 25 percent (or 10 percentage points) in phone contact from those who do not email any core ties to those who email almost every core tie at least weekly.

However, email does not appear to be associated with in-person contact: People see about the same number of core ties regardless of whether they email a few or many core ties (Figure 3.7). The percent of weekly in-person contact does not decrease as the percent of weekly email contact increases. For example, the percentage of core ties seen in-person at least weekly is the same, 41 percent, for both those who do not use email and for those who email 80 percent to 100 percent of their core ties at least weekly.

Figure 3.7



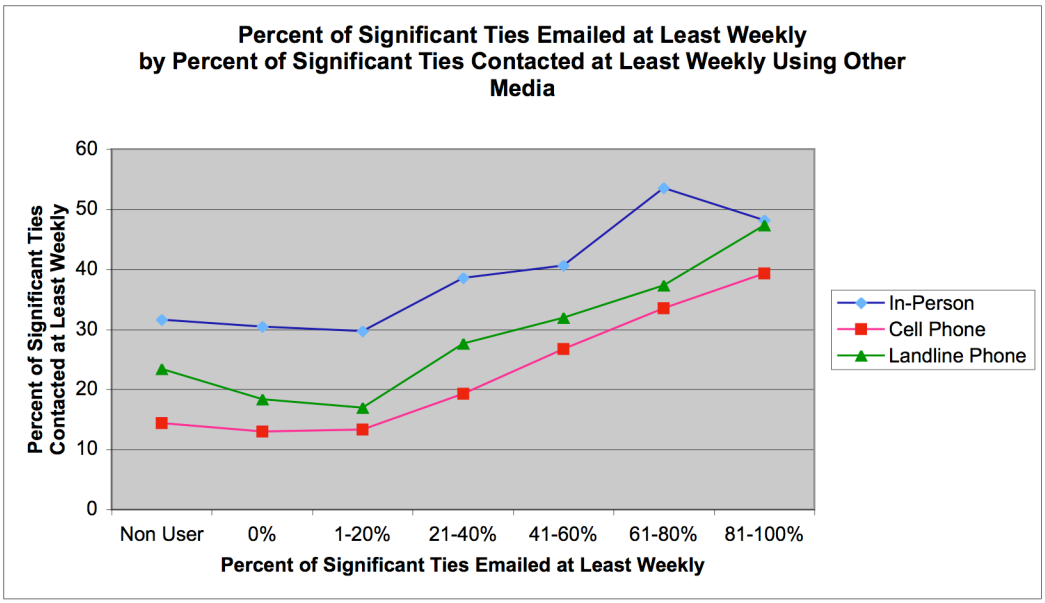
3.3.4.2 Significant Ties and Media Multiplexity

The greater the percentage of significant ties contacted weekly by email, the greater the percentage of significant ties in that network that are contacted weekly by all other means of communication we surveyed—cell phone, landline phone, and in-person. The steep lines in Figure 3.8 for significant ties show that the positive ties between emailing and other forms of contact are stronger for significant ties than for core ties. Heavy email users have more than twice as much landline phone contact and three times as much cell phone contact than email non-users. People who email weekly with almost all of their significant ties (80 percent to 100 percent) have weekly contact with 48 percent of their significant ties by landline phone and 47 percent of their significant ties by cell

phone. By contrast, non-users of email have weekly landline phone contact with 23 percent of their significant ties and cell phone contact with only 14 percent.

The same pattern holds for in-person contact although the differences are not as marked. Those people who use email for weekly contact with 80 percent to 100 percent of their significant ties have weekly in-person contact with 48 percent of their significant ties. By contrast, email non-users have weekly in-person contact with 32 percent of their significant ties. There is an increase in in-person weekly contact of 50 percent (or 16 percentage points) between non-email users and heavy users.

Figure 3.8



In general, these findings show that media multiplexity exists not only when examining the frequency of contact, but also when examining the number of ties that are contacted.

3.4 Conclusion

These results show that email is just one part of a much larger communication system. This system draws on many types of media to make contact with many kinds of ties. This complexity is consistent with previous research examining social network composition and media use in America. As network analysts have already shown, social networks contain many types of ties, many of which are voluntary. The large percent of friendship ties in both core and significant networks indicates that people often maintain relationships that are highly voluntary in nature. Moreover, the large percentage of core and significant ties that include people from outside of neighbourhood boundaries shows that people rely heavily on transportation and communication technology to connect with many of their ties. Finally, the evidence of media multiplexity found in this data supports previous findings by Haythornthwaite and Wellman (1998), showing that the more ties people contact by email, the more ties they contact through the use of other media.

Given that these findings show that Americans contact fewer of their ties by email than by other media, and that those who use email also use other media, it may be argued that email plays a relatively minor role in the total communication system. It could be that email is only a supplement to other more rich forms of communication. In this way, email may only be useful insofar as it helps arrange more meaningful contact that occurs in-person or by the telephone.

However, these descriptive statistics only give averages, without showing how different types of ties and media vary as part of one coherent communication system. This makes it impossible to know if the more ties people have, the more they contact their ties by email. In the chapter that follows, I will use multivariate statistics to examine these associations. This should give a much more comprehensive indication of email's social utility for those who are most connected.

Chapter 4

The Relationship of Personal Networks to Email and Other Communication Media

4.1 Introduction

The previous chapter has shown that American communication networks are composed of many different kinds of ties, and they rely on many different kinds of media to connect with those ties. These findings are consistent with the literature reviewed in Chapter 1. Just as the network analysts argued, contemporary networks draw on ties from a variety of sources. Although the strong presence of kin ties shows that Americans have not abandoned older forms of community, the strong prevalence of friendship ties shows that Americans exercise greater choice in determining who is part of their active networks. Moreover, these findings are consistent with research regarding the social implications of internet use. The heavy use of in-person and telephone contact shows that people have not abandoned older ways of communication. These findings also show that high levels of in-person and telephone contact typically accompany high levels of email use. In general, it appears that the way Americans use communication media is as rich and multiplex as their networks themselves.

What exactly is the role of email in this complex communication system? Although recognizing the complexity of communication networks in America is

an important first step to placing the social significance of email in context, this chapter will go further, examining the extent to which these different kinds of ties and communication media lead people to adopt and use email.

On the one hand, it could be argued that email only plays a minor role in connecting people with their social networks. The previous chapter has shown that email is used comparatively less than other media. Moreover, there is no evidence to show that email has replaced other media – high levels of email contact are typically accompanied by high levels of contact through other media. Thus, it may be argued that email merely supplements contact that occurs through more rich media. In this way, email's utility may depend entirely on the use of other media. That is, if people do not use other media to contact their ties, they will not use email. This line of reasoning fits well with the literature that views email as a "thin" medium. Lacking the rich sensory feedback of in-person or even telephone contact, email may help people only to the extent that it is used to connect them through more engaging media.

On the other hand, I have theorized that email's utility may be dependent on more than just the extent to which people communicate in-person and by telephone – it may be an extremely important communication medium for those who are the most connected. The more ties people connect with, the more the lean nature of email may work to their advantage. The asynchronous nature of email may help those with many ties to contact avoid scheduling conflicts. Moreover, it may help them stay in ultra connection with their ties, letting them stay in-touch when ties are not available for contact by synchronous means. For these reasons,

the utility of email may depend on more than the use of other media alone – it may depend on how many ties people have in their networks.

Although email may be well suited to the needs of highly connected individuals, their ability to use email may be severely constrained by the kinds of ties that they would like to contact. The literature reviewed in Chapter 1 has shown that email is used to connect with some ties more than others. For example, there is a strong indication that people often use email to contact their friends, but they use it less often to contact their kin. I explain these results by drawing on the concept of social affordance, which considers the social characteristics of ties a fundamental determinant of the kinds of communication media that can be used to contact those ties. If a certain kind of tie does not have social characteristics that make it amenable to email contact, then people will not use email, even if they have many of those ties to contact.

This dissertation focuses on two kinds of tie characteristics that may limit the extent to which people use email when they have many ties in their networks: tie type and tie distance. Drawing on a variety of literature about the nature of contemporary social life, I explained in Chapter 1 how the nature of these various relationships make them more or less amenable to email contact. I will briefly review these arguments regarding tie type and tie distance.

I focus on three types of ties: friend, work and kin ties. In Chapter 1, I used literature regarding the nature of contemporary ties as a starting point for understanding the basic characteristics of these ties. This literature showed that

people in contemporary society often have high amounts of choice when determining whom to contact, and how that contact occurs. The separation of work and kin life during the industrial revolution allowed people to form ties more actively, outside of their given kin group. Georg Simmel (1922) argued that the ability to form ties based on common inclination, rather than common affiliation, is the hallmark of contemporary social life. Anthony Giddens (1990, 1991, 1992) made a similar argument, explaining that the ability to choose interaction partners was enabled through more complex ways of co-ordinating social interaction. Technological innovations such as the mechanical clock and transportation systems increased the choice available when determining when and where contact occurs. Thus, the increasing choice in determining whom to contact was enabled by increasing choice in determining how (when and where) contact was to occur. Friendship ties provide high amounts of choice in determining with whom and how contact occurs, making them open to the possibility of email communication. Work ties also provide some choice in who contact occurs with, and especially how it occurs, making them open to email contact. Moreover, these ties often exchange high amounts of information, for which email is well suited. Finally, kin ties provide the least amount of choice when determining who is contacted, and how that contact occurs. For this reason, these ties may be less open to email contact than friendship and work ties.

I focus on three types of tie distance: neighbours, mid-range, and distant ties. Mid-range ties live beyond the neighbourhood but still within 1 hour's travel, while distant ties live more than one hour's travel. The literature reviewed in

Chapter 1 shows that while Americans are becoming more rooted in their neighbourhoods, they are paradoxically becoming more mobile. Advances in transportation technology have allowed people to maintain regular contact with many relationships that exist beyond neighbourhood boundaries. However, time and distance have not collapsed completely; those ties that live beyond one hour's travel typically are not contacted in-person as often as those living closer to home. As with tie type, distance also limits the choice that people have when determining whom they contact and how that contact occurs. People have the least choice in who their neighbours are, or how they are contacted. For this reason, these ties are not as open to email, although those that have many neighbour ties may use email only to supplement in-person contact. By contrast, mid-range ties generally provide the greater choice in determining who is contacted and how that contact occurs. These ties live close enough that people may see them in-person, but this contact is often necessitated by shared geographic location. For this reason, these ties may be open to email contact, but may also use it as a supplement to extended kinds of contact. Finally, because distant ties lack shared location, they often require that people choose to actively stay in-touch. The low cost of distant communication afforded by email make it well suited for staying in contact with these ties. Moreover, the difficulty or expense of in-person or telephone contact means that email may also be used as the primary mode of communication for contacting distant ties.

In sum, although the descriptive statistics discussed in Chapter 3 show that Americans typically do not use email to contact as many ties as they do in-person

or by telephone, email may still be an important medium. I expect that it will be particularly important for those who have large numbers of social ties to contact. Nevertheless, the ability to use email when contacting ties may be limited by the characteristics of the ties being contacted. In particular, I expect that while friendship, work, and kin ties may all be at least somewhat open to email contact, friendship and work ties will be more open to email than kin ties. I further expect that while neighbour, mid-range and distant ties will all be at least somewhat open to email contact, mid-range and distant ties may be more open to email than neighbour ties. In this chapter, I will use evidence collected from the Social Ties survey to test the validity of these assertions. I will first explain how I plan to analyse the Social Ties data, and then I will use this analysis to test each of the hypotheses stated in Chapter 1.

4.2 Plan of Analysis

The dissertation focuses on answering the following research question: is there evidence that the more ties Americans have, the more they use email? As discussed in Chapter 1, when examining the relationship between the number of ties that people have and their use of email, I operationalize email use as the number of ties that are sent email at least once a week. However, when examining the significance of demographic variables on email use, I also operationalize email use as those who are email users vs. those who are not email users. In

Chapter 1 I argued that social ties are casually prior to email use. For this reason, I treat these two measures of email use as dependent variables.

Given that my first measure of email use – the number of ties contacted by email at least weekly – is continuous, I use linear regression when treating this measure of email use as the dependent variable. Given that my second measure of email use is dichotomous – non-users vs. users – I use multinomial logistic regression when treating this measure of email use as the dependent variable.

My main independent variables are the number of ties that people have in their networks, contact that is made in-person and by telephone, and demographic characteristics. To control for the potentially confounding influence of these factors on each other, I use multiple regression. Moreover, because the data being used collected tie type and distance information in aggregate, rather than for each tie, there is strong multicollinearity when using both tie type and tie distance variables in the same regression equation. For this reason, separate regression analyses will be run for tie type and tie distance. Finally, when examining the influence of tie strength, I run separate linear regression analysis for core and significant ties. In total, the different combinations of these variables lead me to use 7 sets of regression models. In the text that follows I will explain the variables in greater detail, and then use these models to test each of the hypotheses stated in Chapter 1.

4.2.1 Dependent Variables

The Number of Ties Contacted at Least Weekly

This measure is taken from a set of questions that asks people about their core and significant ties. First, respondents report the number of their core ties living outside of their homes, who are immediate kin, extended kin, work, and friendship ties. The interviewer then sums these ties, giving a total number of core ties. Later, respondents are asked how many of these core ties they, "…send email to at least once a week?" These same questions are later repeated for significant ties. It is important to note that respondents are asked to report only those ties to whom they send email, but not from whom they receive email. This is because I expect that the number of ties that people have in their networks will lead people to actively use email to maintain contact. Sending email gauges active communication use better than receiving email, which may occur because people are part of listservs.

On average, email users send email at least once a week to approximately 5 (25 percent) of their core ties and 4 (15 percent) of their significant ties. In total, this means they send email to at least 9 active ties at least once a week. However, these distributions are highly skewed, showing skewness scores of 5.6, 11.9 and 8 for core, significant, and active (core + significant) ties, respectively. For this reason, a base 10 logarithmic transformation was applied to these scores before using them as dependent variables in the linear regression analyses that follows.

Users vs. Non-Users

Being an email user is measured in the Social Ties survey as those respondents who used email at least once in the past month. Respondents are coded as being email users based by way of a filter question. First respondents are asked if they ever, "… go online to access the Internet or World Wide Web or to send and receive email." Those respondents that reply "yes" are later asked: "In the past month, have you used… email?" I treat those respondents who replied, "yes" as those respondents who are email users. Of the 2,200 respondents, 1,381 (63 percent) say that they use email at least once a month.

Being an email user vs. being a non-user is the dependent variable used to test hypotheses H 1, H 1.1, H 1.2, H 2, H 2.3, H 3, and H 3.3. Because testing these hypotheses involves controlling for the effects of multiple variables, I will use binary logistic regression analysis. In the analysis, 1 = is an email user and 0 = is not an email user.

4.2.2 Independent Variables

Tie Type: Number of Friend, Work, and Kin Ties

Number of friend, work, immediate kin and extended kin, are main independent variables in each analysis that follows. The measures and results of friend, work, and kin ties, are discussed in Chapter 3, sections 3.2.1 and 3.2.2. I will only

briefly review this discussion here, with an additional explanation of how outliers are treated in the analysis that follows.

Respondents report an average of 15 friendship, 11 immediate kin, 10 extended kin, and 9 work ties that are active (core + significant) ties. Among the core ties, there is an average of 6 immediate kin, 6 friendship, 5 extended kin, and 3 work ties. Among the significant ties, there is an average of 9 friendship, 6 work, 5 immediate kin, and 5 extended kin ties.

These distributions contained outliers, which I define as being those respondents with scores that are 3.29 standard deviations (SD) above the mean. 3.29 SD is the 99th percentile, in a normal distribution. Defining outliers in this way is common practice, according to Tabachnick & Fidell (1996). Although 3.29 SD is somewhat of an arbitrary cut point, using this method allows for consistency in identifying outliers. Identifying outliers is important, because they can potentially distort the results of a regression analysis. As a way of minimizing the influence these outliers have on my analysis without excluding them entirely, all respondents with scores above 3.29 SD are recoded to have a score of exactly 3.29 SD above the mean.

Tie Distance: Neighbour, Mid-Range, and Distant Ties

The previous chapter describes these variables in detail. I will only now briefly repeat their coding and average scores. Tie distance is divided into three groups: neighbours, mid-range, and distant ties. Mid-range ties are those ties living

between neighbourhood boundaries and 1 hour's travel. Distant ties are those ties living more than 1 hour's travel.

Among the active ties, there are an average of 5 neighbourhood ties, 30 mid-range ties, and 17 distant ties. These averages do not differ greatly when they are broken down into core and significant ties. On average, 2 core ties are neighbours, 16 are mid-range, and 8 are distant. These averages are almost exactly the same for significant ties.

In-Person and Telephone Use

Contact that occurs in-person, by landline telephone and by mobile phone is treated as independent variables in both analyses that follow. Respondents report their level of in-person and telephone use in the same way they report their level of email use. First, respondents report the number of their core ties living outside of their homes, which are immediate kin, extended kin, work, and friendship ties. The interviewer then sums these ties, giving a total number of core ties. Later, respondents are asked how many of these core ties they, "…talk with face-to-face at least once a week?" "…talk with by cellular phone at least once a week?" and "…talk with by regular landline phone at least once a week?" These same questions are later repeated for significant ties.

The results of these questions are discussed in detail in Chapter 3. I will only briefly review the results here. Respondents report that they see an average of approximately 16 active ties in-person, and they call 11 active ties by landline telephone, and 7 active ties by mobile phone, at least once a week. Among these

ties, the average number of ties contacted is much higher for the core ties than the significant ties. On average, respondents report that they see 8 core ties in-person, and they call 7 by landline telephone, 4 by mobile phone, at least once a week. By contrast, they see 7 significant ties in-person, call 4 by landline phone, and 2 by mobile phone, at least once a week.

As with the number of ties contacted by email, the number of ties contacted in-person, by landline telephone, and by mobile telephone, all contain outliers that could distort analysis results. To minimize their influence in the analysis, they are recoded to a value of 3.29 SD.

Demographic Variables

Age: Age is measured as the exact year reported by the respondent. Scatter plot results show a clear curvilinear relationship between age and being an email user. In general, people in their late 30s use email more than those of different ages. However, the number of respondents who are email users decreases significantly in respondents over 40 years old. For this reason, the square root of age is included in the regression analyses that follow. Such a curvilinear relationship was not found when producing a scatter plot for age and the number of ties emailed. However, the square root of age is included when predicting the number of ties emailed, so there is consistency across models. It is also included in case a curvilinear relationship emerges when controlling for other potentially confounding variables.

Gender: As discussed in Chapter 2, 53 percent of the respondents are female, and 47 percent are male.

Education: Education is measured as the last grade or class that the respondent completed in school. Of the 2,200 respondents, 36 percent reported having high school or less, 29 percent had some college or an associate degree, 19 percent were college graduates, and 13 percent had a post graduate or professional degree. Preliminary analysis found the largest differences in the odds of being an email user between those who had at least a college degree, and those with less education. To strengthen the analysis by minimizing the total number of degrees of freedom, education was coded into a dichotomous variable: 0 = some college or less, 1 = college degree, postgraduate degree, or professional degree.

Occupation type: During the Social Ties interview, respondents were read a list of 10 different occupations. Those that described their jobs as "knowledge based professional worker," "other professional worker, manager, executive, or official," or "business owner" are coded as having a score of 1, while all others are given a score of 0. Those who reported themselves to be a "knowledge based professional worker," or "other professional worker, manager, executive, or official," reported similar numbers of ties: 56 and 57 active ties, respectively. Business owners reported the highest numbers of ties, having an average of 64 ties. Although business owners would ideally have their own variable in the analyses that follows, they are too small in number to have a category of their own. Only 54 of the 2,200 respondents reported that they are business owners (less than 5 percent of the total sample). This does not meet the standard criterion

of having at least 10 percent of respondents in binary variables (Tabachnick & Fidell 1996). For this reason, business owners are categorized along with professionals, to create a single binary variable. 1 = knowledge based professional, other professional, or business owner; 0 = other occupation type.

4.2.3 Control Variables

Years Online

In the analyses that treat the number of ties emailed as the dependent variable, the number of years online is treated as a control variable. Years online is the total number of years that the respondent reports having internet access. Because it may take time to become accustomed to email, those with more experience online may be more likely to send email to their ties. Moreover, because those who are young do not have the opportunity to be online for long periods of time, years online potentially affects the relationship between age and the number of ties emailed.

Extroversion

I do not treat extroversion as an independent variable because it does not measure the social utility of email that interests me – that is, the extent to which the number of ties that people have in their networks or communication media use determines the number of ties emailed. Nevertheless, I include it as a control variable, because it may influence both the number of ties emailed and the

number of ties people have in their networks. Those that are extroverted likely have more ties, and to use email more than those that are not extroverted (Kraut et al. 2002).

Respondents were asked 5 standard questions about their level of extroversion. Answers ranged in score from 0 to 5. The extroversion variable is of these scores. This method of coding the extroversion variables is similar to the method used by Robert Kraut et al. (2002).

Voluntary Participation

In Chapter 1, I theorized that those with many ties would use email because they are in heavy communication with their ties, and because email would help them deal with scheduling conflicts. This leads me to expect that there will be a positive relationship between the number of ties that people have and the number of ties that they contact by email.

However, it may be argued that any positive relationship between the number of ties that people have in their networks and the number of ties that they email is not caused by the fact that email is useful for those with many ties. Instead, it may be argued that participation in voluntary associations causes people to have many ties and it causes people to use email.

Participation in voluntary associations may increase the number of ties that people have in their networks. The results discussed in the previous chapter show some evidence that those in voluntary associations have large networks.

There is a relatively small but statistically significant correlation between participation in voluntary associations and number of friendship ties.

Research about the social implications of internet use also shows that people who participate in voluntary association tend to be heavy users of the internet (Katz, Rice & Aspden 2001; Quan-Haase et al. 2002; Glavin working paper). It is quite possible that people often send email to all members in their voluntary associations as a way of staying active in these groups. According to this line of argument, voluntary participation would act as a source of spuriousness.

Given the possibility that participation in voluntary associations may act as a source of spuriousness for the hypothesized relationship between the number of ties that people have in their networks and their use of email, I control for participation in voluntary associations.

Density

As argued in Chapter 1, email is useful for connecting with networks of all densities. For sparse networks it is useful for connecting people individually, the cc: function makes it possible to contact many people in dense networks. Nevertheless, density may affect telephone use, which does not typically enable group communication. For this reason, when testing hypotheses regarding the impact of tie strength, tie density may affect telephone use, which in turn may affect email use. Results presented in Chapter 3 also show that tie density is

different for core and significant ties. For this reason, I control for density in regression models that compare tie strength.

4.3 Results

As argued, the extent to which the number of ties that people have leads them to use email, depends on the type and distance of those ties. I will begin by giving results regarding tie type, and then tie distance. These results pertain to active ties, which are the sum of both core and significant ties. After reporting these results and explaining if they meet the expectations hypothesized in Chapter 1, I will then discuss these results as they vary by tie strength.

4.3.1 Tie Type and Email Use

Although it may be generally true that the more ties people have in their networks the more they use email, not every type of tie may be equally open to contact that occurs through email. As argued in Chapter 1 and at the outset of this current chapter, I expect that those ties that permit the greatest amount of choice when determining who is contacted and how that contact occurs are also the most open to email contact. Nevertheless, I have argued that friendship, work, and kin ties may all be open to email contact to at least some extent. This led me to hypothesize that:

H 1 ***The greater the number of friendship, work, and kin ties, the greater the number of ties that are emailed.***

The results given in Table 4.1, Model 2, show some support for this hypothesis. (Note that Model 1 is discussed below.) There are statistically significant (at the 0.01 level) relationships between the number of friendship, work, and extended kin ties that people have in their active networks and the number of ties that they contact by email at least weekly. However, there is no statistically significant relationship between the number of immediate kin ties that people have in their active networks and the number of ties that they email.

Although this difference between immediate and extended kin ties was not explicitly hypothesized, it does fit with the theoretical framework discussed in Chapter 1. It is possible that in-person or telephone contact with immediate kin typically occurs through routine interaction that does not require advanced co-ordination by email. This may mean that people have even less choice when determining who is contacted and how contact occurs, with immediate kin than with extended kin.

Table 4.1
Multiple Regression Results: Number of Active Ties Emailed At Least Weekly - Users Only

	Number of Active (Core + Significant) Ties Emailed at Least Weekly (log)		
	Model 1 Beta	Model 2 Beta	Model 3 Beta
Years Online	0.17 **	0.15 **	0.15 **
Extroversion	0.17 **	0.09 **	0.07 *
Voluntary Associations	0.19 **	0.12 **	0.10 **
Age - Square Root	-0.12	-0.16	0.05
Age	0.09	0.10	-0.08
Male	-0.04	-0.08 **	-0.08 **
College +	0.04	0.04	0.06 *
Professional	0.06	0.03	0.03
Number of Active Ties			
Friendship Ties		0.24 **	0.18 **
Work Ties		0.23 **	0.14 **
Extended Kin Ties		0.11 **	0.07 *
Immediate Kin Ties		0.00	0.00
Number of Active Ties Contacted at Least Weekly			
In-Person			0.12 **
Landline Phone			0.10 **
Mobile Phone			0.10 **
Adjusted R Square	0.13	0.28	0.32

N = 1012
*p < 0.05
**p < 0.01

Although friendship, work and kin ties are all at least somewhat open to email contact, as discussed in Chapter 1, I expect that friendship and work ties are more open to email contact than kin ties. This is because friendship and work ties typically yield greater amounts of choice in determining who is contacted and how contact takes place than kin ties, I further hypothesized that:

H 2 Friendship and work ties are more strongly associated with the number of ties that are emailed than kin ties.

This hypothesis is supported by the analysis presented in Table 4.1, Model 2. The standardized coefficients for friendship and work ties are more than twice as large than the standardized coefficient for extended kin ties (0.24 and 0.23 vs. 0.11, respectively). Moreover, the standardized coefficient for immediate kin ties is 0.00, which is much lower than the standardized coefficients for friendships and work ties.

In Chapter 1, I argued that email would most likely be used as a supplement to in-person and telephone contact that occurs with kin ties. For this reason, the relationship between the number of kin ties that people have in their networks may lead them to have more in-person and telephone contact, which would in turn lead them to have more email contact. By contrast, I argued that it might be used both as a supplement and as the primary mode of contact when connecting with friendship and work ties. This led me to hypothesize that:

H 3 ***When controlling for the effects of in-person and telephone contact on the number of ties that are emailed, the positive relationships between the number of friendship, work, and kin ties that people have in their networks and the number of ties that they email will disappear for kin ties but not for friendship and work ties.***

The results presented in Table 4.1, Models 2 and 3, generally support this hypothesis. The statistical significance of extended kin ties decreases from the 0.01 level to the 0.05 level when controlling for in-person and telephone contact. This suggests that when email is used to contact extended kin ties, it is often used as a supplement. However, because the association between the number of friendship and work ties that people have in their networks is strong before controlling for in-person and telephone contact, these coefficients still remain statistically significant when controlling for in-person and telephone contact. This suggests that email is used heavily both as a supplement and as the primary mode of contact when connecting with friendship and work ties.

4.3.2 Tie Distance and Email Use

As argued in Chapter 1 and at the outset of this current chapter, the geographic distance of ties may also make them more or less open to email contact. However, in general, the social affordances offered by email make it at least somewhat useful for contacting ties at almost any given distance. This led me to hypothesize that:

H 4 ***The greater the number of neighbour, mid-range, and distant ties, the greater the number of ties that are emailed.***

Results given in Table 4.2, Model 2, generally support this hypothesis. The association between the number of neighbour ties that people have in their networks and the number of people that they email is statistically significant at the 0.05 level. The associations between the number of mid-range and distant ties that people have in their networks and the number of people that they email are both statistically significant at the 0.01 level.

Table 4.2
Multiple Regression Results: Number of Active Ties Emailed At Least Weekly - Users Only

	Number of Active (Core + Significant) Ties Emailed at Least Weekly (log)		
	Model 1 Beta	Model 2 Beta	Model 3 Beta
Years Online	0.17 **	0.14 **	0.15 **
Extroversion	0.17 **	0.11 **	0.08 **
Voluntary Associations	0.19 **	0.12 **	0.10 **
Age - Square Root	-0.12	-0.10	0.07
Age	0.09	0.03	-0.10
Male	-0.04	-0.06 *	-0.06 *
College +	0.04	0.04	0.06 *
Professional	0.06	0.04	0.03
Number of Active Ties			
Neighbour Ties		0.06 *	0.04
Mid-Range Ties		0.24 **	0.13 **
Distant Ties (1+ Hours)		0.29 **	0.23 **
Number of Active Ties Contacted at Least Weekly			
In-Person			0.13 **
Landline Phone			0.10 **
Mobile Phone			0.09 **
Adjusted R Square	0.13	0.30	0.33

N = 969
*p < 0.05
**p < 0.01

Although ties at different distances may be at least somewhat open to email contact, in Chapter 1 I argued that mid-range and distant ties would be more open to email contact than neighbour ties. This is because mid-range and distant ties typically provide more choice when determining who is contacted and how that contact occurs. This led me to hypothesize that:

H 5 Mid-range and distant ties are more strongly associated with the number of ties that are emailed than are neighbour ties.

The results given in Table 4.2, Model 2, support this hypothesis. The standardized coefficient for mid-range ties is four times larger than the standardized coefficient for neighbour ties (0.24 vs. 0.06, respectively). As well, the standardized coefficient for distant ties is almost five times larger than the standardized coefficient for neighbour ties. This shows that mid-range and distant

ties are more strongly associated with the number of ties that are emailed than are neighbour ties.

In Chapter 1, I argued that the affordances of email are most useful for supplementing contact that occurs in-person and by telephone with neighbour ties. By contrast, email's affordances may make it useful as both a supplement and a primary mode of communication when contacting mid-range and distant ties. This led me to hypothesize that:

H 6 ***When controlling for the effects of in-person and telephone contact on the number of ties that are emailed, the positive relationships between the number of neighbour, mid-range and distant ties that people have in their networks and the number of ties that they email will disappear for neighbour ties but not for mid-range and distant ties.***

The results presented in Table 4.2, Models 2 and 3, support this hypothesis. The coefficient for neighbour the ties drops from being statistically significant at the 0.05 level to having no statistical significance when controlling for in-person and telephone contact. By contrast, the coefficients for mid-range and distant ties remain statistically significant at the 0.01 level when controlling for in-person and telephone contact. This indicates that email is used primarily to supplement in-person and telephone contact with neighbour ties, but not with mid-range and distant ties.

Note that the coefficient for mid-range ties drops much more than the coefficient for distant ties, when controlling for in-person and telephone contact.

When taking into account the effect of in-person and telephone contact on the number of ties emailed, the coefficient for number of mid-range ties drops from 0.24 to 0.13, a reduction of 54 percent. By contrast, when taking into account the effect of in-person and telephone contact on the number of ties emailed, the coefficient for number of distant ties drops from 0.29 to 0.23, a reduction of only 20 percent. This indicates that email is used more as a supplement for mid-range ties than for distant ties.

4.3.3 Tie Strength and Email Use

As discussed in Chapter 1, research by Haythornthwaite and Wellman (1998, 2000) suggests that strong ties may be more open to email contact than weak ties. This is because people tend to contact their strong ties using multiple kinds of media, while they rely on just one or two more traditional media to contact their weak ties. For this reason, I expected that the more strong ties people have in their networks, the more likely they are to contact their strong ties by email.

Given that strong ties may be more open to email contact, in Chapter 1 I hypothesized that:

H 7 ***The positive associations between the number of ties that people have in their networks and the number of ties that they email will be stronger for core ties than they will be for significant (non-core) ties.***

In regards to tie type, the results presented in Table 4.3 and Table 4.4, Model 2, show mixed support for this hypothesis. I find that the hypothesis is supported with respect to friend and immediate kin ties, but not supported with respect to work and extended kin ties. Because testing this hypothesis involves comparing variables from different regression models – one model for core ties, and the other for significant ties – I use unstandardized B coefficients, as opposed to standardized beta coefficients.

This hypothesis is supported with respect to friend and immediate kin ties, because the unstandardized coefficients for friend ties and immediate kin ties are higher for core ties than they are for significant ties. The unstandardized coefficient for core friend ties is twice as large as the unstandardized coefficient for significant friend ties (0.014 vs. 0.007, respectively), and the unstandardized coefficient for core immediate kin ties is almost three times as large as the unstandardized coefficient for significant immediate kin ties (0.014 vs. 0.005, respectively).

By contrast, this hypothesis is not supported with respect to work and extended kin ties, because the unstandardized coefficients for extended kin and work ties are similar among core and significant ties (0.011 vs. 0.013, respectively, for work ties; 0.007 vs. 0.005, respectively, for extended kin ties).

In sum, these results offer only mixed support for this hypothesis, in regards to tie type.

Table 4.3
Multiple Regression Results: Number of Core Ties Emailed At Least Weekly - Users Only

	Number of Core Ties Emailed at Least Weekly (log)					
	Model 1		Model 2		Model 3	
	B	Beta	B	Beta	B	Beta
Years Online	0.015	0.12 **	0.013	0.11 **	0.013	0.11 **
Extroversion	0.083	0.17 **	0.050	0.10 **	0.040	0.08 **
Voluntary Associations	0.056	0.20 **	0.038	0.14 **	0.032	0.12 **
Density						
(ref = Most or All Know Each Other)						
1/2 Know Each Other	0.041	0.04	-0.019	-0.02	-0.014	-0.01
Most or All Know Each Other	0.011	0.01	0.004	0.00	0.011	0.01
Age - Square Root	-0.155	-0.40	-0.151	-0.39	-0.124	-0.32
Age	0.012	0.39	0.010	0.34	0.009	0.30
Male	-0.058	-0.07 *	-0.059	-0.07 *	-0.059	-0.07 *
College +	0.022	0.03	0.043	0.05	0.051	0.06
Professional	0.002	0.00	0.004	0.00	-0.001	0.00
Number of Core Ties						
Friendship Ties			0.014	0.28 **	0.013	0.26 **
Work Ties			0.011	0.11 **	0.009	0.08 **
Extended Kin Ties			0.007	0.09 **	0.005	0.07 *
Immediate Kin Ties			0.014	0.17 **	0.012	0.14 **
Number of Core Ties Contacted at Least Weekly						
In-Person					0.002	0.03
Landline Phone					0.003	0.04
Mobile Phone					0.008	0.10 **
Adjusted R Square	0.11		0.30		0.30	

N = 940
*p < 0.05
**p < 0.01

Table 4.4
Multiple Regression Results: Number of Significant (Non-Core) Ties Emailed At Least Weekly - Users Only

	Number of Significant Ties Emailed at Least Weekly (log)					
	Model 1		Model 2		Model 3	
	B	Beta	B	Beta	B	Beta
Years Online	0.017	0.14 **	0.013	0.11 **	0.016	0.13 **
Extroversion	0.051	0.10 **	0.022	0.04	0.005	0.01
Voluntary Associations	0.048	0.18 **	0.033	0.12 **	0.022	0.08 *
Density						
(ref = Most or All Know Each Other)						
1/2 Know Each Other	0.012	0.01	-0.006	-0.01	0.017	0.02
Most or All Know Each Other	-0.013	-0.02	-0.039	-0.04	0.004	0.01
Age - Square Root	0.000	0.00	-0.030	-0.08	0.003	0.01
Age	0.000	0.00	0.001	0.03	0.000	-0.02
Male	-0.010	-0.01	-0.053	-0.06	-0.070	-0.08 **
College +	0.039	0.05	0.030	0.04	0.045	0.05
Professional	0.042	0.05	0.016	0.02	0.011	0.01
Number of Significant Ties						
Friendship Ties			0.007	0.24 **	0.005	0.16 **
Work Ties			0.013	0.28 **	0.009	0.19 **
Extended Kin Ties			0.005	0.06	0.003	0.04
Immediate Kin Ties			0.005	0.07 *	0.001	0.01
Number of Significant Ties Contacted at Least Weekly						
In-Person					0.007	0.14 **
Landline Phone					0.018	0.20 **
Mobile Phone					0.016	0.10 **
Adjusted R Square	0.09		0.25		0.33	

N = 722
*p < 0.05
**p < 0.01

In regards to tie distance, the results presented in Table 4.5 and Table 4.6, Model 2, also show mixed support for this hypothesis. This hypothesis is only somewhat supported with respect to mid-range and distant ties, but it is not supported with respect to neighbour ties.

This hypothesis is only somewhat supported with respect to mid-range and distant ties, because the unstandardized coefficients for mid-range and distant ties are somewhat higher for core ties than they are for distant ties. The unstandardized coefficient for core mid-range ties is 0.009, while the unstandardized coefficient for significant mid-range ties is 0.006. The unstandardized coefficient for core distant ties is 0.014, while the unstandardized coefficient for significant distant ties is 0.010. Since these differences are not strong for either mid-range or distant ties, the hypothesis is only somewhat supported.

This hypothesis is not supported with respect to neighbour ties, because the unstandardized coefficient for core neighbour ties is somewhat smaller than the unstandardized coefficient for significant neighbour ties (0.008 vs. 0.010, respectively).

Table 4.5
Multiple Regression Results: Number of Core Ties Emailed At Least Weekly - Users Only

	Number of Core Ties Emailed at Least Weekly (log)					
	Model 1		Model 2		Model 3	
	B	Beta	B	Beta	B	Beta
Years Online	0.015	0.12 **	0.013	0.11 **	0.012	0.10 **
Extroversion	0.083	0.17 **	0.059	0.12 **	0.048	0.10 **
Voluntary Associations	0.056	0.20 **	0.036	0.13 **	0.029	0.10 **
Density						
(ref = Most or All Know Each Other)						
1/2 Know Each Other	0.041	0.04	-0.017	-0.02	-0.013	-0.01
Most or All Know Each Other	0.011	0.01	0.013	0.01	0.026	0.02
Age - Square Root	-0.155	-0.40	-0.135	-0.34	-0.120	-0.31
Age	0.012	0.39	0.009	0.29	0.009	0.28
Male	-0.058	-0.07 *	-0.044	-0.05	-0.042	-0.05
College +	0.022	0.03	0.050	0.06	0.062	0.07 *
Professional	0.002	0.00	-0.002	0.00	-0.009	-0.01
Number of Core Ties						
Neighbour Ties			0.008	0.05	0.005	0.04
Mid-Range Ties			0.009	0.30 **	0.007	0.23 **
Distant Ties (1+ Hours)			0.014	0.32 **	0.013	0.29 **
Number of Core Ties Contacted at Least Weekly						
In-Person					0.002	0.04
Landline Phone					0.005	0.07 *
Mobile Phone					0.008	0.10 **
Adjusted R Square	0.11		0.30		0.30	

N = 940
*p < 0.05
**p < 0.01

Table 4.6
Multiple Regression Results: Number of Significant (Non-Core) Ties Emailed At Least Weekly - Users Only

	Number of Significant Ties Emailed at Least Weekly (log)					
	Model 1		Model 2		Model 3	
	B	Beta	B	Beta	B	Beta
Years Online	0.017	0.14 **	0.012	0.10 **	0.014	0.12 **
Extroversion	0.051	0.10 **	0.025	0.05	0.007	0.01
Voluntary Associations	0.048	0.18 **	0.033	0.12 **	0.023	0.09 *
Density						
(ref = Most or All Know Each Other)						
1/2 Know Each Other	0.012	0.01	-0.029	-0.03	-0.001	0.00
Most or All Know Each Other	-0.013	-0.02	-0.057	-0.06	-0.002	0.00
Age - Square Root	0.000	0.00	0.044	0.11	0.063	0.16
Age	0.000	0.00	-0.005	-0.16	-0.005	-0.16
Male	-0.010	-0.01	-0.039	-0.04	-0.054	-0.06
College +	0.039	0.05	0.043	0.05	0.059	0.07
Professional	0.042	0.05	0.012	0.01	-0.002	0.00
Number of Significant Ties						
Neighbour Ties			0.010	0.09 *	0.004	0.03
Mid-Range Ties			0.006	0.26 **	0.003	0.11 **
Distant Ties (1+ Hours)			0.010	0.30 **	0.007	0.22 **
Number of Significant Ties Contacted at Least Weekly						
In-Person					0.010	0.19 **
Landline Phone					0.017	0.19 **
Mobile Phone					0.014	0.09 *
Adjusted R Square	0.08		0.26		0.35	

N = 722
*p < 0.05
**p < 0.01

In chapter 1 I also argued that Haythornthwaite and Wellman's research suggests that email will more often be used as a supplement for contact that occurs with core ties than for contact that occurs with significant ties. This is because Haythornthwaite and Wellman find greater evidence of media multiplexity among strong ties than among weak ties. This led me to hypothesize that:

H 8 ***The relationship between the number of ties that people have in their networks and the number of ties that they email will be more heavily mediated by in-person and telephone contact for core ties than it will be for significant ties.***

In regards to tie type, the results presented in Tables 4.3 and Table 4.4, Model 2 and Model 3, strongly contradict this hypothesis. Because testing this hypothesis involves examining changes in coefficient strength when variables are added to particular regression models, I return to use standardized beta coefficients to test this hypothesis. These results show that the relationship between the number of ties that people have in their networks and the number of ties that they email is *less* heavily mediated by in-person and telephone contact for core ties than it is for significant ties.

Among core ties, the coefficients for friendship, work, extended kin, and immediate kin, only drop slightly when controlling for the effects of in-person and telephone contact on the number of ties that people email. The largest relative drop is for immediate kin ties, from 0.17 to 0.14. However, even this is only a reduction of 18 percent.

In contrast to core ties, the coefficients for significant friendship, work, and immediate kin ties drop greatly when controlling for in-person and telephone contact. For example, the coefficient for friendship ties drops from 0.24 to 0.16 when controlling for in-person and telephone contact – a reduction of 34 percent.

In regards to tie distance, results presented in Tables 4.5 and 4.6 also contradict this hypothesis. These results also show that the relationship between the number of ties that people have in their networks and the number of ties that they email is *less* heavily mediated by in-person and telephone contact for core ties than it is for significant ties.

Among core ties, the coefficients for neighbour, mid-range, and distant ties do not drop to the same extent for core ties as they do for significant ties, when controlling for in-person and telephone contact. For example, among core ties, the coefficient for mid-range ties drops from 0.30 to 0.23 when controlling for in-person and telephone contact. This is a reduction of 23 percent. By contrast, among significant ties, the coefficient for mid-range ties drops from 0.26 to 0.11 when controlling for in-person and telephone contact. This is a reduction of 58 percent. Thus, the relative reduction for significant ties is more than twice the reduction for core ties, when controlling for in-person and telephone contact.

4.3.4 Demographic Factors and Email Use

In Chapter 1 I argued that demographic factors may lead people to become email users, and affect the extent to which they use email. Drawing on a number of different studies, I found reason to believe that people in late 30s, women, those who are well educated, and those working in high status occupations, might all be more prone to become email users. This led me to hypothesize that:

H 9 ***Those who are in their late 30s, well educated, working in high status occupations, and women are more likely to be email users than those with different demographic characteristics.***

The results presented in Table 4.7, Model 1, support this hypothesis, except that they do not show that women are more likely to be email users than men. I will discuses the results as they relate to each of these demographic factors in turn.

Table 4.7
Logistic Regression Results: Odds of Being an Email User - Active (Core & Significant) Ties

	Email User		
	Model 1 Exp(B)	Model 2 Exp(B)	Model 3 Exp(B)
Age - Square Root	6.40 **		6.26 **
Age	0.83 **		0.84 **
Male	1.15		1.13
College +	4.58 **		4.50 **
Professional	2.79 **		2.66 **
Number of Active Ties			
Friendship Ties		1.00	1.00
Work Ties		1.02 **	1.01
Extended Family Ties		0.99 **	0.99 *
Immediate Family Ties		1.00	1.00
Cox & Snell R Square	0.25	0.01	0.25

N = 2200
*p < 0.05
**p < 0.01

Table 4.8
Logistic Regression Results: Odds of Being an Email User - Active (Core & Significant) Ties

	Email User		
	Model 1 Exp(B)	Model 2 Exp(B)	Model 3 Exp(B)
Age - Square Root	6.40 **		5.87 **
Age	0.83 **		0.84 **
Male	1.15		1.11
College +	4.58 **		4.66 **
Professional	2.79 **		2.80 **
Number of Active Ties			
Neighbour Ties		0.98 *	1.01
Mid-Range Ties		1.00	1.00
Distant Ties (1+ Hours)		1.01 **	1.01
Cox & Snell R Square	0.25	0.01	0.25

N = 2200
*p < 0.05
**p < 0.01

These results show some support at those who are in their in the middle of their adult lives have greater odds of being email users than those of different ages. There is a statistically negative association (at the 0.01 level) between age and the odds of being an email user. However, preliminary analysis indicated that older respondents may have influenced these results, because older respondents are not typically email users. To minimize the effect of older respondents on the

analysis, I also used the square root of age an independent variable. In contrast to the untreated age variable, there is a statistically positive association (at the 0.01 level) between the square root of age and the odds of being an email user. As the square root of age increases by one unit, the odds of being an email user increase 6.4 times. This indicates that decreasing the influence of older respondents on the analysis drastically changes the association between age and the odds of being an email user. It should be noted that all respondents completing this survey are at least 18 years of age. Thus, these results that those who are in the middle of their adult lives have the greatest odds of being email users.

These results also show that those who are well educated have higher odds of being email users than those who are not as well educated. There is a statistically positive association (at the 0.01 level) between having a college degree or more education and the odds of being an email user. The odds of being an email user are 4.85 times greater for those with college degrees or higher education than for those with less education.

These results also show that those who are working in high status occupations have greater odds of being email users than those who are not working in high status occupations. There is a statistically positive association (at the 0.01 level) between being a professional or business owner and the odds of being an email user. The odds of being an email user are 2.79 times greater for those who are professionals or business owners than for those in other occupations.

However, these results do not show that women are more likely to be email users than men. There is no statistically significant difference in the odds of being an email user for men and women.

In Chapter 1, I also theorized that these demographic factors might also increase the likelihood that people will use email to contact their ties. This led me to hypothesize that:

H 10 Those who are in their late 30s, well educated, working in high status occupations, and women contact a greater number of ties by email than those with different demographic characteristics.

The results presented in Table 4.1, Model 1 (located near the top of this section), do not support this hypothesis. There is no statistically significant association (at the 0.05 level) between age, the square root of age, being a male, having a college degree or more education, and being a professional or business owner, and the number of ties that are emailed.

There were no significant interaction effects between these demographic variables and the number of ties that people have in their networks. For example, because people of high social status may be more likely to live in wealthy neighbourhoods where their neighbours also use email, it is possible that an interaction effect might exist between the number of neighbour ties that people have and their social status. However, there were no statistically significant interaction effects between the number of neighbour ties that people have and having college education or higher.

In Chapter 1 I also theorized that the number of ties in personal networks would mediate the relationship between demographic factors and odds of being an email user. This led me to hypothesize that:

H 11 When controlling for the effects of the number of ties that people have in their networks on the likelihood of being an email user, there will be a reduction in the strength of the association between demographics and the likelihood of being an email user.

The results presented in Table 4.7 and Table 4.8, Model 1 and Model 2, do not show much support for this hypothesis. In regards to tie type, adding the number of friendship, work, and kin ties that people have to their networks only slightly reduces the associations between the demographic factors and the odds of being an email user. For example, when controlling for friendship, work, and kin ties, the odds of being an email user drops from 2.79 to 2.66. This is only a reduction of 5 percent, and it is the largest reduction among all of the demographic factors.

4.4 Summary of Results

4.4.1 Tie Type and Email Use

The number of friendship, work, and extended kin ties that people have in their active tie networks are all positively associated with the number of ties that they send email to at least weekly. However, contrary to expectations, the number of

immediate kin ties that people have in their networks is not statistically associated with the number of ties emailed. As expected, friendship and work ties are more strongly associated with the number of ties that are emailed than are kin ties.

These results also show that controlling for in-person and telephone contact significantly lowers the statistical association between kin ties and the number of ties emailed. By contrast, controlling for in-person and telephone contact does not drastically decrease the statistical significance for the associations between friendship ties and the number of ties emailed, or for the association between work ties and the number of ties emailed. This indicates that email is used more as a supplement for kin ties than it is for friendship and work ties.

4.4.2 Tie Distance and Email Use

The number of neighbour, mid-range, and distant ties that people have in their active tie networks are all positively associated with the number of ties that they send email to at least weekly. However, as expected, mid-range and distant ties are more strongly associated with the number of ties that are emailed than are neighbour ties.

When controlling for in-person and telephone contact, the statistical association between neighbour ties and the number of ties emailed becomes non-significant at the 0.05 level. By contrast, when controlling for in-person and telephone contact, the association between mid-range ties and the number of ties emailed lowers, but remains statistically significant at the 0.01 level. When

controlling for in-person and telephone contact, the association between distant ties and the number of ties emailed also lowers, but remains significant at the 0.01 level. This indicates that email is used mostly as a supplement to in-person and telephone contact that occurs with neighbours, while being used both as a supplement and as the primary mode of contact when communicating with mid-range and distant ties.

4.4.3 Tie Strength and Email Use

In general, these results show that tie strength often affects the relationship between the number of ties that people have, and their use of email. However, these results showed that tie strength affected different kinds of relationships in different ways. I will start by summarizing the results in regards to tie type, and then summarize the results with respect to tie distance.

In regards to tie type, these results show strong evidence that tie strength affects the extent to which number of friend, work, and kin ties are associated with number of ties emailed. However, contrary to expectations, it is not always the case that core ties are emailed more than significant ties. Although there is evidence that the associations between number of friendship and immediate kin ties and the number of ties emailed is stronger for core ties than it is for significant ties, this is not the case with work or extended kin ties.

Moreover, these results show that controlling for in-person and telephone contact has a strong effect on the extent to which tie strength and email use matters with friendship ties. When in-person and telephone contact are not

controlled, the strength of the association between number of friendship ties and number of ties emailed is about the same for core and significant ties. However, when controlling for in-person and telephone contact, the association is much stronger for core ties than it is for significant ties. This implies that the weaker the friend tie, the more email is only used as a supplement to support contact that occurs through other media. Paradoxically, regardless of the extent to which strong ties are contacted in-person or by telephone, the more strong friendship ties people have, the more they will use a weak medium (email) to contact those ties.

In regards to tie distance, I also found mixed results for core and significant ties. Core mid-range and distant ties are somewhat more strongly associated with the number of people emailed than are significant mid-range and distant ties. By contrast, core neighbour ties are somewhat less strongly associated with the number of people emailed than are significant neighbour ties.

Tie strength makes the largest difference for mid-range and distant ties only when controlling for the effects of in-person and telephone contact. When controlling for in-person and telephone contact, the impact on mid-range and distant ties on number of ties emailed is much stronger for core ties than for significant ties. However, when the effects of in-person and telephone contact on email use are not controlled, there are no large differences in the strength of the effects of mid-range and distant contact on the number of ties emailed.

4.4.4 Demographic Factors and Email Use

These results show that age, gender, education, and job type, all have strong impacts on the odds of being an email user. In general, those who are in the middle of their adult lives, well educated (college degree or higher), and in high status occupations (professionals or business owners), all tend to be email users. However, women were no more likely to be email users than men.

When controlling for the number of ties that people have in their networks, the strong associations between attainment (age, education, and job type) and the odds of being an email user are lowered only slightly. This indicates that those with high levels of attainment are not more prone to be email users because they have many ties to contact.

These results also show that age, gender, education, and job type, are not associated with the number of ties emailed at least weekly. In sum, these results show that although attainment leads people to become email users, ties cause them to use email.

4.5 Discussion

These results are generally consistent with the theory discussed in Chapter 1, with a few important exceptions. I will now discuss the implications of these results as they apply to the theoretical framework discussed in Chapter 1.

4.5.1 The Role of Tie Type in the Use of Email

In Chapter 1 I argued that the affordances of email made it at least somewhat useful for connecting with friendship, work, and kin ties. Nevertheless, I argued that friendship and work ties would be more open to email contact than would kin ties. This is because friendship and work ties generally allow for more choice in who is contacted and how that contact takes place. In general, these results support this argument – the more friendship, work and kin ties that people have, the more they used email. Moreover, friendship and work ties are more strongly associated with email use than are kin ties. However, one unexpected finding was that there was no statistically significant relationship between the number of immediate kin ties that people have and their use of email. This suggests that even when people have many immediate kin ties, they will not use email to contact these ties. Although this result is somewhat unexpected, it fits well with the theory proposed. Immediate kin ties may allow for the least amount of choice in who is contacted and how that contact occurs. Because interaction with these ties may occur at routine times, places and through relatively traditional media (in-person or by telephone), email may not be useful either as a supplement or as the primary mode of contact.

In Chapter 1 I also argued that when email is used to contact kin ties, it would generally be used only to supplement in-person and telephone contact. By contrast, I expected that the openness towards email contact with friendship and work ties would mean that it would be used both as a supplement and as the

primary mode of contact when connecting with these ties. As shown above, the data does support this argument.

In general, these results show strong support for the theoretical framework discussed in Chapter one for three reasons. First, they generally show that the more ties people have, the more they use email. Second, they show that the types of ties people have in their networks affects the extent to which they use email. Third, they show that the types of ties people have in their networks affects the extent that email is integrated into contact that occurs through other media.

4.5.2 The Role of Tie Distance in the Use of Email

In Chapter 1 I also argued that the affordances of email make it at least somewhat useful for connecting with neighbour, mid-range, and distant ties. Nevertheless, because mid-range and distant ties permit more choice in who is contacted and how that contact occurs, I argued that mid-range and distant ties would be more strongly associated with email use than neighbour ties. These results support this argument, showing that the more neighbour, mid-range and distant ties people have, the more they email. However, these positive associations with email are stronger for mid-range and distant ties than they are for neighbour ties.

In Chapter 1 I further argued that email would mostly be used as a supplement to in-person contact with neighbour ties. By contrast, I expected that because people have more choice in determining how contact is made with mid-

range and distant ties, they would use email both as the primary mode of contact and as a supplement to contact that occurs using other media. As discussed above, the data does support this argument.

4.5.3 Tie Strength and Email Use

Drawing on Haythornthwaite and Wellman's (2000) research on the issue of media multiplexity, I argued in Chapter 1 that core ties would generally be more open to email contact than significant ties. The results presented above show that the relationship between tie strength and email use is not so clear-cut. On the one hand, there is evidence that the association between the number of kin ties that people have in their networks and their use of email is stronger for core ties than it is for significant ties. On the other hand, no significant differences between core and significant ties were shown in regards to friendship and work ties.

I interpret this result to mean that tie strength matters most when traditional ways of communicating limit the choice that people have in determining who is contacted and how that contact occurs. People who are particularly close to their kin ties may be more willing to connect by email, because they want to connect with these ties as much as possible. The *asynchronous* nature of email may help them stay ultra connected with these core kin ties, especially at times during the day when these ties may not be available for contact by other means. Even though contact with kin ties need not be so

intense, people may break with tradition in order to stay in close connection with those who they care about most.

When people already have high levels of choice in determining who they contact and how that contact occurs – as in the case of friendship and work ties – they are no more likely to email their core ties than their significant ties. Core friendship ties have about the same strength of association with the number of ties emailed as significant friendship ties. Moreover, core work ties show a weaker association with the number of ties that people email than significant work ties. Because both friendship and work ties permit high levels of choice, it may be that email is always a viable option to contact these ties, even when the relationship with these ties is not strong. For this reason, the number of friendship and work ties that people have in their networks may be a more important determinate of using email than the actual strength of the ties being emailed. Haythornthwaite and Wellman's measures would not have picked up on the effect of network size, because they measure the frequency of interaction, rather than the number of ties contacted.

In regards to tie distance, these results also show little evidence that tie strength affects the use of email. This means that people are just as likely to contact their core and significant ties by email, regardless of where they are located. As with friendship and work ties, I explain these results as showing that the number of ties people have in their networks are more important determinants of email use than the strength of those ties.

Drawing on Haythornthwaite and Wellman's research, I also argued that core ties would be more prone to use email as a supplement than would significant ties. This is because Haythornthwaite and Wellman find that relatively strong ties are more prone to use email in conjunction with other media than are weaker ties. These results showed the opposite of what I expected – people are less likely to use email as a supplement to in-person and telephone contact with their core ties than with their significant ties. This is true both in regards to tie type and tie distance.

Because people generally contact their core ties more than their significant ties (as discussed in Chapter 3) they may be more prone to email their core than their significant ties, regardless of how much they contact them by other media. This may be especially true for those who have many core ties. In this dissertation I have argued that the social affordances of email make it particularly useful for those who have many ties. Because people generally contact their core ties more than their significant ties and because email is useful for making this connection happen, those with many ties may be more prone to email their core ties than their significant ties, regardless of how much they contact theses ties in-person or by telephone.

4.5.4 The Impact of Attainment on Email Use

In Chapter 1 I argued that demographic characteristics would both lead people to become email users, and affect the extent to which they use email. These results

generally show support for the first part of this argument – those who are well educated, in good jobs, and in the middle of their adult lives are more often email users than those with less attainment in these respects. However, they did not show support for the second part – demographic factors have no significant effect on the extent to which people use email. In short, attainment causes people to become email users, but the number of ties that they have drives them to use email.

These results also imply that email's strength may not only be its ability to support contact with large numbers of ties – its relatively simple user interface might make it easy to use and therefore widely accessible. Although email may require that people be literate and have a basic knowledge of how to use a computer, it may be far less difficult to use than even an internet search engine (see Hargittai 2003). The simplicity of user interface may also explain why email has consistently been the most widely used application since the dawn of the internet. I will discuss the more general implication of these findings in the conclusion that follows.

In Chapter 1 I also drew on research by Shanyan Zhao to argue that the number of ties that people have in their networks would also mediate the relationship between demographic factors and the odds of being an email user. This is because Zhao finds a significant association between the number of friendship and kin ties that people have and their use of email, even when controlling for demographic factors. However, these results do not support this argument. Contrary to my expectations, I find that the number of ties that people

have in their networks has little effect on the odds of being an email user, while the demographic factors have a strong effect on the odds of being an email user.

Why do my results differ from Zhao's results? There are a few important differences between his measures and analysis and my own. The measure used by Zhao is based on a question that asks respondents to give the total number of friendship and kin ties that they have contacted in the previous year. By contrast, the Social Ties measures used here are separated into friends and kin, and only include those ties that are more than just casual acquaintances. It may be that because the measure used by Zhao may be less accurate than the Social Ties measure, Zhao's results are actually a false positive. More importantly, Zhao's analysis did no show if demographic factors are more important determinants of becoming an email user than the number of ties that people have in their networks. By contrast, this analysis and the analysis done by Hlebec et al. does show how demographic factors compare with the number of ties that people have in their networks. When making this comparison, it becomes clear that demographic factors are the most important determinants of being an email user.

Chapter 5
Conclusion

5.1 The Strength of Email Ties

5.1.1 The Strength of a Weak Medium

When considering only the descriptive statistics presented in Chapter 3, it might appear as though email plays a minor role in American social life. When comparing the average number of ties contacted by different media, email is generally used to contact a smaller percent of ties than is in-person or telephone contact. These averages appear to support the argument that email's social utility is severely limited by its inability to provide implicit back channelling through physical or verbal gestures. Under this view, email may only help people stay connected to the extent that it is used to arrange the comparatively rich contact that occurs in-person or by telephone.

Although email lacks the rich feedback cues that occur through synchronous communication, this weakness is also its strength. Not everyone may be able or willing to use in-person or telephone contact with all of their ties. I have argued that this is especially true for those individuals who have large numbers of ties. The results presented in this dissertation support this assertion. These results generally show that the more ties people have, the more they use email. This is not simply because those with many ties also contact more people

in-person and by telephone, which in turn leads them to use email. Even when controlling for the effect of in-person and telephone contact on email, there is generally a positive association between the number of ties that people have in their networks and the number of ties that they email. This means that email use is not solely determined by contact that occurs in-person or by phone. In this way, email stands on its own, helping those that are most connected stay in close contact with their ties.

I theorize in Chapter 1 that email is especially useful for those with many ties for two reasons. First, the more ties people have, the more difficult it is for them to make synchronous contact. This is because those with many ties have greater difficulty finding mutually agreeable times for synchronous contact than those with smaller numbers of ties (Gibson 2006). Second, the more ties people have, the more contact they have with those ties (Wellman & Gulia 1998). This is not simply because they have greater numbers of ties to contact – they have more contact per tie.

Email helps those with large numbers of ties deal with their inevitable scheduling difficulties, and stay in frequent contact with their many ties. Because email is asynchronous, it helps resolve scheduling conflicts. This can do this in two ways. First, email can be used to arrange future synchronous contact, without causing interruption to the current activities of the receiver. Second, it may be used as the primary mode of contact, skipping the need to schedule times for synchronous contact all together. Moreover, email helps those who are more connected stay in greater contact, per tie. While it may not be possible to stay in

heavy contact with each tie through synchronous contact, the asynchronous nature of email makes it possible to contact each tie more often. This makes it possible to contact those ties that are already often seen in-person or talked to on the telephone, at times during the day when they might not be free for synchronous contact. For example, email can be used to make contact while ties are busy at work, even though those same ties may be seen in-person when they have free time during the evening. This helps those who are most connected stay ultra connected.

5.1.2 Tie Type and the Complexity of Personal Communication Systems

Although it is generally true that the more ties people have the more they email, there are some important exceptions to this finding. In general, the associations between the number of friendship ties and email are much stronger than the associations between kin ties and email. Moreover, the number of neighbour ties that people have in their networks is only weakly associated with email use.

These results show that although it is generally true that more ties are associated with more email, tie type places limits on the extent to which this occurs. Drawing on literature about nature of contemporary relationships, I theorize that certain kinds of ties are more open to email contact than other kinds of ties. As discussed in Chapter 1, those ties that provide relatively high amounts of choice in determining who is contacted and how that contact occurs tend to be more open to email use than those who have less choice in these regards. If people

do not have the choice of using email, they will not use it, even if it might help them stay in contact when they have large numbers of ties. Moreover, the affordances of email may make it more of a logical choice when contacting certain kinds of ties. The automatic *record of information* left by email makes it well suited for exchanging information with work ties.

Tie type affects more than just the extent to which email is used – it affects the extent to which other media are used in conjunction with email. For example, findings in Chapter 4 show that the more friendship ties people have, the more they will use email, regardless of how much they contact those same ties in-person or by telephone. The association between the number of core friendship ties and email only drops slightly (from 0.28 to 0.26) when controlling for the effects of in-person and telephone contact on email use. By contrast, email is only used to contact neighbour ties to the extent that those same ties are contacted in-person or by telephone. The statistically weak association (at the 0.05 level) between the number of neighbour ties and email disappears completely when taking into account in-person and telephone contact.

Tie type affects the extent to which email is used in conjunction with other forms of contact for the same reason that it affects the ability to use email in the first place. If people do not have a choice in how contact is made – in this case, through what medium – then email must be used to supplement contact that occurs through media that are pre-determined. For example, when compared to those living beyond neighbourhood boundaries, people have less choice in whom their neighbours are or when they communicate with them. The results presented

in Chapter 4 show that the weak association between the number of neighbour ties and the number of ties emailed disappears when controlling for in-person and telephone contact. This indicates that even though people with many neighbour ties send email to those ties, this email is only used if these same ties are contacted in-person. If people avoid seeing their neighbours in-person, despite the ease and obligation created by living in the same physical space, it is unlikely that they will connect in cyberspace.

5.1.3 Tie Strength and Email Use

The results presented in Chapter 4 show that even a weak medium such as email can be useful for connecting with strong ties. When examining the effects of the number of friendship and kin ties on the number of ties that are emailed, the results show that the effects are much stronger for core ties than they are for significant ties. This implies that people with many friendship and kin ties will be more prone to email those ties when they are part of their core network.

Because core ties tend to be known for long periods of time, the high amounts of shared experiences may help those ties better interpret and understand the meaning of email messages. In this way, it may be possible to send meaningful email messages, even though email lacks the rich feedback of body and verbal gestures. Moreover, core ties may have high amounts of trust, minimizing the chance that a message will be interpreted in a negative way.

It should be noted that the measures used by the Social Ties survey only asked about the number of ties contacted at least weekly. If the survey had asked about the number of ties contacted at least monthly, the number of significant friendship and kin ties that people have in their networks might be more strongly correlated with the number of ties that they email. The utility of email for contacting significant ties less often than once a week requires further investigation. Nevertheless, despite these measurement limitations, these findings clearly show that email is a useful mode of communication for those who have many friendship and kin ties. Although email is a thin medium, it is still used to contact close ties on a frequent basis, helping people stay in close connection with their close relationships.

These results also show that the number of work ties is more strongly associated with the number of ties emailed among significant ties rather than among core ties. I expect this is because the *record of information* and *asynchronous* nature of email make it well suited for exchanging information with work ties. Because weak ties tend to be most useful for instrumental purposes (Granovetter 1973, 1983; Lin et al. 1981; Lin 2001) this indicates that email may help those who have many weak ties access information from those ties by way of email.

5.1.4 Implications for the Social Affordance Approach

As discussed above, there are some exceptions to the general finding that the more ties people have in their networks, the more they use email. The association between the number of kin ties and email was generally weak, especially for the immediate kin ties. Similarly, the association between the number of neighbour ties and email was also weak. The social affordance approach explains these results by privileging the characteristics of social ties, making them the fundamental determinants of email. Compared to other types of ties, kin and neighbours do not allow for as much choice in determining who is contacted and how that contact takes place. These tie characteristics place constraints on the ability of people to use email. For this reason, even if people have many kin or neighbour ties, their ability to use email is constrained.

Although these findings fit well with the social affordance approach, there is need for clarification. The concept of social affordance emphasizes the social characteristics of those relationships that are being contacted by email as being the most fundamental determinant of email use. However, these results show that the characteristics of relationships only lead people to use email when it is readily available. Although the number of ties in a network will determine the extent to which people use email, it does not determine if they will become email users in the first place. Although the number of ties that people have and the odds that they are email users are somewhat associated, these associations are caused by more fundamental demographic factors. The results presented in Chapter 4 show that those who are middle aged, well educated, and working as professionals or

business owners, are most likely to be email users. These factors are more fundamental determinants of becoming an email user than the number of ties that people have in their networks.

Once people have email, social relationships are key in determining the extent to which they use it. Results presented in Chapter 4 show that once people have email access, demographic factors do not cause people to use email. Instead, the relationships themselves are strong determinants of the extent to which people use email. These findings are completely consistent with the social affordance approach.

In sum, the results presented in this dissertation give evidence of a two-stage process by which people become heavy email users. First, age, education, and job type lead people to adopt email. Second, the kind and the number of relationships that people have determine the extent to which they use email.

5.1.5 Causality in Media Multiplexity

The results presented in this dissertation have also shown that although email is a useful tool for those who have many ties to contact, it is still part of a complex communication system. This system is complex because it draws on many kinds of media to contact many kinds of ties. Moreover, the extent to which different media are combined depends on the kind of tie that is being contacted. The type, distance, and strength of ties all affect the extent to which email is dependent on

communication that occurs by other means. For example, the closer ties live, the more email is used as a supplement. As neighbour ties increase in number, people will use email more, but this is only because they will also have more in-person or telephone contact. By contrast, as distant ties increase in number, people are more likely to use email, regardless of how much contact they make in-person or by telephone. Moreover, the extent to which the number of friend, work, and extended kin ties determine email use directly depends on the strength of the tie.

The dependency of email use on both the number of ties that people have in their networks and communication that occurs by other means sheds new light on the concept of media multiplexity. The strong association between percent of ties contacted by email and the percent of ties contacted in-person and by telephone discussed in Chapter 4 is consistent with Haythornthwaite and Wellman's (1998) concept of media multiplexity. The more contact people have through one medium, the more they have through extended kinds of media. Although Haythornthwaite and Wellman do not make the argument directly, it is possible to interpret these results to mean that contact through one medium will cause contact through another medium. For example, in-person contact will be followed up by email contact, which will then be used to schedule future in-person contact. However, the results presented in Chapter 4 show that in-person or telephone contact is not the only cause of email. Even when controlling the amount of contact occurring in-person and by telephone, there was still a strong effect for the number of ties that people have in their networks on email use.

This means that although media multiplexity describes the empirical that media tend to be used in conjunction with each other, it does not fully explain the causes that lead people to use media together. The number of friendship, work, extended kin, mid-range and distant ties people have, has strong effects on the extent to which people use email. These effects are independent of contact that occurs through other media, meaning that email is used regardless of the extent to which other media are used in conjunction with email. Thus, media multiplexity explains why people use email to some extent, but the number of ties that people have in their networks is also an important determinant.

5.1.6 Implications for Digital Inequality

It has been well established that digital inequality is not just a matter of internet access (DiMaggio et al 2001; Katz & Rice 2002). Even if people have access to the internet, their skills and knowledge are key determinants to the extent to which they use the internet to their advantage. Those who are already advantaged offline are also typically the most advantaged online, using email to enhance their social position further.

The findings presented in Chapter 4 show another example of how this process occurs. As discussed in Chapter 1, a wide variety of literature shows that social ties provide support that help people better their lives. However, ties will be more prone to deliver that support the more frequently they are contacted. The findings presented in Chapter 4 show that those who are most connected offline

are able to use their time online to help maintain their social connections. This means that the people using email the most will already be prone to receive support, because they have the largest numbers of ties. Moreover, these same people will use the internet to stay in close contact with their ties, which will increase their chances of receiving that support even further.

Moreover, these findings show that email can be used to connect with a wide variety of ties. The more friendship, work and extended kin ties people have, the more ties they will contact by email. Because different kinds of ties deliver different kinds of support, this further implies that email will be useful for helping to obtain a wide variety support.

These findings can be interpreted somewhat more optimistically than other findings regarding digital inequality. Previous research has shown that demographic factors are the key determinants of the extent to which people will benefit from internet use. For example, people are able to use search engines more effectively if they are well educated (Hargittai 2003). However, the findings presented in this dissertation show that this not the case with email. The results presented in Chapter 4 show that although attainment factors cause people to become internet users, they do not cause people to use email. Although it may be true that a certain amount of education provides the literacy necessary to write email messages, a high level of education is not required.

These findings can be interpreted in an optimistic light insofar as they imply that if people who are highly connected are given email, they might use it

to their advantage. In this way, as long as those who are economically disadvantaged have social ties, they may be able to use email. For example, community leaders in low-income neighbourhoods might be able to use email as a means to help stay connected with at least some of their ties. Nevertheless, further research is required to see if this is actually the case. There are likely other factors that have not been discussed in this dissertation that will contribute to their ability to use email. For example, community leaders in low-income neighbourhoods might not use email simply because most of their ties do not have email. Nevertheless, it is possible that these well connected individuals have at least some ties that use email, helping them stay connected to those that are more advantaged. Using email to enhance their contact with those higher in the social structure may be important in its own right, helping these people access important recourses and information (Lin 2001).

5.1.7 Communication Networks as Contemporary Community

Contrary to the concerns of many classical and contemporary scholars alike, the results presented in this dissertation show that social life is thriving in contemporary society. There are at least three ways in which the results support this view.

First, by measuring the number of ties that make up active communication networks, results from the Social Ties survey show that Americans are highly connected. Although participation in group oriented activities such as voluntary

associations may be on the decline, as argued by Putnam (2000), Americans still have large numbers of ties that are more than just casual acquaintances. This is because people have many relationships that exist outside of voluntary associations, as shown by the weak association between the number of friend ties that Americans have in their networks and their participation in voluntary associations. Clearly, participation in the formal group activity is only a small part of contemporary social life. Rather than relying on formal groups, people in contemporary America maintain their own personal communities.

Second, the inclusive measure of active ties used in the Social Ties survey also shows that people connect with a variety of ties to maintain their social lives. While McPherson, Smith-Lovin and Brashears (2006) argue that Americans are socially isolated because they only have a small and dwindling number of core discussion partners, the Social Ties data shows that Americans still have many other core ties with whom they feel very close, contact frequently, and who provide them with support when called upon. This shows that Americans are not socially isolated, because their communication networks are multi-stranded, consisting of many different types of ties.

Third, this dissertation has shown that people combine multiple communication media in complex ways to stay in close connection with their social ties. When their ties – such as friendship ties – permit choice in determining who is contacted and how that contact occurs, email alone can be enough to maintain direct contact. When their ties do not permit as much choice, email is still used as a supplement to more traditional forms of contact. In these

ways, people tailor their communication media to fit with the social demands of their multi-stranded communication networks. They effectively combine both contemporary and traditional technology to maintain contact with large numbers of contemporary and traditional ties.

The concerns raised by Robert Putnam, and by McPherson, Smith-Lovin and Brashears, are similar to concerns raised by classical social theorists such as Ferdinand Tönnies, Karl Marx, and Max Weber. These scholars all assume that because people in contemporary society have fewer ties that come from local, all-encompassing, and homogenous groups, they are necessarily isolated, alienated, or estranged. However, this dissertation has shown that although people in present-day America may have fewer of these traditional relationships, they are by no means alone. Instead, they actively maintain contact with many different types of ties by drawing on many different communication media. These personal networks are sparsely knit, weaving together ties from a variety of social circles into what Georg Simmel dubbed, "The Web of Group Affiliations" (1922). Moreover, the diversity of these networks supports Emile Durkheim's (1945) view that people in contemporary society have the ability to form meaningful relationships with those from very different backgrounds. These new communication networks are also strikingly similar to the networks described earlier by Barry Wellman (1979) and Claude Fischer (1982) near the end of the 20th century. However, with the emergence of email – currently one of the most popular new communication technologies of the 21st century – Americans now have one extra communication tool which they draw on to stay socially

connected. In short, community is alive and well in contemporary society, but it exists as multi-stranded and actively maintained communication networks, rather than passively enacted membership in local groups.

5.2 Future Directions

The Social Ties data has provided new and important information about communication networks in America. It has also explained the extent to which people use email and other media to communicate with their networks. However, doing this in a 19-minute telephone survey limits the amount of detail about these ties that can be collected. Information collected about media use, tie type, and tie distance through the Social Ties survey has been at the aggregate level, rather than on a per tie basis. Moreover, the density and connection between each of these ties was only collected at a very general level in the Social Ties survey. Collecting this information for each tie would be extremely difficult, if not impossible, using a telephone survey. Nevertheless, having such information for each core tie and significant tie would allow for a much more refined analysis of this data. For example, with such data it would be possible to understand how people use media to span structural holes, and connect with ties that are outside of isolated cliques.

Fortunately, this level of detail has been collected through NetLab's Toronto based Connected Lives Project. This project uses a paper survey that has measures similar to those used in the Social Ties survey. Moreover, it follows up

those survey measures with in-depth interviews, during which time respondents report information regarding their communication with each core and significant tie in their networks. Although this data does not come from the US population, it includes respondents that have similar survey characteristics as those that completed the Social Ties survey. This would potentially allow for comparative analysis between the Social Ties data and the Connected Lives data. Such an analysis would help explain the general findings of the Social Ties data by using the rich information collected per tie through the Connected Lives data.

Throughout this dissertation, I have been careful to point out that these findings are limited to America. However, this limitation leaves open the opportunity to compare these results with data collected in other countries. Although the use of communication media may be similar in the US and Canada, it is clearly different in other countries. For example, my previous research on mobile phone use in Japan has shown that Japanese people use their mobile phones to stay in frequent contact with their core ties (see Miyata, Boase & Wellman 2005; Miyata, Wellman & Boase 2005). Use of mobile phone text messaging in Japan likely means that Japanese people combine their communication media much differently than do Americans and Canadians. Moreover, it might mean that PC based email is used to contact very different kinds of ties in Japan than it is in America or Canada. A more in-depth comparative study using the Social Ties, Connected Lives, and available Japanese data, might better show how and why these different uses of email occur.

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Appendix A

Demographic Characteristics and Network Size

Gender

Women, those who are older, and those with college degrees, tend to have the largest numbers of core ties. People with large numbers of significant ties tend to be male, educated, and working in professional occupations.

Men most often maintain contact with only a small number of core ties. By contrast, equal percentages of women have small, medium, or large numbers of core ties. The opposite pattern appears when examining the number of significant (non-core) ties maintained by men and women. Women often maintain small or medium numbers of significant ties, and less often maintain large numbers of significant ties. By contrast, there is a greater percent of men with large numbers of significant ties, than men with medium or small numbers of significant ties.

Age

The mean age is slightly higher for those with large numbers of core ties (50 years old), than it is for those with small and medium numbers of core ties (47 and 46 years old, respectively). It is possible that age gives people time to develop these core ties. Unlike core ties, the number of significant ties maintained by respondents does not vary by age.

Employment Status

Those working full-time or part time most often have a medium number of core ties, while those who are retired are more likely to have either a small or large number of core ties, and those that are unemployed are more likely to have a small number of core ties. By contrast, those working full-time are no more likely to have a medium number of significant ties than they are to have small or large number of significant ties. Those working part-time are more likely to have a medium number of significant ties, while those who are retired and unemployed are more likely to have a small number of significant ties.

Education

Those with college degrees often have a medium number of core ties. By contrast, those with high school degrees often have a small number of core ties. These findings are more pronounced for the number of significant ties. Those who have a college degree tend to have a medium or large number of significant ties. The opposite is true for those with high school or less education—they often have a smaller number of significant ties. Those with a college degree have an average of 34 significant ties, while those with high school or less education have a mean of only have 23 significant ties.

Community Type

A commonly held perception is that small communities foster large numbers of supportive and intimate relationships. The Social Ties data show that people

living in rural areas are no more prone to have large numbers of core ties than they are to have small or medium numbers of core ties. The same is true for people living in suburban areas. However, those living in urban areas are more apt to have a small number of core and significant ties in their networks.

Job Type

When taking the Social Ties survey, respondents gave us the name of their occupation. These responses were later coded as fitting into one of the following categories: professionals, working class and service class. Professional jobs include knowledge-based professional workers and business owners; working class jobs include manual labourers and semi-skilled workers; service class jobs include low-level sales, and office workers.

The results show that people with professional or service class jobs most often have a medium number of core ties. Meanwhile, people with working class jobs most often have small or medium numbers of core ties.

Professionals most often have a large number of significant ties. People with service jobs most often have a medium number of significant ties, while people with working class jobs most often have a small number of significant ties.

Demographic Characteristics and Network Size

	Core Ties					Significant Ties				
	% Small (1-10)	% Medium (11-22)	% Large (22+)	Mean # Ties	Median # Ties	% Small (0-10)	% Medium (11-26)	% Large (26+)	Mean # Ties	Median # Ties
Women	32	35	33	23	16	37	35	29	24	16
Men	37	33	30	24	15	32	32	36	32	18
Age (average)	47	46	50			49	46	48		
Age (median)	46	45	50			48	45	47		
Employment Status										
Full-Time	33	37	31	22	15	31	34	35	28	18
Part-Time	28	38	35	26	17	28	43	29	24	17
Retired	33	27	41	28	17	38	29	32	31	16
Not Employed	43	35	22	20	13	44	32	24	22	13
Education										
High School or Less	36	33	31	24	15	41	34	26	23	14
Some College	34	34	33	24	15	36	30	33	27	16
College Degree	29	38	33	23	16	26	35	40	34	21
Grad or Prof. Degree	35	33	33	20	16	24	38	38	32	22
Community Type										
Rural	34	33	33	25	15	34	34	33	29	17
Suburban	32	35	33	24	16	34	33	33	28	17
Urban	37	34	29	22	14	36	34	30	25	16
Job Type										
Professionals	32	36	31	23	15	25	35	40	33	21
Working	35	35	30	25	15	37	30	33	24	16
Service	30	39	32	21	16	33	39	28	23	16
Internet Access										
No internet at Home	37	30	33	26	15	41	30	29	27	15
Internet at Home	32	37	31	22	15	31	36	34	27	18

Appendix B

The Social Ties Questionnaire

PEW/INTERNET
PEW INTERNET & AMERICAN LIFE PROJECT

1615 L Street, NW, Suite 700
Washington, DC 20036-5610

Telephone 202.419.4500
Facsimile 202.419.4505
www.pewinternet.org

August 2, 2006

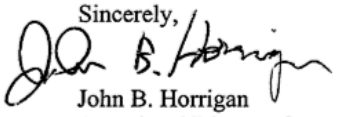
Mr. Jeffrey Boase
Massey College
4 Devonshire Place
Toronto ON M5S 2E1
Canada

Dear Jeff:

I am writing to grant you permission from the Pew Internet & American Life Project to reprint in your doctoral thesis a copy of the questionnaire used in the Pew Internet "Social Ties" survey fielded between February 17, 2004 and March 17, 2004. The data from that survey was used in the report "The Strength of Internet Ties".

This letter of permission not only allows you to reproduce the questionnaire in the thesis, but also covers use made of the thesis by the National Library of Canada (i.e., to reproduce, loan, distribute, or sell copies of the thesis by any means and in any form or format).

Sincerely,



John B. Horrigan
Associated Director for
Research

Conducted by: PRINCETON SURVEY RESEARCH ASSOCIATES
Funded by: PEW INTERNET AND AMERICAN LIFE
N= 2,200 adults 18 and older
Field Dates: February 17 to March 17, 2004
Job#: 23064

Hello, my name is _____ and I'm calling for Princeton Survey Research. We're conducting a survey to find out how Americans live their lives today, and we would like to include your household. May I please speak with the YOUNGEST MALE, age 18 or older, who is now at home? (**IF NO MALE, ASK:** May I please speak with the OLDEST FEMALE, age 18 or older, who is now at home?)

SEX RECORD RESPONDENT SEX

1 Male
2 Female

Q1 Overall, are you satisfied or dissatisfied with the way things are going in this country today?

1 Satisfied
2 Dissatisfied
9 Don't know/Refused

Q2 I'm going to read you a few statements. On a scale of 1 to 5, with 1 being strongly agree and 5 being strongly DISagree, please tell me how you feel about each of the following… **(READ; ROTATE) (AS NECESSARY:** 1 means you strongly agree with this statement, 5 means you strongly disagree**)**

a. We have gone too far in pushing equal rights in this country
b. We should be more tolerant of people who choose to live according to their own standards, even if they are very different from our own
c. This country would have fewer problems if there were more emphasis on traditional kin values
d. It is more difficult for non-whites to be successful in American society today than it is for whites

1 Strongly agree

2 Agree

3 Neutral

4 Disagree

5 Strongly disagree

9 Don't know/Refused

Q5 Turning to a different topic… do you use a computer at your workplace, at school, at home, or anywhere else on at least an occasional basis?

1 Yes
2 No
9 Don't know/Refused

Q6 Do you ever go online to access the Internet or World Wide Web or to send and receive email?

1 Yes
2 No
9 Don't know/Refused

ASK ALL INTERNET USERS (Q6=1); NON-USERS GO TO Q17:

Q12 About how many years have you had access to the Internet?

____ **RECORD NUMBER OF YEARS**
0 Under a year
99 Don't know/Refused

IF ONLINE UNDER A YEAR (Q12=0):

Q12.1 About how many months is that?

____ **RECORD NUMBER OF MONTHS**
99 Don't know/Refused

ASK ALL INTERNET USERS (Q6=1):

Q16 About how often do you go online from… **(INSERT IN ORDER)** – several times a day, about once a day, 3-5 days a week, 1-2 days a week, every few weeks, or less often?

a. home?
b. work?
c. someplace other than home or work?

1 Several times a day

2 About once a day

3 3-5 days a week

4 1-2 days a week

5 Every few weeks

6 Less often

7 **(VOL)** Never

9 Don't know/Refused

ASK IF GO ONLINE AT HOME (Q16a=1-6):

MODEMDoes the computer you use at home connect to the Internet through a dial-up telephone line, or do you have some other type of connection, such as a DSL-enabled phone line, a cable TV modem, a wireless connection, or a T-1 or fiber optic connection?

1 Standard telephone line
2 DSL-enabled phone line
3 Cable modem
4 Wireless connection (either "land-based" or "satellite")
5 T-1 or fiber optic connection
6 Other **(MAKE SURE NOT ONE OF ABOVE)**
9 **(DO NOT READ)** Don't know/Refused

ASK IF GO ONLINE FROM WORK (Q16b=1-6):

BBW Do you happen to know what kind of Internet connection you have at WORK, a high-speed connection or dial-up connection through a modem?

1 High speed
2 Dial-up
3 **(DO NOT READ)** None/Does not apply
9 **(DO NOT READ)** Don't know/Refused

ASK ALL:

Q17 IN THE PAST MONTH, have you used any of the following things… **(READ ITEMS IN ORDER) (IF NECESSARY:** Have you used this in the past month, or not?)

a. A cellular phone?
b. A digital camera?
c. A Personal Digital Assistant or PDA, such as a Palm Pilot or Pocket PC?

ASK d-f OF INTERNET USERS ONLY (Q6=1):

d. Email?
e. Instant messaging or IM?
f. A laptop computer with a wireless modem?

ASK g IF USE CELL PHONE (Q17a=1)

g. A cell phone that can send and receive email?

1 Yes

2 No

3 **(VOL)** Don't know what this is

9 Don't know/Refused

Q18 Next, please tell me if you have been a member of any of the following kinds of groups or organizations IN THE PAST THREE YEARS… **(READ ITEMS: ROTATE) (ONLY IF NECESSARY:** Have you been a member of this kind of group in the past three years?**)**

IF YES (1), ASK Q19 FOLLOW-UP BEFORE MOVING TO NEXT ITEM.

a. A business or professional association
b. A labour union
c. A sports league you play in yourself or a child's sports league
d. A religious organization
e. A hobby group or club
f. A community service group
g. A political or activist group

ALWAYS ASK h LAST:

h. Any other group or organization I haven't already mentioned?

1 Yes

2 No

9 Don't know/Refused

IF YES (1) TO ITEM ABOVE, ASK:

Q19 Have you been an ACTIVE member – regularly attending meetings, contributing time or money, or holding a leadership position – or not an active member?

(AFTER FIRST ITEM, SHORTEN TO: Have you been an ACTIVE member or not?)

1 Active member
2 Not an active member
9 Don't know/Refused

(READ) Our research is about people's relationships and how they communicate with one another. I'm going to ask you questions about two different types of people in your life – those you feel VERY CLOSE to who do not live with you, such as close kin and friends, and those you feel SOMEWHAT CLOSE to who do not live with you. We'd like to know how many people in your life fit into each one of these categories…

WT1 Let's start with the people you feel VERY close to, which might include those you discuss important matters with, regularly keep in touch with, or are there for you when you need help. Thinking about ALL the people who fit this description and who do NOT live with you, how many are… **(INSERT FIRST ITEM)**. How many are… **(INSERT NEXT ITEM IN ORDER)**

(**INT NOTE:** If R has trouble answering, ask them to give us their best guess)

a. Members of your immediate kin– parents, siblings, adult children, or in-laws – who you are very close to?
b. Other relatives you are very close to?
c. People you know from work who you are very close to?
d. Neighbours you are very close to?
e. Other people who are not co-workers or neighbours, who you are very close to?

____ **RECORD EXACT NUMBER**
0 None
999 Don't know/Refused

IF ALL ITEMS WT1a-e=999, GO TO WT3

WT2 Based on your answers, you have **(INSERT TOTAL FROM WT1a-e)** people you feel very close to who do not live with you. Is that number about right?

_____ **(ENTER CORRECT TOTAL)**

(READ) Now think about the other type -- the people you feel SOMEWHAT CLOSE to who do not live with you. They're more than just casual acquaintances, but they're not as close as the friends and relatives we just talked about.

WT3 Thinking about ALL the people who fit this description, how many are … **(INSERT FIRST ITEM)**. How many are… **(INSERT NEXT ITEM IN ORDER)**

(**INT NOTE:** If R has trouble answering, ask them to give us their best guess)

a. Members of your immediate kin – parents, siblings, adult children, or in-laws – who you are somewhat close to?
b. Other relatives you are somewhat close to?
c. People you know from work who you are somewhat close to?
d. Neighbours you are somewhat close to?
e. Other people who are not co-workers or neighbours, who you are somewhat close to?

____ **RECORD EXACT NUMBER**
0 None
999 Don't know/Refused

IF ALL ITEMS WT3a-e=999, GO TO WT5

WT4 Based on your answers, you have **(INSERT TOTAL FROM WT3a-e)** people you feel somewhat close to who do not live with you. Is that number about right?

_____ **(ENTER CORRECT TOTAL)**

ASK WT5-WT11 IF TOTAL IN VERY CLOSE NETWORK EQUALS 1 OR MORE (WT2=>1); ELSE GO TO WT12:

(READ) For my next few questions, I'd like you to think ONLY about the **(INSERT TOTAL FROM WT2)** people/person you feel VERY CLOSE TO…

WT5 How many of them are women?/Is this person a woman?

____ **RECORD EXACT NUMBER (ENTER 1 IF JUST ONE PERSON IN NETWORK AND ANSWER IS YES)**
0 None
999 Don't know/Refused

WT6 How many are the same race or ethnicity as you are?/Is this person the same race or ethnicity as you are?

____ **RECORD EXACT NUMBER (ENTER 1 IF JUST ONE PERSON IN NETWORK AND ANSWER IS YES)**
0 None
999 Don't know/Refused

WT7 And how many live more than one hour's travel away from where you live?/Does this person live more than one hour's travel away from where you live?

____ **RECORD EXACT NUMBER (ENTER 1 IF JUST ONE PERSON IN NETWORK AND ANSWER IS YES)**
0 None
999 Don't know/Refused

ASK WT8-10 IF MORE THAN ONE PERSON IN NETWORK (WT2=>2); ELSE GO TO WT8a:

WT8 We'd like to know if any of these **(INSERT TOTAL FROM WT2)** people you feel VERY close to have ever helped you with the following activities. If you've never done the activity, just tell me.

(First/Next…) **(READ ITEMS; ROTATE)**. **(<u>FOR FIRST ITEM AND THEN ONLY AS NECESSARY</u>:** Have you ever gotten help with this activity from one of the people you feel VERY close to who does not live with you?**)**

a. Find a new place to live
b. Change jobs
c. Buy a personal computer
d. Make a major investment or financial decision
e. Look for information about a major illness or serious medical condition
f. Care for someone with a major illness or serious medical condition
g. Put up drywall in your house
h. Decide who to vote for in an election

1 Yes, have gotten help

2 No, have not gotten help

3 Have never done this activity

9 Don't know/Refused

WT9 Still thinking about the **(INSERT TOTAL FROM WT2)** people you feel very close to, how many know one another? Would you say… **(READ 1-5)**

1 They ALL know each other,

2 MOST of them know each other,

3 About HALF know each other,

4 Only SOME know each other, or

5 NONE know each other?

9 **(DO NOT READ)** Don't know/Refused

WT10 How many of them do you… **(INSERT FIRST ITEM)**? How many do you… **(INSERT NEXT ITEM IN ORDER)**

a. talk with face-to-face at least once a week?

ASK b IF USE CELL PHONE (Q17a=1):

b. talk with by cellular phone at least once a week?

ASK ALL:

c. talk with by regular landline phone at least once a week?

ASK d IF USE EMAIL (Q17d=1):

d. Send email to at least once a week?

ASK e IF USE IM (Q17e=1):

e. Instant message with at least once a week?

____ **RECORD EXACT NUMBER**

0 None

999 Don't know/Refused

IF ONLY ONE PERSON IN NETWORK (WT2=1); ELSE GO TO WT12:

WT8a We'd like to know if this person you feel VERY close to has ever helped you with the following activities. If you've never done the activity, just tell me.

(First/Next…) **(READ ITEMS; ROTATE)**. **(<u>FOR FIRST ITEM AND THEN ONLY AS NECESSARY</u>:** Have you ever gotten help with this activity from the person you feel VERY close to who does not live with you?**)**

a. Find a new place to live
b. Change jobs
c. Buy a personal computer
d. Make a major investment or financial decision
e. Look for information about a major illness or serious medical condition
f. Care for someone with a major illness or serious medical condition
g. Put up drywall in your house
h. Decide who to vote for in an election

1 Yes, have gotten help

2 No, have not gotten help

3 Have never done this activity

9 Don't know/Refused

WT11 Do you… **(INSERT ITEMS IN ORDER)**

a. talk with this person face-to-face at least once a week?

ASK b IF USE CELL PHONE (Q17a=1):

b. talk with this person by cellular phone at least once a week?

ASK ALL:

c. talk with this person by regular landline phone at least once a week?

ASK d IF USE EMAIL (Q17d=1):

d. Send email to this person at least once a week?

ASK e IF USE IM (Q17e=1):

e. Instant message with this person at least once a week?

1 Yes
2 No
9 Don't know/Refused

ASK WT12-WT18 IF TOTAL IN SOMEWHAT CLOSE NETWORK EQUALS 1 OR MORE (WT4=>1); ELSE GO TO WT19:

(READ) Now I want you to think ONLY about the **(INSERT TOTAL FROM WT4)** people/person you feel SOMEWHAT CLOSE TO…

WT12 How many of them are women?/Is this person a woman?

____ **RECORD EXACT NUMBER (ENTER 1 IF JUST ONE PERSON IN NETWORK AND ANSWER IS YES)**
0 None
999 Don't know/Refused

WT13 How many are the same race or ethnicity as you are?/Is this person the same race or ethnicity as you are?

____ **RECORD EXACT NUMBER (ENTER 1 IF JUST ONE PERSON IN NETWORK AND ANSWER IS YES)**
0 None
999 Don't know/Refused

WT14 And how many live more than one hour's travel away from where you live?/Does this person live more than one hour's travel away from where you live?

____ **RECORD EXACT NUMBER (ENTER 1 IF JUST ONE PERSON IN NETWORK AND ANSWER IS YES)**
0 None
999 Don't know/Refused

ASK WT15-17 IF MORE THAN ONE PERSON IN NETWORK (WT4=>2); ELSE GO TO WT15a:

WT15 Have any of these **(INSERT TOTAL FROM WT4)** people you feel SOMEWHAT close to ever helped you with the following activities?

IF R WAS <u>NOT</u> ASKED WT8 or WT8a (WT2=0 OR ALL ITEMS WT1a-WT1e=999), ADD: If you've never done the activity, just tell me.

(First/Next…) **(READ ITEMS; ROTATE)**. **(<u>ONLY IF NECESSARY</u>:** Have you ever gotten help with this activity from one of the people you feel somewhat close to who does not live with you?**)**

ASK a IF WT8a/WT8aa NE 3:
a. Find a new place to live
ASK b IF WT8b/WT8ab NE 3:
b. Change jobs
ASK c IF WT8c/WT8ac NE 3:
c. Buy a personal computer
ASK d IF WT8d/WT8ad NE 3:
d. Make a major investment or financial decision
ASK e IF WT8e/ET8ae NE 3:
e. Look for information about a major illness or serious medical condition
ASK f IF WT8f/WT8af NE 3:
f. Care for someone with a major illness or serious medical condition
ASK g IF WT8g/WT8ag NE 3:
g. Put up drywall in your house
ASK h IF WT8h/WT8ah NE 3:
h. Decide who to vote for in an election

1 Yes, have gotten help

2 No, have not gotten help

3 **(VOL)** Have never done this activity

9 Don't know/Refused

WT16 How many of the **(INSERT TOTAL FROM WT4)** people you feel somewhat close to know one another? Do… **(READ 1-5)**

1 They ALL know each other,

2 MOST of them know each other,

3 About HALF know each other,

4 Only SOME know each other, or

5 NONE know each other?

9 **(DO NOT READ)** Don't know/Refused

WT17 How many do you… **(INSERT FIRST ITEM)**? How many do you… **(INSERT NEXT ITEM IN ORDER)**

a. talk with face-to-face at least once a week?

ASK b IF USE CELL PHONE (Q17a=1):

b. talk with by cellular phone at least once a week?

ASK ALL:

c. talk with by regular landline phone at least once a week?

ASK d IF USE EMAIL (Q17d=1):

d. Send email to at least once a week?

ASK e IF USE IM (Q17e=1):

e. Instant message with at least once a week?

____ **RECORD EXACT NUMBER**

0 None

999 Don't know/Refused

IF ONLY ONE PERSON IN SOMEWHAT CLOSE NETWORK (WT4=1); ELSE GO TO WT19:

WT15a Has this person ever helped you with the following activities?

IF R WAS <u>NOT</u> ASKED WT8 or WT8a (WT2=0 OR ALL ITEMS WT1a-WT1e=999), ADD: If you've never done the activity, just tell me.

(First/Next…) **(READ ITEMS; ROTATE)**. **(<u>ONLY IF NECESSARY</u>:** Have you ever gotten help with this activity from the person you feel somewhat close to who does not live with you?**)**

ASK a IF WT8a/WT8aa NE 3:
a. Find a new place to live

ASK b IF WT8b/WT8ab NE 3:
b. Change jobs

ASK c IF WT8c/WT8ac NE 3:
c. Buy a personal computer

ASK d IF WT8d/WT8ad NE 3:
d. Make a major investment or financial decision

ASK e IF WT8e/ET8ae NE 3:
e. Look for information about a major illness or serious medical condition

ASK f IF WT8f/WT8af NE 3:
f. Care for someone with a major illness or serious medical condition

ASK g IF WT8g/WT8ag NE 3:
g. Put up drywall in your house

ASK h IF WT8h/WT8ah NE 3:
h. Decide who to vote for in an election

1 Yes, have gotten help

2 No, have not gotten help

3 **(VOL)** Have never done this activity

9 Don't know/Refused

WT18 Do you… **(INSERT ITEMS IN ORDER)**

a. talk with this person face-to-face at least once a week?

ASK b IF USE CELL PHONE (Q17a=1):

b. talk with this person by cellular phone at least once a week?

ASK ALL:

c. talk with this person by regular landline phone at least once a week?

ASK d IF USE EMAIL (Q17d=1):

d. Send email to this person at least once a week?

ASK e IF USE IM (Q17e=1):

e. Instant message with this person at least once a week?

1 Yes
2 No
9 Don't know/Refused

ASK WT19 IF WT2=>1 OR WT4=>1; ELSE GO TO WT20:

WT19 Thinking about ALL of the people we just talked about – those you feel very close to AND those you feel somewhat close to – are any of them in the following occupations… **(READ; ROTATE) (IF NECESSARY:** Does anyone we talked about do this for a living?)

IF YES: Is this someone you feel VERY close to, SOMEWHAT close to, or both?

IF R SAYS "SOMEONE USED TO DO THIS BUT NOW RETIRED" RECORD AS NO (4).

a. Lawyer
b. Truck driver
c. Sales or marketing manager
d. Pharmacist
e. Janitor or caretaker
f. Engineer
g. Cashier
h. Waiter or waitress
i. Computer programmer
j. Carpenter

1 Yes, someone VERY close does this for a living

2 Yes, someone SOMEWHAT close does this for a living

3 Yes, someone in BOTH GROUPS does this for a living

4 No, none do this for a living

9 Don't know/Refused

ASK ALL:

(READ) I have just a few questions about you personally. This is the last part of the survey…

WT20 Which of the following best describes how you spend your leisure time? Do you… **(READ 1-4)**

1 Spend most of it BY YOURSELF,
2 Spend most of your time with JUST ONE OR TWO PEOPLE,
3 Spend most of your time with a single GROUP of people, or
4 Divide your time among DIFFERENT GROUPS of people?
9 **(DO NOT READ)** Don't know/Refused

WT21 On a scale of 1 to 5, where 1 means you strongly agree and 5 means you strongly DISagree, please tell me how well each of the following statements describes YOU personally. (First/Next)…**(INSERT – ROTATE)**. **(IF NECESSARY:** 1 means you strongly agree and 5 means you strongly disagree)

a. I am outgoing and sociable
b. I am original, coming up with new ideas
c. I am reserved
d. I am sometimes shy and inhibited
e. I have an active imagination
f. I have an assertive personality
g. I am curious about many different things
h. I am talkative
i. I prefer work that is routine
j. I like to explore new art, music or literature
k. I tend to be quiet

1 Strongly agree

2 Agree

3 Neutral

4 Disagree

5 Strongly disagree

9 Don't know/Refused

ASK INTERNET USERS (Q6=1); NON-USERS GO TO DEMOS:

WT22 Overall, do you think using the Internet has INCREASED, DECREASED, or NOT REALLY AFFECTED… **(INSERT FIRST ITEM)**? Has the Internet INCREASED, DECREASED, or NOT REALLY AFFECTED… **(INSERT NEXT ITEM IN ORDER)**?

a. the number of people you feel VERY close to in your life
b. the number of people you feel SOMEWHAT close to in your life
c. the number of CASUAL ACQUAINTANCES in your life

1 Increased

2 Decreased

3 Hasn't affected

9 Don't know/Refused

WT23 Do people ever complain that you spend too much time on the Internet?

1 Yes
2 No
3 **(VOL)** Live alone
9 Don't know/Refused

DEMOGRAPHICS:

ASK ALL:

(READ) The remaining questions are for statistical purposes only…

AGE What is your age?

_____ years
97 97 or older
98 Don't know
99 Refused

WT24 Not including yourself, how many adults age 18 and older, such as parents, siblings, in-laws or adult children, live in your household?

____ **RECORD EXACT NUMBER**
0 None
99 Don't know/Refused

WT25 Do you live with a partner or spouse?

1 Yes
2 No
9 Don't know/Refused

MAR Are you married, living as married, divorced, separated, widowed, or have you never been married?

1 Married
2 Living as married
3 Divorced
4 Separated
5 Widowed
6 Never been married
8 **(DO NOT READ)** Don't know
9 **(DO NOT READ)** Refused

PAR Are you the parent or guardian of any children under age 18 now living in your household?

1 Yes
2 No
9 **(DO NOT READ)** Don't know/Refused

IF PAR=1:
WT26 How many children under the age of 12 live in your household?

____ **RECORD EXACT NUMBER**
0 None
99 Don't know/Refused

IF PAR=1:
WT27 How many children between the ages of 12 and 17 live in your household?

____ **RECORD EXACT NUMBER**
0 None
99 Don't know/Refused

ASK ALL:

EMPL What is your current employment status? Are you now employed full-time, part-time, retired, or are you not employed for pay?

1 Employed full-time
2 Employed part-time
3 Retired
4 Not employed for pay
5 **(VOL)** Disabled
6 **(VOL)** Student
7 **(VOL)** Other
9 Don't know/Refused

IF EMPL=1,2:

EMP2 About how much of your work do you do at home? **(READ 1-5)**

1 All,
2 Most,
3 About half,
4 Some, or
5 None?
9 **(DO NOT READ)** Don't know/Refused

IF EMP2 DOES NOT EQUAL 1:

EMP3 On a typical day, how long does it take you to travel ONE WAY to work? **(READ 1-2)**

1 Less than an hour, or
2 An hour or longer?
9 **(DO NOT READ)** Don't know/Refused

IF EMPL=1,2:

EMP4 And specifically what kind of work do you do? **CHECK CATEGORY BELOW THAT BEST DESCRIBES THE RESPONDENT'S WORK. IF UNABLE TO CLASSIFY, ASK RESPONDENT TO CHOOSE:** Which one of the following BEST describes the kind of work you do? **(READ JOB CATEGORIES IN CAPS)**

01 KNOWLEDGE BASED PROFESSIONAL WORKER – computer and mathematical occupations, architect, engineer, scientist, education and library occupations, arts, design, entertainment, sports, media occupations
02 OTHER PROFESSIONAL WORKER, MANAGER, EXECUTIVE, OR OFFICIAL—lawyer, doctor, registered nurse, accountant, consultant,
store manager, sales manager, office manager, business executive, association executive, government official
03 BUSINESS OWNER (with two or more employees) -- such as a store, restaurant or factory owner, building or plumbing contractor
04 CLERICAL OR OFFICE WORKER -- typist, word processing, secretary, administrative assistant, receptionist, data entry, postal clerk, bank teller, etc.
05 SALES WORKER -- store clerk, telemarketing person
06 MANUFACTURER'S REPRESENTATIVE -- outside salesperson, sales representative
07 SERVICE WORKER -- who performs services, such as waiter/waitress, hairstylist, police or fireman, housekeeper, janitor, day care worker, teachers' or nurses' aide, parking attendant, etc.
08 SKILLED TRADE OR CRAFT-- electrician, machinist, plumber, carpenter, mechanic, printer, baker, tailor, etc.
09 SEMI-SKILLED WORKER -- operates machine in a factory, assembly line worker, truck driver, taxi or bus driver, etc.
10 LABOURER -- construction worker, plumber's helper, warehouse or dock worker, garbage man, or other physical work
11 Other **(SPECIFY)**
99 **(DO NOT READ)** Don't know/Refused

ASK IF EMPL DOES NOT EQUAL 6:

STUD Are you also a full- or part-time student?

1 Yes, full-time
2 Yes, part-time
3 No
9 Don't know/Refused

ASK ALL:

EDUC What is the last grade or class you completed in school? **(DO NOT READ, BUT CAN PROBE FOR CLARITY IF NEEDED).**

1 None, or grades 1-8
2 High school incomplete (grades 9-11)
3 High school graduate (grade 12 or GED certificate)
4 Business, Technical, or vocational school AFTER high school
5 Some college, no 4-year degree
6 College graduate (B.S., B.A., or other 4-year degree)
7 Post-graduate training/professional school after college (Master's degree/Ph.D., Law or Medical school)
9 **(DO NOT READ)** Don't know/Refused

EDUCF As far as you know, did your FATHER graduate from college?

1 Yes
2 No
3 **(VOL)** Don't know father/Father absent
9 Don't know/Refused

IF EDUCF=1:

EDUCF2 Did he go on to get a post-graduate or professional degree after college, such as an M.A. or J.D.?

1 Yes
2 No
9 Don't know/Refused

ASK ALL:

EDUCM Did your MOTHER graduate from college?

1 Yes
2 No
3 **(VOL)** Don't know mother/Mother absent
9 Don't know/Refused

IF EDUCM=1:

EDUCM2 Did she go on to get a post-graduate or professional degree after college, such as an M.A. or J.D.?

1 Yes
2 No
9 Don't know/Refused

ASK ALL:

HISP Are you, yourself, of Hispanic or Latino origin or descent, such as Mexican, Puerto Rican, Cuban, or some other Latin American background?

1 Yes
2 No
9 Don't know/Refused

RACE What is your race? Are you white, black, Asian, or some other race? **IF R SAYS HISPANIC OR LATINO, PROBE:** Do you consider yourself a WHITE (Hispanic/Latino) or a BLACK (Hispanic/Latino)? **IF R DOES NOT SAY WHITE, BLACK OR ONE OF THE RACE CATEGORIES LISTED, RECORD AS "OTHER" (CODE 6)**

1 White
2 Black or African-American
3 Asian or Pacific Islander
4 Mixed race
5 Native American/American Indian
6 Other **(SPECIFY)**
9 **(DO NOT READ)** Don't know/Refused

INC Last year, that is in 2003, what was your total kin income from all sources, before taxes. Just stop me when I get to the right category… **(READ 1-8)**

1 Less than $10,000
2 $10,000 to under $20,000
3 $20,000 to under $30,000
4 $30,000 to under $40,000
5 $40,000 to under $50,000
6 $50,000 to under $75,000
7 $75,000 to under $100,000
8 $100,000 or more
9 **(DO NOT READ)** Don't know/Refused

END INTERVIEW: Thank you very much for taking the time to complete this survey. Have a nice (day/evening).