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Revisiting Social Isolation in America: An Egocentric Analysis of "Feel Close to" Networks

Chao Liu
University of Arkansas, Fayetteville

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Revisiting Social Isolation in America:
An Egocentric Analysis of "Feel Close to" Networks

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Master of Arts in Sociology

by

Chao Liu
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Dr. Song Yang
Thesis Director

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Dr. Anna Zajicek   Dr. Patricia Herzog
Thesis Member   Thesis Member

Abstract

Evidences from interpersonal networks in which Americans discuss "important matters" (core discussion networks) suggest that Americans have become increasingly isolated. Using the national representative Science of Generosity Survey 2010, this paper revisits the issue of social isolation. The survey asked respondents to name the people they felt close to in the last six months. On average, respondents mentioned 3.87 people they felt close to, a significant increase from the 1985 (2.94) and 2004 (2.08) core discussion networks. Education, income, and gender are significant explanatory variables for the "feel close to" networks. People with high education, those with high income, and women tend to have larger "feel close to" networks than those with low education, those with low income, and men. Despite the difference in name generators between "feel close to" networks and "core discussion" networks, this research casts serious doubts on the assertion that Americans experience increasing social isolation.

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Introduction

It seems to be more common that changes of the way people interact with each other provoke worries about whether people will become increasingly lonely and isolated. As what Television and Telephone did several decades ago, the widespread use of Internet and Social Networking Sites over the last twenty years has raised similar panics again (Fischer 2011; McPherson et al. 2006; Parigi & Henson 2014;Wang & Wellman 2010). People often blame the new technology for being so distracting, which is keeping people from community involvement and damaging people's social networks (Fischer 1982; McPherson et al. 2006; Putnam 2001). Technological innovation reshapes the traditional way of face-to-face contact as well as the meaning people derive from interpersonal interactions (Parigi & Henson 2014). Internet makes it possible for people to make new friends without leaving their house and stay in touch with friends from every corner of the world. Friends should know each other well in traditional friendship, while everyone could remain anonymous in online friendship. With Social Networking Sites, more time and attention are spent on online friends rather than the friends around. These characteristics of online interaction might bring people more weak ties but fewer strong ties, which makes people still be lonely or isolated. Considering these changes on interpersonal interaction brought by Internet, people become more worried about the increasing social isolation in America (McPherson et al. 2006; Putnam 2001).

As more time is spent on Internet, time devoted to social networking, social activities, and social participating will decline. People thus could be separated from others, and have fewer

and fewer friends. This experience of being physically or emotionally separated from others is called as social isolation (Parigi & Henson 2014). From the other perspective, however, it is also possible that Internet is positively impacting people's social networks (Hampton et al. 2011; Wang & Wellman 2010; Wellman et al. 2001; Zhao 2006). The increasing online interactions could strengthen social connections between friends, and it tends to help build more social ties among strangers. The debate regarding whether there has been a decline in social connection has attracted a lot of attention. The debate started with the landmark work of Putnam (2001), and then the research of McPherson and colleagues (2006) renewed that interest. Both of these two studies concluded that Americans' social connections have declined, and that Americans have become more isolated than they used to be (McPherson et al. 2006; Putnam 2001). With the wide coverage of public media[1], this idea that Americans have become more and more isolated seems to be a fact. Many people in public and in academia believe that Americans' core social networks shrank between 1985 and 2010 (Brashears 2011; Cornwell et al. 2009; McPherson et al. 2006, 2008; Putnam 2001;Wang & Wellman 2010). At the same time, however, many scholars doubted the conclusion of the shrinking networks, and indicated that the average core networks of Americans had not changed much between 1985 and 2010 (Fischer 2005, 2009, 2011; Hampton et al. 2011; Paik & Sanchagrin 2013). They considered the shrinking networks finding as an artifact, and encouraged scholars and the public to be cautious regarding the findings (Fischer 2009; Paik & Sanchagrin 2013).

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[1] https://www.nytimes.com/books/00/06/25/reviews/000625.25talbott.html
  http://www.cbsnews.com/news/the-lonely-states-of-america/

Significance

Although a great amount of time and effort were devoted to this question, there is still no agreement about the issue whether there is an increase of social isolation in Americans. Scholars with one of these two perspectives cannot persuade the others to agree with their ideas. However, knowing what the scale of social isolation was and how social isolation in the United States changed in the context of the wide use of Internet is very important. First, social isolation is not only a personal issue but also a characteristic of society. Both the causes and consequences of social isolations have tightly associated with other factors in society. To some degree, the current characteristics of a society is rooted in the inner changes such as the populations and generational change, gender equality, and technological revolution. The change of social isolation makes us review and get a better understanding of the social changes happened in the last twenty years. Moreover, a great number of isolated people might make the function of family and community decline. As a result of this decline, people will receive fewer social support from the people around them (Thoits 1983), and fewer people can help them when they are in trouble. Isolated people are also likely to protest, and it might result in the rising of social unrest (McAdam & Paulsen 1993). Consequently, social anxiety, crime, and other social problems might increase if the social isolation increases.

In addition, social isolation is a reflection of social trends within the whole society. It helps us understand where American society will go and what should be changed. In general, there are two main types of reasons that could increase social isolation in a society. The first type is large social disruptions or changes such as the persistent reduction of social credibility, social instability and big economic crises. The other type is the spread of new values and norms,

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especially from the new generation. They might bring in lots of new values and norms, and that probably could reduce social connections. Born with Internet, Millennials may spend more time communicating online rather than offline, and they might focus more on individuals than groups. They probably reconstruct a new definition of friendship. The analysis of social isolation will also reflect these values or norms of new generations, and help identify what happened in the past and where America could go in the future. If social isolation really grew in the United States, it is possible that new values resulted from Internet and social media change their networks composition. If it did not, the new generation might still spend much time with friends and family offline.

Research Problem

The purpose of this paper is to investigate if Americans today have fewer core networks than they did in 1980s. Previous researchers mainly considered discussion networks as important indicators of core networks, and they analyzed data in discussion networks to support their arguments (Brashears 2011; Cornwell et al. 2009; Fischer 2009; Marsden 1987; McPherson et al. 2006; Paik & Sanchagrin 2013). However, there are some drawbacks of using discussion networks to estimate the core networks, and the reliability and validity of discussion networks might be hurt by the wide use of Internet and social media (Wellman et al 2001; Zhao 2006). As a result, errors may be caused in estimating the size of core networks and the prevalence of social isolation. Instead, this paper will estimate the prevalence of social isolation in America using "feel close to" networks. Similar to discussion network, as one kind of name generator, "feeling close to" network also ask respondents to list their social ties. The difference between these two networks is the question being asked to respondents. The core question of discussion networks

ask respondents to think of social facts (discussing important matters), while the question of "feel close to network" focus on personal feeling. "Feel close to" networks can reflect the characteristics of respondents' core networks, and they are reliable. The analysis of "feel close to" networks at least can provide a different perspective towards the core networks and social isolation in America.

In order to discuss the changes of social isolation in last two decades clearly, this paper mainly consider two interrelated questions. First, knowing the changes of social isolation in the past twenty years requires me to compare the current prevalence of social isolation with that of twenty years ago. Limited by data, this paper will indirectly compare two estimates of degree of social isolation in America based on "discussion networks" in 1985 and "feeling close to" networks in 2010 respectively. Second, the query of what factors lead to the changes of social isolation demands the analysis of predictor of the size of core networks. Therefore, this paper also tries to explore explanations to the variations of the size of "feel close to" networks, providing implications of the causes of changes of social isolation in last two decades.

Organization

The first section of this paper is the introduction, mentioning recent debates on social isolation and stating the purpose and significance of this research. The second section is the literature review, evaluating the relevant theoretical and empirical works and discussing the weakness of previous analyses. The third section contains the hypotheses and the definitions of terms. The fourth is methodology, including data and measures. The fifth section is the analyses of data and findings. The final section is the discussion and conclusion.

<center>**Literature Review**</center>

Concepts of Social Isolation

Social isolation, the experience of being separated from others, has been well documented in the last twenty years (Fischer 2009; Hampton et al. 2011; McPherson et al. 2006, 2009; Paik & Sanchagrin 2013; Parigi & Henson 2014; Wang & Wellman 2010). However, there is no agreement on the concept and the measurement of social isolation, though a lot of time and effort has been devoted to this issue. In general, there are two major points of view regarding the concept of social isolation.

On the one hand, social isolation is considered as a subjective sense of feeling loneliness or perceived isolation (Chappell & Badger 1989; Findlay 2003; Fisher et al. 2013; Tomaka et al. 2006). People will feel isolated and lonely if they think their relations with friends are not meaningful, for example, even though they talk with friends and take participation in social activities every day. In contrast, they will not feel isolated if the friendship satisfies their expectations, even though they only have one or two friends. This type of isolation is considered as a "psychological situation characterized by a deep sense of emptiness, worthlessness, lack of control, and personal threat" (Cacioppo 2010). The research about perceived isolation always directly ask or measure loneliness and depressive symptoms such as stressful life events, perceived press, and neuroticism (Cacioppo 2010). Life experiences, family dynamics, and many cognitive factors could affect the feeling of social isolation (Fisher et al. 2013). In this meaning, social isolation does not have necessary associations with the number of social ties and the strength of connection. People with many social networks could still be isolated from society.

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On the other hand, social isolation has been studied as a structural characteristic of individual relations by Sociologists (Fischer 2001, 2009, 2011; Hampton et al. 2011; McPherson et al. 2006, 2009; Parigi & Henson 2014; Zavaleta et al. 2014). In other word, from this perspective, social isolation is reflected by the situation of social networks and social connections such as the number of friends and the strength of social ties (Parigi & Henson 2014). This perspective emphasizes the quantitative as well as the qualitative situation of social networks. Usually, the research from this perspective has to measure the characteristics of respondents' networks such as the number of friends and the strength of connections between friends. These characteristics are important indicators of social isolation. Having small-size social networks or pretty weak connections is highly associated with social isolation. In a society, the prevalence of social isolation will be substantial if the situation of small-size networks or infrequent connections between social relations is common. Therefore, for individuals, social isolation could be defined as the small support networks and low frequency of social contacts such as no networks or no connections (Fisher 2011; Wilson 1987). For societies, the prevalence of social isolation in a society could be the percentage of isolated people who do not have social ties or social connections.

Due to the difficulties to measure the social isolation that resulted from subjective feeling, most scholars in social networks mainly talk about the social isolation that is considered to result from a lack of social connection or social networks (Fischer 2009, 2011; Hampton et al. 2011; McPherson et al. 2006, 2009). The main previous research only considers the size of core networks, ignoring the strength of connections, when discussing social isolation in the frame of characteristics of social networks (Fischer 2009, 2011; Hampton et al. 2011; McPherson et al. 2006, 2009). In order to compare with previous research, this paper continues the research frame

and considers social isolation as the lack of social networks. The measurement of the number of social ties is objective, but the ways to get the data about the number of social ties are always subjective. There are many ways to collect the data about the number of social networks from respondents. The most common ways to gather these data are to ask respondents about the relevant social facts or social events such as discussing important matters and cognitive feeling such as feeling close to. Discussion networks and feeling close to networks collect the objective data of the size of social networks with different questions, although they use the same measurement of the size of networks. Discussion networks ask respondents to describe social events---discussing important matters, while feeling close to networks ask respondents to report perceived feeling---whom they feel close to.

The Shrinking Networks and Accompanying Queries

Recent studies of social isolation in social networks are basically centered on the debate of "whether Americans become more and more isolated than they used to?" This debate started with the widespread work of McPherson and his colleagues. By analyzing the data of networks in the 2004 General Social Survey (GSS) and comparing with that in the1985 GSS, they found that the average size of Americans' core discussion networks had shrunk by about a third from 1985 to 2004, and the number of respondents who did not report any friends had increased almost twice (Marsden 1987; McPherson et al. 2006, 2009). Both of 1985 GSS and 2004 GSS asked the following question (taken from the GSS questionnaire):

From time to time, most people discuss <u>important matters</u> with other people. Looking back over the last six months – who are the <u>people</u> with whom you discussed matters important to you? Just

tell me their first names or initials. IF LESS THEN 5 NAMES MENTIONED, PROBE: Anyone

else? ONLY RECORD FIRST 5 NAMES.

Their analyses showed that the percentage of respondents who reported nobody to discuss

important matters with increased from 10.0% in 1985 to 24.6% in 2004. Most respondents

reported three confidants in 1985, while most respondents reported no confidants in 2004. In

addition, they found both the number of kin confidants and the number of non-kin confidants

decreased during the years from 1985 to 2004 (McPherson et al. 2006, 2009). The percentage of

respondents who reported at least one kin confidant decreased from about 70% in 1985 to about

60% in 2004, and the percentage of respondents who reported at least one non-kin confidant

decreased from about 64% to about 54%. Based on these findings, they concluded that

Americans are much more isolated than they used to be in 1985.

Their findings not only garnered tremendous public attention but also inspired a healthy

scholarly debate (Fischer 2009, 2011; Fountain 2006; Hampton et al. 2011; McPherson et al.

2006, 2009; Paik & Sanchagrin 2013; Parigi & Henson 2014; Wang & Wellman 2010). The

conclusion of decreasing social connection or increasing social isolation drew widespread

coverage in public media, and people believed that Americans were more isolated and became

more anxious about the lonely Americans (Fountain 2006). The debate basically generated two

camps, one see the increasing social isolation as real, and the other one, one the contrary, thinks

the findings are artifact and people should be cautious about the data (Paik & Sanchagrin 2013;

Parigi & Henson 2014;).

The conclusion from McPherson and his colleague matches up with Putnam's argument

that Americans experienced the declining civic engagement and neighborhood involvement in

the last fifty years (Putnam 2001). The less participation undermines individual's connections

within communities and makes people become more isolated (Putnam 2001). Other research also documented evidence supporting the declining social capital or increasing social isolation hypothesis. In the book *The Lonely America*, Olds and Schwartz argued that online activities reduced physical relationships and may weaken individual's social capital and increase social isolation (Olds & Schwartz 2009). Sigman (2009) claimed that the new social networking sites tend to contribute to the decline of social interaction, which may increase social isolation. Basically, this line of research insists the idea of declining social connection and blames the Internet as the cause of the increasingly isolated society.

At the same time, this finding causes many queries and doubts. Two of the main causes that doubts arise from are the social change did not support the increasing social isolation and the finding did not align with other parts of the data (Fischer 2009, 2011; Paik & Sanchagrin 2013). McPherson and his colleagues (2006) found a 2.8-fold[2] increase of respondents who reported no confidants when asked to list five persons whom they discussed important matters with. However, the scale of change in this results is much bigger than that in Putnam's book *Bowling Alone*, and this dramatic change in social isolation makes it hard to be explained sociologically (Putnam 2001; Fischer 2009). Without sharp change in society, it is almost impossible for social isolation --- one part of society--- to change so quickly. In addition, the changes of American society in the last twenty years do not support the hypothesis of shrinking declining of average network size. For example, the years from 1985 to 2004 witnessed the decreasing of crime rates and the rising of volunteering time and labor in America. These social trends have positive effect on the social connection and social involvement, which should increase individuals' network size

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[2] In the article of 2006, McPherson and his colleagues found a 2.9-fold increase of respondents who reported no confidants when asked list five people whom they discussed important matters with. The change reduced to 2.8-fold when they corrected for the 41 miscoded cases (McPherson et al. 2008a).

and reduce social isolation in society (Fischer 2001; Levitt 2004; Wilson 2000). The wide use of Internet may also tend to increase individuals' social network by lowering the cost of social interaction. At least, the Internet, as well as the rising demand of work and greater gender equality, is restructuring Americans' social networks (Fischer 2001; Parigi & Henson 2014; Wellman et al. 2001; Zhao 2006). We so far do not know exactly how they are changing the characteristics of individuals' social networks. It is rude and tenuous for us to just conclude that these social changes reduced the size of social networks.

Besides, the dramatic declining of the average size of core networks (or increasing of social isolation) in 2004 GSS is inconsistent with the other relevant data in 2004 GSS (Fischer 2009). From Fischer's analysis, the percentage of respondents who appear friendless in other four measures of social involvement in 2004 GSS, frequency of social evenings, number of close friends, social support networks, and keeping in contact networks, ranges from 0% to 6% (Fischer 2009). These small changes in other part of 2004 GSS itself contradict the considerably shrinking networks finding in 2004 GSS. Moreover, serious anomalies have been found in the percentage of respondents who reported two or more organizational membership but reported no confidants, who had postgraduate degree but reported no confidants, and who married but reported no confidants between the 1985 GSS and the 2004 GSS (Fischer 2009). This weakens the reliability and validity of the data, and makes the shrinking core networks finding highly implausible. Both of the contradictions and anomalies makes scholars considered the finding of shrunken social networks in the 2004 GSS as an artifact (Fischer 2009; Hampton et al. 2011).

The possible sources of the methodological artifact in McPherson's analysis might come from problems in study design, interview effect, fatigue, and a random technical error of the GSS (Fischer 2009; Marsden 2003; McPherson et al. 2008b; Paik & Sanchagrin 2013). Specific, the

section of networks questions asked in the 2004 GSS came late in the whole interview, after the complicated questions about organizational membership. This design made respondents feel tired and reluctant to report more confidants. As a result, the reported number of confidants could be lower than the real number. Besides, interviewers have different actions, probes, and interactions during an interview. These variations during an interview could also result in some errors. The training and interview effects are significant in producing errors in the 2004 GSS. In addition, there are some technical errors or computer errors during the interview and coding process (Paik & Sanchagrin 2013). For a specific item, an error is really small, but these small errors together could produce large cumulative biases (Groves 1989; Hox 1994). In total, these random errors resulted in at least 15% to 20% of respondents who are member of subgroups to be coded as isolated (Fischer 2009). All these possible errors make the quality of the 2004 GSS to be a high degree of uncertainty, and lead us to doubt the findings of shrunken connection in the 2004 GSS.

Research based on other data also doubts the finding of substantial shrinkage of average size of networks in 2004 GSS. Based on a national random digit dial telephone sample of World Internet Project in 2002 and 2007, researchers reported that the average number of friends has grown substantially between 2002 and 2007, especially for heavy Internet users, and only 5% of Americans did not have any confidants (Wang & Wellman 2010). Research based on a 2008 U.S. national survey and a nationally representative experiment respectively found that discussion networks have reduced in size but the prevalence of social isolation in America has not grown since 1985 (Brashears 2011; Hampton et al. 2011). With a random-digit dial survey of 2,512 adults living in households in the continental United States, Hampton and colleague (2011) found that the average of core discussion networks is 1.93, and 12.0 percent of the respondents did not report any discussion ties. Using data from field experiments via the internet to a

representative sample of the nation's population, Brashears (2011) found that Americans have a mean discussion networks of 2.03 ties, and only 4.27% of respondents reported no confidants. In both of these studies, the average of core discussion networks is similar to the 2.06 derived from the 2004 GSS, while the scale of social isolation is much smaller than the 22.5% in 2004 GSS, even though the low respondent rate in two survey above may disrupt the quality of data and hurt their conclusions.

Moreover, the unknown effects of Internet or New Social Networking Sites on individuals' social connections are making the changes in social networks and social isolation more complex. The last thirty years witnessed the expanding of Internet, and Internet is reshaping individual's connection with others. "We have moved from living in a world where social connections required considerable investment of time to a world where connections are widely available and inexpensive to establish (Parigi & Henson 2014)." Since Internet lowered the cost to build networks, our social ties go beyond the limitation of geographical proximity and acquaintance circles (Ellison et al. 2007; Fischer 2011). With Internet, everyone can stay in touch with people in any places and make friend with people they never know. From this perspective, Internet facilitates the social-networks-building activities and social involvement in society, even though the activities goes beyond community. Research has documented that Internet has positive effects on social networks and social involvement (Ellison et al. 2007; Fischer 2011; Hampton et al 2011; Paik & Sanchagrin 2013; Robinson 2010; Wang and Wellman 2010; Williams 2006). On the other hand, however, many scholars tend to believe that online activities disrupt social networks and might result in the decline of social involvement and increase of depression and isolation (Kraut et al 1998; McPherson et al. 2006; Nie & Hillygus 2002; Parigi & Henson 2014; Stern 2008). Their research has found that Internet use was

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associated with a reduction in the size of one's local social circles (Kraut et al 1998; Stern 2008). The main reason is that Internet takes time and attention away from other face-to-face activities (Hampton et al 2011; Parigi & Henson 2014). Logically, it is also possible that Internet did not change the number of individuals' networks, but changed the characteristics of networks such as strength and structure. Research has documented that the use of Facebook and mobile phone could maintain and bond social ties (Ellison et al. 2007; Kavanaugh & Patterson 2001; Shrum et al. 2011). Internet may change the structure of networks by increasing online networks and decreasing offline networks.

The wide use of Internet and other technological innovation inspired latest surge of studies on isolation (Fischer 2011; Parigi & Henson 2014). Before knowing clearly how Internet and Social Networking Sites changed individual's network, we should not simply approve or reject McPherson's idea of substantial shrinkage in networks or dramatic increasing in social isolation. More evidence and voices should be found to support or argue against their idea.

Problems in Networks of Discussing Important Matter

The complex effects of Internet on networks cannot be represented on discussion networks, and it inspired us to ask a question: Are questions in discussion networks good enough to elicit the confidants in respondents' core networks? Previous research showed that the discussion networks are good indicators of core networks (Burt 1985; Marin 2004; Marsden 1987; McPherson et al. 2006). The networks elicited by the questions in discussing important matters are respondents' frequently accessed interpersonal relations, which are small, dense, and centered on kin and spouses. They are used by people for sociality and advice, and for social-

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emotional and instrumental support (Marin 2004; Marsden 1987; McPherson et al. 2006). Therefore, to some degree, discussion networks could be stable and valuable in representing individual's core networks. However, the probe ---discussing important matters--- is vulnerable to "noise" and contextual effects (Bailey and Marsden 1999; Bearman and Parigi 2004; Fischer 2009; Ruan 1998). When respondents are questioned during a season of heated discussion about war and presidential primaries, the "important matters" tend to be interpret as political matters, and the size of discussion networks could be larger than the real networks (Fischer 2009). In different contexts, people may talk about same matters with different kinds of confidants because the topic of conversation is associated with specific role and the role of specific person varies with contexts (Ruan 1998; Bearman and Parigi 2004). For example, Chinese today may tend to talk about personal matters with family rather than coworkers in twenty years ago. Internet is the external context we are experiencing, and it is changing our roles in specific conversations. I may talk to my friend on Facebook who is an expert about my career plan, for example, rather than my parents. Internet could change the structure of our discussion networks. As a result, it remains a question whether discussion networks could always accurately reflect humans' core networks under the context of wide use of Internet.

In the GSS, respondents were asked to list at most five persons that they had discussed important matters with in the last six months. If respondents reported nobody to discuss important matters with, then the answer was coded as 0. In McPherson's research, respondents were considered as socially isolated if they reported nobody to discuss important matters with (McPherson et al. 2006). The fact is that some respondents have lots of friends but they do not think they have anything that are so important to discuss with their friends. Research found that half of people who reported no one to discuss important matters with actually have nothing to

talk about (Bearman & Parigi 2004). Discussion networks in the GSS assumed that nothing to talk about equals to no one to talk to. Obviously, it is incorrect. In addition, the occurrence of discussing important matters reported in the GSS survey should be happened no earlier than six months ago. Social events are variable, and people may not always have something important to discuss with their friends. In the last six months, it is quite possible that a respondent did not have or did not think he had important matters to discuss with anybody. It does not mean that he did not have any social networks. The GSS does not separate the situations of nothing to talk about and no one to talk to and considers both of them as social isolated. Consequently, many people are labeled as socially isolated by mistake, and the social isolation is overstated.

Moreover, respondents have a plethora of interpretations towards "important matters" when asked to list people they discussed important matters with. Most of respondents considered "important matters" as personal or intimate relationships or personal life, and some referred to work and political discussion (Bailey & Marsden 1999). Respondents also talked about things that many would consider as unimportant such as cloning of headless frogs (Bearman & Parigi 2004). Appreciable numbers of respondents also understood the question in terms of close rather than in terms of specific social event (Bailey & Marsden 1999). Therefore, the meaning of "important matters" varies by respondents. The people they discuss personal issues with might be different from the people they discuss work problems with. A respondent discussed work problems with many friends, but he did not discuss personal issues with anybody in the last six months. He interpreted the "important matter" as a personal issue, so he reported nobody. Another respondent had the opposite situation, and also reported nobody to discuss matters with. Obviously, there are a lot of mistakes here, and it might not represent the true characteristics of individual's core networks.

What's more, the inconsistencies in respondents' interpretation of "important matter" could be more common in the context of expansion of Internet usage. By 2007, approximately 69% of US adults were Internet users, and 23% of them used a social networking site (Chou et al. 2009). The proportion of young people will be much higher, and the upward trend of participation in social networking sites is significant. The wide use of Internet and social networking sites in America changed the way people communicate with each other as well as the number or strengths of social ties. Internet and social networking sites have made people be attracted to computer-mediated interactions and activities rather than face-to-face conversations (Ellison et al. 2007; Tanis 2008; Wang and Wellman 2010). The use of social networking sites has been found to be positively associated with network size and social connection (Williams 2006; Wang and Wellman 2010; Hampton et al. 2011). With social networking sites, it is easy for people to make friends with people at a distance and people from different backgrounds, which increased the diversity of networks compositions. Therefore, the interpretation of "important question" could be more diverse and blurry.

The use of Internet and social networking sites is not only directly increasing the diversity of individuals' networks but also restructuring the composition of their networks. This means the roles of a specific person could be changed greatly by social networking sites. With the extensive participation of Internet and social networking sites, people have a lot of opportunities to discuss their "important matters" with online friends rather than offline confidants, and they can also find possible solutions using Google. They can talk to different "confidants", depending on what questions or problems they want to talk about. As a result, the roles of their traditional confidants, such as family, has changed, and people regularly discuss important matters with unimportant friends (Small 2013). Being questioned by the questions of

discussing important matters, the people appeared on respondent's networks probably are those "unimportant friends", and their family ties disappeared. Obviously, it contradicts the assumption of discussion networks: small, dense, and centered on kin and spouses. These inconsistencies show that the questions of discussing important matters might not be able to elicit the core networks of respondents, with the context of the expansion of Internet and social networking sites usage. An alternative probe should be introduced to elicit respondent's core networks.

As a new probe, questions in "feel close to" networks ask respondents to list at most five confidants they felt close to in the last six months. It may have the potential to avoid the inconsistencies appeared in discussion networks. First, "feel close to" networks could represent respondent's core networks. In most cases, close ties are more accessible in memory than distant ties, and close ties tend to be reported first when being asked to list confidants (Brewer 1995; Burt 1986; McPherson et al. 2006). Questions in "feel close to" networks ask respondent's perceived feeling about their social ties, so the close ties will come first. As a result, respondents tend to report their frequently contacted, close, core network ties. Second, "feel close to" networks tend to be more reliably than discussion networks. "Feel close to" networks focus on respondent's perceived social ties, while discussion networks tend to elicit more instrumental relationships. Social emotional ties are always considered more reliably than instrumental relationships (Burt 1986). Due to the flexible interpretations of "important matters", the question in discussion networks is easy to make respondents confused (Straits 2000). On the contrary, it is not common to be confused about the meaning of "feel close to". People tend to share similar interpretations towards the term "feel close to". It always refers to the people who are most accessible in memory. Therefore, the interpretation of "feel close to" seems to be reliable, and it does not vary with respondents in different characteristics. Even the Internet will not change the

meaning of "feel close to", so "feel close to" networks are considered as more reliably than discussion networks. Third, as perceived social ties, "feel close to" networks are better indicator of social isolation. The research of social isolation tries to know how many friends individuals have. However, the questions in discussion networks could make friends for respondents. For example, a respondent interpreted "important matters" as work issues, and he reported many confidants in networks. However, these people might be considered as colleague rather than friends by respondents. In this situation, these respondents should be considered as social isolated, but they were not named as isolated in discussion networks. On the contrary, "feel close to" networks can avoid the problems in discussion networks that mentioned above. "Feel close to" networks not only represent the core networks of people but also reflect the scale of social isolation.

Demographic Characteristics and Social Networks

Our social networks are shaped by different characteristics including achieved characteristics, such as education and income, and ascribed characteristics, such as gender and race. People with different characteristics thus have distinct networks, both network size and network composition (McPherson et al 2001). For example, men may have more non-kin networks, while women have more kin networks. The effects of those demographic characteristics, age, gender, race/ethnic, education, marriage and income, on personal networks are complex and not clear (Fischer& Phillips 1982; Marsden 1987; McPherson et al 2006; McPherson et al 2001). In general, poorly educated people, lower class, older people and female tend to report fewer networks, especially non-kin networks (Fischer& Phillips 1982; Marsden 1987; McPherson et al 2006).

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Education significantly and clearly affects personal networks and kinship composition (Fischer& Phillips 1982; Marsden 1987; McPherson et al. 2006). More educated people tend to have more networks, especially non-kin networks (Marsden 1987). The size of non-kin networks goes up quickly with education. The reasons why more educated people have more networks could be their stronger ability using to build and maintain networks, more resources devoted to build and maintain networks, and more time spending with their social ties (Lin 1999; McPherson et al . 2006; Sevilla et al. 2012). Towards the discussion networks, the differences could be amplified because educated people tend to have more discussion opportunity and discussion partner (Fischer& Phillips 1982). Similar to education, income tend to have a positive effect on size of networks (Chatters et al. 1989; Christoforou & Davis 2014; Marsden 1987; McPherson et al. 2006). Rich people probably could spend more resources, time and money, in building and maintaining social networks. In addition, marriage could combines two families and two persons' networks, so it may increase individuals' networks (Bearman 2003; Fischer& Phillips 1982; Hill & Dunbar 2003). However, at the same time, married people are most likely to be isolated from non-kin networks (Fischer& Phillips 1982). Basically, the effects of those achieved characteristics on personal networks, especially network size, are relatively clear.

On the contrary, how age, gender, and race affects individual's networks is much more complicated. Younger people generally have more networks than older people (Fischer and Oliker 1983; Marsden 1987; Ajrouch et al. 2001). Social isolation is more common in old people because old people are easy to lose networks, especially non-kin networks. A curvilinear pattern between age and non-kin networks has been found in 1985 GSS (Marsden 1987; McPherson et al 2006). Mainly, non-kin networks first increase as age goes up, and falls as the age goes down. Accordingly, the proportion of kin networks in individual's networks is smallest for middle-

aged, and larger for younger and older people. However, in 2004 GSS, age did not have significant influences on network size and kinship composition (McPherson et al. 2006). McPherson argued that the reason for the shift is generation change which made an active generation decline (McPherson et al. 2006).

The effect of gender on personal networks is not very clear. Basically, gender mainly affects the composition rather than the size of personal networks. Scholars used to believe that women have more kin networks, and fewer non-kin networks, than men do (Marsden 1987; Moore 1990; Hill and Dunbar 2003; Smith 2000). In 2004 GSS, women still showed their favors to kinship ties, and they reported more kin networks than men did (McPherson et al. 2006). Meanwhile, women are achieving equality with men in non-kin networks, and they no longer reported fewer non-kin networks and higher proportion of kin networks than men did (McPherson et al. 2006; Smith et al. 2014). The increasing gender equality, such as more women in higher education and labor marker, and the expansion of social networking sites might compensate for the changes (Brashears 2015; Cohen 2004; Jacobs 1996). This trend seems to show that male and female networks are becoming more similar in size and composition. However, McPherson argued that men's shrinking interaction with non-kin networks rather than women's increasing connection to networks beyond family contributed to the equity appeared in male and female non-kin networks (McPherson et al. 2006).

Race and ethnicity are clearly a big divide in social stratification. They surely significantly affect people's social networks, and the network compositions are structured by race and ethnicity (McPherson et al 2001). In general, Whites have the largest size of networks, while blacks have the smallest size of networks (Lin 2000; Marsden 1987; McPherson et al. 2006). Both kin networks and non-kin networks, as well as the proportion of kin networks, of

blacks are smaller than those of Whites in 1985 GSS (Marsden 1987). The overwhelmingly large

confidants in a respondent's discussion networks are the same in race or ethnicity as the

respondents (Marsden 1987). Race and ethnicity continually affects network size and network

composition of people in 2004 GSS (McPherson et al 2006). Many people who are not White are

immigrants, so they may lose some networks at their home countries, and their backgrounds

make it hard for them to build new contacts in America. Therefore, it is understandable that these

people could report fewer networks than White. However, these conclusions may not be totally

true. The longer these immigrants stay in America, the better adaption to American society or

local communities. So their specific situation such as the percent of new immigrants in the

sample could affect the conclusions. Therefore, we should be cautious with those conclusions

about the effect of race on networks.

Furthermore, different probes used in a survey could elicit different networks. All the

different networks elicited by qualified probes may represent people's core network (Bailey &

Marsden, 1999; Burt 1986, 1997; Hampton et al 2011; McPherson et al 2006; Marin 2004) , but

they have their unique emphasizes. These diverse emphasizes make the effects of those achieved

characteristics and ascribed characteristics on personal social networks could be a little different.

For example, in discussion networks, the probe is discussing important matters, so male

networks tend to be larger than female networks because man on average may have more

discussion partners. On the contrary, the probe in feel close to network is feeling close to

somebody, so female networks may be larger than male networks because women used to be

more emotional. Following the same logic, the effects of other characteristics on personal

networks in different survey could also be distinct. In addition, social networking sites can also

change these effects on networks. Social networking sites lowered the cost to build networks

(Fischer 2011), so the disadvantaged group could benefit from the social networking sites and strengthen their networks. For example, the old people can easily build networks online, neutralizing the difficulty to meet friends in person. All in all, the effects of those demographic characteristics on personal networks are complex, so these effects should be understood in different contexts.

Definition of Terms

Isolated people: The people who reported no confidant.

Social isolation: The prevalence of people who do not have any confidant in a society.

Core networks: The frequently contacted, close, dense network ties, which are used for social and advice.

Kin networks: The alters in a respondent's networks who share kinship with the respondent, such as spouses and parents.

Kin networks: The alters in a respondent's networks who do not share kinship with the respondent, such as friends and coworkers.

Discussion networks: The networks elicited by the questions in discussing important matters.

"Feel close to" networks: The networks elicited by the questions in discussing important matters.

Hypotheses

Based on the literatures and the purposes of this research, this paper will investigate six relevant hypotheses below.

Hypothesis 1: From 1985 to 2010, Americans became more and more isolated.

Hypothesis 2: Educated people have larger size of core networks than less educated ones.

(People with higher education have larger core networks.)

Hypothesis 3: Married people have larger size of core networks than single people.

H_{3a}: Married people have more core kin networks than single people.

H_{3b}: Married people have fewer core non-kin networks than single people.

Hypothesis 4: Women have larger size of core networks than men.

H_{4a}: Women have more core kin networks than men.

H_{4b}: Women have more core non-kin networks than men.

Hypothesis 5: White have larger size of core networks than people in other race/ethnicity.

Hypothesis 6: High-income people have larger size of core networks than low-income people.

Methodology

Data[3]

The 2010 Science of Generosity Survey[4], a cross-sectional survey of a representative sample of adult Americans ages 23 and older who live in U.S. households, was used as data in this paper. The survey was conducted by Knowledge Networks, Inc. of Menlo Park, California. Respondents completed the survey over the Internet between May 19, 2010 and June 2, 2010. Median time to completion was 70 minutes. Knowledge Networks panel survey samples are well known for resembling the U.S. Census benchmarks on primary demographics. The final completion rate for the 2010 Science of Generosity Survey is 65.2%. This response rate is considered good for such an online and probability-based survey design.

The 2010 Science of Generosity Survey uses a dual-frame sampling method constructed by Knowledge Networks, Inc. The sample was partly recruited through an address-based sample method and partly by telephone using random-digit-dialing (RDD) methods. This dual-sampling frame captures cell-phone only households along with internet and technically challenged as well as Spanish language households. The combination of address-based-sampling (ABS) and telephone random-digit-dial (RDD) methods accounts for about 99% of the US population. The Knowledge Networks sample used for the 2010 Science of Generosity Survey is a probability-based, online, non-volunteer access panel sample.

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[3] The description of this data is from the paper of Patricia Snell Herzog and Song Yang in 2015 (unpublished), Is it the Doing, Asking, or Supporting? Understanding Social (Capital) Network Influences on Charitable Giving.
[4] 2010 Science of Generosity Survey: http://generosityresearch.nd.edu/current-research-projects/christakis/

All Knowledge Networks surveys are collected online. Notifications to complete

upcoming surveys are mailed to households and emailed to respondents that are included in the

Knowledge Panel sample. Households without computers are provided laptops and immediate

internet access. Respondents who completed the survey received a total of $20. The 2010

Science of Generosity Survey sample was randomly using an implicitly stratified systematic

sample design selected from Knowledge Networks' larger, national, "KnowledgePanel"3 sample

of respondents to be a nationally representative sample of respondents. A final N=1,997 was

achieved for the 2010 Science of Generosity Survey. Weights are used to adjust for any

disproportionate probability of selection.

Analytical Procedures

In general, the analysis in this paper concludes two process: First, compare the current

prevalence of social isolation appeared in 2010 "feeling close to" networks with that appeared in

discussion networks in 2004 and 1985; Second, explore the predictors of variations in the size of

"feel close to" networks.

It seems not valuable to compare these two networks elicited by two different probes

because the two networks are a little bit different. However, previous research proved that the

confidants listed by respondents to different network probes in questionnaires often represent

their core personal networks rather than whatever was specifically asked (Bailey & Marsden,

1999; Burt 1986, 1997; Hampton et al 2011; McPherson et al 2006; Marin 2004). Those

confidants elicited by probes in discussion networks name generator tend to be similar people

listed in "feel close to" networks (Hampton et al 2011; Marin 2004). As a result, both discussion

networks and "feel close to networks" can represent people's core networks, which are most

accessed interpersonal relations in respondents' memory. Therefore, it is still valuable to

compare these two kinds of networks, though the comparison is not direct. The two different

probes used in questionnaires make the networks have their own emphasizes, which leads to the

different parts of the two networks. "Feel close to" networks emphasize perceived feeling, so

there should be more kin ties in "feel close to" networks than that in discussion networks.

Considering the difference, the comparison between these two kinds of networks in this paper

will focus on non-kin networks.

Specifically, the analysis will be conducted as follows: 1, this paper will show the general

demographic information of the respondents (see Table 1); 2, this paper presents the distributions

of the network size, which are the percentages of respondents who have different sizes of

networks. The distributions of overall networks, kin networks, and non-kin networks are

presented separately. In order to compare with the distributions of discussion networks, this

paper replicated the relevant tables found in 1985 GSS and 2004 GSS (Marsden 1987;

McPherson et al. 2006). The distributions and comparisons will be showed on Table 2. 3, this

paper will also calculate the structural characteristics, which are Proportion of Kin, Length of

Association, Race Heterogeneity, and Gender Heterogeneity, of those alters appeared in "feel

close to" networks. The race heterogeneity and sex heterogeneity were measured by the Index of

Qualitative Variation (IQV). In this paper, IQV[5] was calculated based on percentage. These

results are also compared with the findings in 1985 GSS and 2004 GSS (Marsden 1987;

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[5] The formula for calculating IQV in this paper is: $IQV = \frac{K(100^2 - \sum Pct^2)}{100^2(K-1)}$
Construct a percentage distribution first, and then square the percentages for each category, and
then sum the squared percentage, and calculate the IQV using the formula above.
https://learn.bu.edu/bbcswebdav/pid-826908-dt-content-rid-
2073693_1/courses/13sprgmetcj702_ol/week02/metcj702_W02S02T02_iqv.html

McPherson et al. 2006) (See Table 3); 4, this paper will explore the predictors of variations in the size of "feel close to" networks. The relevant regression model will be displayed in Table 4.

Measure of variables

There are three dependent variables: the size of overall networks, the size of kin networks, and the size of non-kin networks. The 2010 Science of Generosity Survey asked the following question (taken from the questionnaire):

SN1. In the last 12 months, how many adults have you felt close to, including a spouse or romantic partner, adult children or other adult family members, friends, neighbors, coworkers, or people involved in groups or organization that you are involved in?

    0. *None.*   *1. One.*   *2. Two.*   *3. Three.*   *4. Four.*   *5. Five or more*.

The size of overall networks refers to the number of people that a respondent felt close to in the last six months. Kin networks conclude a respondent's spouse or romantic partner, members of family other than a spouse or romantic partner, or a parent or person who raised the respondent. Non-kin networks exclude these people. The size of kin networks and non-kin networks respectively refers to the number of kin confidants and non-kin confidants that a respondent felt close to in the last six months.

The independent variables are age, education, marital status, race/ethnicity, gender, and income. Age and income are internal variables, and the others are nominal variables. Education level is divided into four groups: less than higher school, high school, some college, and Bachelor's or higher degree. Marital status and gender are binary variables. Married people were coded as 1, and the others were coded as 0. Males were coded as 0, and females were coded as 1.

Race/ethnicity was divided into four groups: white, Black, Hispanic, and others. Income is the

log value (log income) of the original income. The models for predicting the size of overall

networks, kin networks, and non-kin networks are computed respectively.

Results

Table 1 presents the descriptive statistics of the dependent variables and independent

variables, showing the general information of the sample. The table indicates that the average

size of overall networks in "feel close to" networks is 3.87, and the median size of overall

networks is 5. The average size of kin networks is 2.45, and the median size of kin networks is 2.

The average size of non-kin networks is 1.42, and the median size of non-kin networks is 0.

Regarding the independent variables, the characteristics of all these variables used in this paper

are match up with the 2010 Census Demographic Data[6]. The mean age of those respondents is

48.99, and the median age is 49. Men and women account for 50% of the whole sample

respectively. The proportion of married people is 52.1%, and the proportion of single people is

47.9%. Almost 13% of the respondents had not graduate from high school, more than 31% of

than only had a degree of high school, almost 29% had a degree of some college, and more than

27% of them received higher education. Around 75% of those respondents are white, more than

9% are blacks, around 10% are Hispanics, and the rest are other race/ethnicity. The median

income of all the respondents is 45000, and the average income is 59283. The lowest income in

the sample is 2500, while the highest is 200000. Considering the age limitation required in the

survey, the characteristics of the sample are not exactly the same as that of census data, but it can

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[6] 2010 Census Demographic Profiles: http://www.census.gov/2010census/news/press-kits/demographic-profiles.html

be national representatively, and the results of this paper could be generalized to the whole population in the United States.

[Insert Table 1 about here]

Table 2 shows the distributions of network size, including the size of overall networks, kin networks, and non-kin networks, in discussion networks and "feel close to" networks respectively. That is, in 2010 "feel close to" networks and 1985 and 2004 discussion networks, what is the percentage that respondents reported each size of overall networks, kin networks, and non-kin networks7. The data in "feel close to" networks indicates that more than 60% of the respondents nominated five or more than five confidants that they felt close to in last six months, while only 6.9% of those respondents reported nobody they felt close to. The percentages of respondents who reported one confidant, two confidants, three confidants and four confidants are 7.8%, 10.0%, 8.1%, and 6.7% respectively. Towards the kin networks, the distribution is almost even. The percentage of respondents who reported different sizes of kin networks are similar, and the percentage in each category ranges from 14.5% to 18%. Different from the even distribution in kin networks, the distribution path of the non-kin networks goes down quickly. The percentage of respondents decreases as the number of nominated confidants they felt close to who are not kin increases. Most people, 38.5%, reported that they did not feel close to anybody who is non-kin tie in the last six months. Only 4.6% of respondents reported five or more than five confidants whom they felt close to in non-kin networks. The percentages of respondents who nominated one confidant, two confidants, three confidants, and four confidants who are not kin are 21.1%, 17.3%, 11.4%, and 7.1% respectively.

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7 In order to compare the core networks in "feel close to" networks with those in discussion networks in 1985 GSS and 2004 GSS, the characteristics of discussion networks found by Marsden (1987) and McPherson et al.(2006) are included in Table 2.

The differences between distributions of network size in "feel close to" networks and discussion networks reflect the distinctions between these two types of networks and the changes of network size from 1985 to 2010. Compared with those in discussion networks in 1985 and 2004, the distributions of the size of overall network in "feel close to" networks are different. First, only a few respondents, which is almost 7%, reported they did not have any confidants in "feel close to" networks. This is a little fewer than the 10% in discussion networks in 1985, while much fewer than the 24.6% in the discussion networks in 2004. Second, much more respondents nominated five or more than five people in "feel close to" networks than that in discussion networks. The percentage of that in "feel close to" networks is 60.5%, the other two percentages in discussion networks are 23.6% in 1985 and 11.4% in 2004. Third, the mode of the size of overall networks is different in different period. The size reported by most respondents in "feel close to" networks in 2010 is five or more, and 60% of them reported this size. In 1985 discussion networks, most respondents, 20.3%, reported three confidants. In 2004 discussion networks, most respondents, 24.6%, reported no confidants. Not like the discussion networks, there is no requirement of specific action in "feel close to" network, so it is easy for respondents to nominate confidants, and they elicited more confidants than discussion networks. This is also reflected in the average size of overall networks, which is 3.87 in "feel close to" networks in 2010, 2.94 in discussion networks in 1985, and 2.08 in discussion networks in 2004.

For the kin networks, on average, there are much more kin confidants in "feel close to" networks than that in discussion networks in 1985 and 2004. The average size of kin networks in "feel close to" networks is 2.45, and those in discussion networks in 1985 and 2010 are 1.44 and 1.22. This distinction is due to the fact that the probe in "feel close to" could elicit more kin

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confidants than that in discussion networks. Almost all the family are probably in "feel close to" networks, while only a small part appear in discussion networks. Regarding the non-kin networks, the distributions in size of non-kin networks of "feel close to" networks in 2010 are similar to those in discussion networks in 1985. Basically, the distribution paths in both networks go down as the size increase, and the percentage in each category is smaller than 3%. The percentages of respondents who reported zero confidant, one confidant, two confidants, three confidants, four confidants, and five or more confidants in "feel close to" networks in 2010 are 38.5%, 21.1%,17.3%, 11.4%, 7.1%, 4.6%, and those in discussion networks in 1985 are 36.1%, 22.4%, 18.1%, 13.2%, 6.8%, 3.4%. These results probably can show that American's core networks have not changed too much since 1985. However, there is discordances between these results and those in discussion networks in 2004 GSS. The percentage of respondents who reported no confidants in both the 2010 "feel close to" networks and 1985 discussion networks is around 37%, while that in 2004 discussion networks is 53.4%. This considerable discrepancy here is abnormal, and it is hard to be explained sociologically.

From this analysis, the percentage of isolated people who did not report any confidants in 2010 is 6.9%, and it is a little bit smaller than the 10% in 1985. The results did not support the Hypothesis 1. Even we only consider the non-kin networks, the percentage of people who did not report any non-kin confidant in "feel close to" networks in 2010 is 38%, and it is similar to the 36% in discussion networks in 1987. The result from non-kin networks also did not support Hypothesis 1. Therefore, no strong evidence showing that the social isolation in American increased from 1985 to 2010. The big discord found in 2004, both of the percentage of people who did not have overall networks and non-kin networks, support the doubt that the finding in 2004 is an artifact. The "feel close to" networks provide a different voice towards the changes of

social isolation in American. That is, Americans probably have not become more isolated in the context of wide use of Internet and Social Networking Sites.

Table 3 presents the structural characteristics of alters in the "feel close to" networks and their comparisons with those in discussion networks in 1985 and 2004. People like others who share similar characteristics with them (McPherson 2001), so the characteristics of the confidants appeared in a respondent's core networks tend to be similar. First, Proportion of kin refers to the percentage of kin ties in the overall networks. In 2010 "feel close to" networks, only 9.9% of respondents reported no kin ties in their core networks, while 33.9% of respondents reported that all the confidants in their core networks are kin ties. Compared with the relevant results of 19.2% and 30.2% in the discussion networks in 1985, the "feel close to" networks have higher percentage of Proportion of Kin. This means there are more kin ties in the "feel close to" networks than those in discussion networks. The reason for this distinction is that the probe in "feel close to" networks could elicit more kin networks. Second, Length of Association means how many years that the respondents have knew alters or confidants. The average years that respondents in "feel close to" networks knew their confidants is 26.88. This is much longer than those, which are both around 7, in discussion networks in 1985 and 2004. The results of Length of Association indicate that respondents in "feel close to" networks knew their confidants much longer than those in discussion networks. The cause of this gap probably be the fact that "feel close to" networks elicit more confidants from family, who should know respondents for a long time. Third, Race Heterogeneity and Gender Heterogeneity are used to measure the percentage of social ties that ego and alter share the same race and gender. Both of them are calculated by the Index of Quality Variation (IQV). The results show that for 83.1% of those respondents in "feel close to" networks, all the confidants they felt close to are of the same race with them. This

is similar to those in discussion networks, which are 91.9% in 1985 and 84.5% in 2004. Both of discussion networks and "feel close to" networks support the idea that people tend to make friends with those have same race with them. In regards to gender, 15.5% of respondents in "feel close to" networks reported that all the confidants they felt close to are of the same gender with them. This is a little fewer than those in discussion networks, which are 23.8% in 1985 and 24.2% in 2004. The inconsistence in these two types of networks still result from that "feel close to" networks elicit more kin ties than discussion networks. It is easy for family members to share different genders rather than friends and coworkers. The inconsistences in structural characteristics of alters that prevented in Table 3 reflect the differences between "feel close to" networks and discussion networks, and the consistencies could provide evidence to show that it is valuable to compare these two networks in different periods.

[Insert Table 3 about here]

Table 4 represents the results of regression analysis, which is used to explore what factors predict the variations in size of overall networks, kin networks, and non-kin networks. The results supports that education, marriage, income, and being female have positive effects on the size of networks in "feel close to" networks. First, Bachelor's or Higher Educational Degree has positive effects on the size of overall networks and the size of non-kin networks, and it has no significant effect on the size of kin networks. The educational degree of High School and Some College do not have any significant effect on the size of all three kinds of networks. Compared with people who dropped out of high school, people with Bachelor's or Higher Educational Degree have 0.438 more people in overall networks and 0.286 people in non-kin networks respectively. These results partially support the Hypothesis 2 that educated people have larger size of core networks than less educated ones. The effects of education only works for people

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with Bachelor's or Higher Educational Degree, and the effects limit to the size of overall networks and non-kin networks. Second, marriage has positive effects on the size of overall networks and kin networks, and it has negative effect on non-kin networks. Compared with the people who are single, divorced or widowed, married people have 0.222 more confidants in overall networks and 0.581 more confidants in kin networks, but they have 0.358 fewer confidants in non-kin networks. It seems that people tend to focus more on family after marriage, and know fewer people beyond kinship. The Hypothesis 3 that married people have larger size of core networks than single people is completely supported. Married people tend to have more core kin networks and fewer core non-kin networks than single people. Third, women generally have more networks than men. The results shows that women have 0.579 more people in overall networks, 0.257 more people in kin networks, and 0.322 more people in non-kin networks than men. These results are the same as the expectation, which is women have more overall networks, kin networks, and non-kin networks than men. It contradicts the previous findings that women do not have more non-kin networks than men (Marsden 1987; McPherson et al. 2006). Probably because women are more emotional and they tend to report more confidants they felt close to, so here I observed that women have more networks than men. The increasing gender equality and more women in labor market could also facilitate the change that women have more non-kin networks than men. These results support the Hypothesis 4, women have larger size of core networks than men. Fourth, race does not have any significant effect on the size of networks. That means people with different race backgrounds may have similar size of core networks. The Hypothesis 4 is rejected by the data in "feel close to" networks. Fifth, income has positive effects on the size of overall networks and kin networks, while it does not have significant effect on the size of non-kin networks. Once the log value of income increase by one unit, the number of

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people we felt close to in overall networks will increase by 0.193, and the number of people in kin networks will increase by 0.175. The Hypothesis 6, high-income people have larger size of core networks than low-income people, is partially supported by the evidence. A question remains, why income positively affects the size of kin networks rather than the size of non-kin networks?

[Insert Table 4 about here]

Conclusion and Discussion

Based on the comparisons between "feel close to" networks in 2010 and discussion networks in 1985 and 2004, this paper found that Americans' core networks did not shrink during the years from 1985 to 2010. The average size of core non-kin networks in 1985 and that in 2010 are same, and the percentage of isolated people who did not have any confidants has decreased a little bit. It seems probably that the social isolation in America has declined, at least has not increased, since 1985. In addition, the percentage of isolated people in "feel close to" networks in 2010 is similar to that in discussion networks in 1985, but this percentage is much lower than that in discussion networks in 2004. It thus casts serious doubts on the assertion that Americans are more isolated than they were in 1985, even though the comparisons between two kinds of networks are indirect.

The analysis of "feel close to" networks shows that only people with Bachelor or higher degree report more networks, and effects of other educational level on the size of networks are not significant. Education also does not significantly affect the size of kin networks. These might reflect the differences between "feel close to" networks and discussion networks. In general,

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education makes people have more discussion partners and more important matters to discuss, while education may not affect people's sensation of feeling close to someone. As a result, education significantly influences the size of networks in discussion networks rather than that in "feel close to" networks. This analysis also indicates that race or ethnicity does not affect the size of personal networks in "feel close to" networks. However, race or ethnicity is an important explanatory variable in discussion networks in 1985 and 2004. Probably, cohort effects rather than the differences in two networks cause this difference. It is possible that the growing equality in race makes people with disadvantaged race or ethnic have more networks. Moreover, the core networks of immigrants vary with their adaptions to American society and local community, and most of the immigrants are non-white. As more time the immigrants stay in America, the size of their core networks could increase. The sample of previous discussion networks probably conclude some immigrants, and their adaptions to local society are different. It might be one of the possible reasons that White have more core networks than people in other race/ethnicity.

As what we have discussed above, the panics that American will become more isolated reoccur with the widespread use of Internet and Social Networking Sites. The ten years, from 2000 to 2010, witnessed the expansion of Social Networking Sites. Current main Social Networking Sites, such as Facebook, Twitter, and LinkedIn, became active and attracted lots of users since then. If Internet had negative effects on personal social networks, then the negative effects could emerge since 2000. However, the analysis of "feel close to" networks in 2010 found that people's core networks had not change very much, comparing with their core networks in discussion networks in 1985. Therefore, the wide use of Social Networking Sites probably did not make people's core networks decrease. The finding of declining social isolation in this paper could, at least, provide a window to see the slight positive effects of Social

Networking Sites on individual's core networks, even though we do not know exactly how it impacts personal networks. In theory, the widespread use of Social Networking Sites can directly increase the size of networks, strengthen the weak ties in people's networks, and transform online friends to offline friends.

Furthermore, the implications of this analysis of social isolation are far reaching. Core networks comprise people in the family, the circle of important friends, and possible neighbors. Core networks or strong ties primarily provide broad forms of support and help during a crisis (Wellman & Wortley 1990). The doubts towards increasing social isolation hypothesis indicate that the basic functions of family and community has not disappeared and weakened. Therefore, help is still available in the form of support from others due to powerful community efficacy in times of crisis. The findings in this paper provide one more evidence to support the assertion that social isolation has not increased. In addition, the conclusion of this paper might indicate that the new generation, who were born with Internet, did not abandon families, friends, and communities. The social connections between them are still strong. The new generation presents the future of America. The increase of core networks and social connection shows that this society might still be an organic unit rather than thousands of atoms. Americans might not only share similar values and actions, but also connect with each other.

Due to the lack of panel data in "feel close to" networks, in this paper, I cannot directly compare "feel close to" networks in different periods. Instead, I compare "feel close to" networks in 2010 with discussion networks in 1985 and 2004. This weakens the conclusion that Americans are not becoming more and more isolated than they used to be in 1985. With the indirect comparison, this paper cannot comprehensively conclude that the average size of core networks in America has increased and the prevalence of social isolation has declined. The

comparison between two kinds of networks in different periods might also affect the conclusions about the differences between discussion networks and "feel close to" networks.

Further, big variation within group could hide the relative small variation among groups, which hurt the significance of model, due to the fact that too many people are in one group. More than 60% of the respondents reported five or more people they felt close to, and they are categorized into one group, while the rest 40% of the respondents are categorized into four groups. As a result, it is possible that the variations between people in one group are much larger than the variations among groups. For example, for the 60% of respondents who reported five or more confidants, the distribution of the educational degree is even distribution, which means the percentage of people who has each educational level is same. In contrast, all the 10% of respondents who reported three confidants have Bachelor's or higher educational degree. Therefore, it is wrong to say that Bachelor's or higher educational degree could increase the size of people's networks. The fact that 60% of the whole sample are categorized into one group could hurt the accuracy of the regression model in predicting the size of networks.

This paper talks about the changes of core networks and social isolation in the context of social process. Changes in social level are the root causes of the changes in social isolation and the average size of personal core networks. The analysis of "feel close to" networks in this paper probably could provide a small window to see the social structural changes such as the wide use of Social Networking Sites. However, no direct measure of the changes in social level could weaken the conclusions. It is possible that the effects of those demographic characteristics on personal networks could be disappeared if we draw in the variables of social level, such as the demographic changes, the rising demand of work, and gender equality. For example, the effects of gender on the size of networks could change as we add the variable of index of gender

equality. Regarding the effect of gender, the underlying influential factor might be how easy

women build their networks rather than being women itself. The future analyses should focus on

how changes in social level could affect personal networks, and find causal relationships

between these individual-level and social-level effects and personal networks.

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Appendix

Table1. Descriptive Statistics for (ego) Variables in Analyses (N=1997)

Variable	Mean	SD	Median	Min	Max
Size	3.87	1.65	5	0	5
Kin	2.45	1.69	2	0	5
Non-kin	1.42	1.49	1	0	5
Age	48.99	15.76	49	23	102
Income	59283	44143	45000	2500	200000
Income (log)	10.66	0.91	10.71	7.82	12.21
Gender	Male			50%	
(Female=1, Male=0)	Female			50%	
Marriage	Married			52.1%	
(Married=1,others=0)	Single			47.9%	
Educate	Less than high school			12.7%	
	High school			31.3%	
	Some college			28.7%	
	Bachelor's degree/ higher			27.3%	
Race	White			74.9%	
	Black			9.2%	
	Hispanic			9.7%	
	Others			6.2%	

Table 2. Distributions of Size in Discussion Networks and "Feeling Close to" Networks [a]

Network Size	Overall (%)		Kin (%)		Non-Kin (%)		Overall (%)	Kin (%)	Non-Kin (%)
	1985	2004	1985	2004	1985	2004	2010	2010	2010
0	10.0	24.6	29.5	39.6	36.1	53.4	6.9	16.1	38.5
1	15.0	19.0	29.1	29.7	22.4	21.6	6.7	18.0	21.1
2	16.2	19.2	21.0	16.0	18.1	14.4	8.1	17.7	17.3
3	20.3	16.9	11.7	9.4	13.2	6.0	10.0	17.4	11.4
4	14.8	8.8	5.8	4.0	6.8	3.1	7.8	14.5	7.1
5[b]	18.2	6.5	2.8	1.3	3.4	1.4	60.5	16.3	4.6
6+	5.4	4.9	-	-	-	-	-	-	-
Mean	2.94	2.08	1.44	1.12	1.42	0.88	3.87	2.45	1.42
Mode	3.00	0.00	0.00	0.00	0.00	0.00	5.00	1.00	0.00
SD	1.95	2.05	1.41	1.38	1.57	1.40	1.65	1.69	1.49

a. N (1985) =1531; N (2004) =1467; N (2010) =1997. Discussion networks are in 1985 and 2004, and "feel close to" networks are in 2010.
b. The maximum reported size of overall networks in "feel close to" networks in 2010 is five or more than five.

Table3. Structural Characteristics (Alters) in Discussion Networks and "Feel Close to" Networks

	Discussion Networks		"feel close to" Networks
	1985	2004	2010
Proportion of Kin[a]			
0	19.2%	-	9.9%
.01-.33	15.4%	-	10.9%
.34-.66	20.7%	-	26.9%
.67-.99	14.5%	-	18.4%
1	30.2%	-	33.9%
Mean	0.55	-	0.65
SD	0.37	-	0.34
Length of Association (years)			
>0-4.5	12.1%	10.7%	10.0%
>4.5-8+	87.9%	89.3%	90.0%
Mean	6.72	7.01	26.88
SD	1.34	1.00	17.77
Race Heterogeneity (IQV[b])			
0	91.1%	84.5%	83.1%
>.00	8.9%	15.4%	16.9%
Mean	0.05	0.09	0.14
SD	0.18	0.26	0.32
Gender Heterogeneity (IQV)			
0	23.8%	24.2%	15.5%
.01-.90	39.9%	37.6%	36.2%
>.90	36.3%	38.1%	48.3%
Mean	0.67	0.68	0.73
SD	0.43	0.46	0.34

a. Proportion of Kin refers to the percent of kin size in the overall size of networks. 0 means that nobody in their core networks is kin, and 1 means that everybody in their core networks is kin.
b. IQV is the Index of Qualitative Variations, and 0 means the same. The measure of IQV in discussion networks in 1985 & 2004 is a little different with that in the "feel close to" networks in 2010. The details are in the section of analysis

Table4. Regression Analysis: Determinants of "feel close to" Networks

VARIABLES	(1) Overall Network Size	(2) Overall Network Size	(3) Non-kin Network Size	(4) Kin Network Size
Age	0.019***	0.013	0.037***	-0.023*
	(0.002)	(0.013)	(0.013)	(0.014)
Age^2		0.00006	-0.00024*	0.00030**
		(0.00013)	(0.00012)	(0.00014)
Education				
_< High School(reference)				
_High School	0.216*	0.145	0.022	0.123
	(0.118)	(0.120)	(0.112)	(0.124)
_Some College	0.263**	0.146	0.072	0.074
	(0.121)	(0.124)	(0.116)	(0.129)
_Bachelor's/Higher Degree	0.645***	0.438***	0.286**	0.152
	(0.122)	(0.132)	(0.123)	(0.137)
Married	0.344***	0.222***	-0.358***	0.581***
(Married=1,others=0)	(0.072)	(0.079)	(0.073)	(0.082)
Race				
_White(reference)				
_ Black	0.043	0.107	0.100	0.007
	(0.126)	(0.127)	(0.118)	(0.132)
_Hispanic	-0.011	-0.006	-0.008	0.002
	(0.123)	(0.122)	(0.114)	(0.127)
_Others	-0.002	0.029	0.217	-0.188
	(0.149)	(0.149)	(0.139)	(0.154)
Gender	0.562***	0.579***	0.257***	0.322***
(Female=1, Male=0)	(0.071)	(0.071)	(0.066)	(0.073)
Income(log)		0.193***	0.019	0.175***
		(0.047)	(0.044)	(0.049)
Constant	2.164***	0.370	-0.024	0.394
	(0.171)	(0.573)	(0.534)	(0.595)
Observations	1,997	1,997	1,997	1,997
R-squared	0.089	0.097	0.042	0.069

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1