On and Off the 'Net:
Scales for Social Capital in an Online Era

Dmitri Williams
Department of Speech Communication
University of Illinois at Urbana-Champaign

Go to a section in the article:

Abstract

Scholars investigating the relationship between the Internet and social capital have been stymied by a series of obstacles, some due to theoretical frameworks handed down unchanged from television research, and some due to the lack of an appropriate yardstick. For example, the social interactions that occur through television are prima facie different from those that occur online. Given this basic functional difference, we cannot approach social capital research in an online era with the same set of assumptions and measures. To address this gap in the literature and in our measurement toolkits, this article reports on the development and validation of the Internet Social Capital Scales, or ISCS. These scales are intended to measure two different types of social capital—known as "bridging" and "bonding"—for both online and offline contexts. Question items are developed and tested and found to be valid and psychometrically sound. Potential uses of the scales are then discussed.

Introduction

As people spend more time online, researchers have sought to understand what happens to offline social networks and what kind of new networks form online. A major problem, however, has been the lack of new tools for examining the effects of these social interactions. As Quan-Haase and Wellman note, "researchers need to develop new forms of measurement that complement existing ones" (2004, p. 124). This article reports on the development and validation of a series of scales to measure social capital in Internet contexts. These scales will be known as the Internet Social Capital Scales, or ISCS.

A review of the literature on virtual community and Internet effects illustrates that there is a need for improved measurement. Notably, new scales must be constructed that allow for the functional differences between the Internet and older media. Not only do social interactions occur in a different way within this new medium, they do so in parallel and in conjunction with "real" life offline. At the same time, new measurements must be driven by theory. Drawing from the work of political scientists and sociologists, the concept of "social capital" (Coleman, 1988) is used to establish a framework. Question items are developed within this framework to account for both online and offline social interactions. The resulting series of scales are then tested, validated, and discussed.

The development of the scales expands and clarifies our understanding of social capital and the Internet; how social capital forms online and offline, and the tradeoff between these two settings. It also provides

a measurement tool for social scientists interested in social capital formation via the Internet. By distinguishing the parallel cases of online and offline social capital, researchers can use the scales to determine whether gains or losses occur online or offline. This is a more rigorous approach than using combined measures of social capital that can conflate the source of the effects.

What is Social Capital?

"Social capital" has been a contentious and slippery term. It is loosely understood to operate like financial capital in that using it creates more of it. However, instead of goods and services, the things being used and created are personal relationships and the benefits that come with them: Some social actors interact and form a network of individuals—a "social network"—resulting in positive affective bonds. These in turn yield positive outcomes such as emotional support or the ability to mobilize others. Unfortunately, there has been confusion in the literature about whether social capital is a cause or an effect. For some researchers it means the social groups and networks that create positive outcomes, while for other researchers it means the outcomes themselves (Foley & Edwards, 1997). In his book *Bowling Alone*, Putnam defines social capital as social networks and their associated norms of reciprocity (2000), implying that it is both the network and the effect of the network.

Still others view social capital as a process, rather than a tangible thing. For example, Newton has noted that social capital is essentially cyclical (1997). He suggests it is comprised of norms, networks, and resulting outcomes, which can then feed back into further norms and networks. Similarly, Resnick has noted that such cyclical patterns carried out through communications technology comprise "sociotechnical capital" (2001). These cyclical approaches are theoretically important but methodologically difficult to capture. Blurring the differences between the social networks and their subsequent effects (which then create further networks) creates an endogeneity problem for measurement.

The operationalization of social capital described below is more specific: The social capital measured here is an *outcome* rather than the network itself. This does not preclude network analysts' use of the measures. It simply suggests that the networks are the causal agents or moderators of the social capital measured by the scales.

Internet-Focused Social Capital Research

As with any new medium (Czitrom, 1982), assessments of the Internet's effects tend to polarize immediately into unrealistic utopian and dystopian visions (Cooper, 2002; DiMaggio, Hargittai, Neuman, & Robinson, 2001; Katz & Rice, 2002). This research is concerned with social impacts at the individual and community level. The applicable studies to date fall into three rough groups: those describing the initial pioneering efforts, those that show the Internet improving people's lives, and those that show it causing problems. One reason for the confusion about the social impacts of Internet use is the scarcity of controlled longitudinal research, but a more basic obstacle is the importation of models from prior media research that do not allow for the new medium's different uses and effects.

The now-famous "Home.net" study was among the first to track Internet uses and effects longitudinally (Kraut et al., 1996). It showed the Internet's potential for isolation and depression, in that some users

spent less time with offline friends and family in order to engage in presumably less substantive relationships online. However, in the research team's follow-up report, these effects had largely disappeared, possibly because the subjects' families had joined them online (Kiesler et al., 2002). In fact, Internet use was associated with increases in community involvement and trust (Kraut et al., 2002), results similar to those found by researchers using General Social Survey data (Neustadtl & Robinson, 2002). Yet the Home.net study-and the subsequent news media attention-was so focused on the offline component that the online portion was given little attention.

The positive impacts discovered include the Internet supplementing rather than supplanting prior human communication (Wellman, Boase, & Chen, 2002; Wellman et al., 2003), particularly through email (Horrigan & Rainee, 2002; Howard, Rainie, & Jones, 2001). Chat rooms have the potential for broadening political participation and the sharing of ideas (Price & Cappella, 2002), and have been shown to be supportive and useful in coordinating action (Spears, Postmes, Lea, & Wolbert, 2002). These last two findings are notable in that they focus on the Internet as a site for both original and offline-extending social interactions. Yet most of the work focuses on offline displacements, even if they are of a positive nature. Time diary studies of the general U.S. and Canadian populations (Provonost, 2002) and working families (Qiu, Pudrovska, & Bianchi, 2002) found that Internet use did not affect time spent with family and friends, but often reduced time with other media (UCLA Center for Communication Policy, 2001), at work, or for grooming and hygiene (Kestnbaum, Robinson, Neustadtl, & Alvarez, 2002).

In stark contrast to the aforementioned research, Nie argues that the Internet is at heart an isolating medium (Markoff, 2002; Nie & Erbring, 2002). Nie explains that the positive findings were incorrectly interpreted and inappropriately applied, pointing out that all of the gains were made among current Internet users, an early adopter group already predisposed for gains by being wealthy, educated, and non-elderly. He also suggests that two major studies, the PEW Internet and American Life Project and UCLA's Surveying the Digital Future project, have made spurious claims to causality with cross-sectional data (Nie, 2001). More recent comparative work suggests that cross-sectional and causal studies can indeed lead to different conclusions about social Internet effects, with the cross-sectional studies prone to spuriousness (Shklovski, Kraut, & Rainie, 2004). As the general population enters the online world, Nie argues that we will all become more isolated simply because any time spent online must come from some previously existing activity, most likely a social one. It is important to note, however, that Nie's research does not consider the Internet as a possible new site of social activities (Nie & Hillygus, 2002). In his research, there is no measure of new social capital that might be formed online. Thus, socializing *online* can never compensate for lost socializing *offline*. This is a key point. In direct contrast, the assumption made in this article is that the online world is a site for social activity, both original and extended from offline life.

The essential problem with the traditional time displacement approach is that it ignores changes that occur when we move from traditional media to interactive ones. What was appropriate for traditional media does not automatically apply to new media (Weston, 1997). TV and the Internet are not functionally equivalent (Kestnbaum et al., 2002) because the Internet's uses are broader than television's and because the Internet is more interactive than television. Crucially, the social interactions that occur via the two media are different. TV viewers do not typically take an active role in communicating with

other viewers through the television, while Internet users do take an active role in communicating with other users. The social use is not analogous. The social capital work around television, exemplified by the time diary approach and by the frameworks of Putnam and Nie, stresses the displacement of people by the medium. The assumption is that people who are watching television are not communicating with each other. But a framework that assumes such one-way passivity is not appropriate for a more socially interactive medium that facilitates interpersonal contact. It also neglects sociability *within* the medium.

In their review of Internet studies, DiMaggio et al. concluded that "the functional equivalence model that described the effects of television thus far appears *not* to fit the experience of Internet users" (2001, p. 315). Therefore, the difference between optimists and pessimists is in their functional view of the Internet, i.e., whether it is displacing, substituting, or creating something wholly new. The key point is that we do not know whether total social activities are or are not in decline. Some of the time spent online will be given to sociability. However, we cannot assume that all time online is contributing to a vibrant social universe. What we have seen so far are only the marginal totals; we need to employ more nuanced measures that parse out the different factors.

Bridging and Bonding, Online and Offline

Some networks and some interactions are qualitatively different from others, meaning that different types and levels of social capital will result. Fortunately, there is a theoretical model for these different kinds of social capital. Putnam's concepts of "bridging" and "bonding" allow for different types of social capital to result when different norms and networks are in place (2000). According to Putnam, these two types of social capital are related but not equivalent. They are not mutually exclusive, and in the validation work below, they are oblique rather than orthogonal to one another.

According to Putnam (2000), "bridging" social capital is inclusive. It occurs when individuals from different backgrounds make connections between social networks. These individuals often have only tentative relationships, but what they lack in depth they make up for in breadth. As a result, bridging may broaden social horizons or world views, or open up opportunities for information or new resources. On the down side, it provides little in the way of emotional support.

By contrast, "bonding" can be exclusive. It occurs when strongly tied individuals, such as family and close friends, provide emotional or substantive support for one another. The individuals with bonding social capital have little diversity in their backgrounds but have stronger personal connections. The continued reciprocity found in bonding social capital provides strong emotional and substantive support and enables mobilization. Its drawback is assumed to be insularity and out-group antagonism. As Sherif (1988) demonstrated, the simple formation of a group can lead to feelings of mistrust and dislike for those outside the group.

Although this overall bridging vs. bonding framework presents a handy means of understanding communities, it has not been used successfully in research to date for either online or offline communities. Putnam writes, "I have found no reliable, comprehensive, nationwide measures of social capital that neatly distinguish 'bridgingness' and 'bondingness'" (2000, pp. 23-24). These measures must therefore be conceptualized and validated.

In coining "bridging" and "bonding," Putnam touched on the work of sociologist Mark Granovetter. It was Granovetter's study of people looking for employment that illustrated that there were what he called "weak-tie" and "strong-tie" relationships. Upon studying who found jobs and who did not, Granovetter discovered that the most successful job seekers were not those who had the strongest relationships and friendships, which come from Putnam's bonding social capital (Granovetter, 1973, 1974). In fact, successful job seekers were those with widespread, weaker relationships, which come from bridging social capital.

This suggests that the *type* of relationships within the social network can predict different kinds of social capital. In the case of weak-tie networks, the connections yield Putnam's bridging social capital; since weaker ties tend to be to those people less like the first person, they lead to more people in different life situations and thus to a broader set of information and opportunities. Granovetter called this phenomenon the "strength of weak ties" (1973). However, those in weak-tie relationships do not gain the benefits of bonding social capital. With less interdependence and fewer commonalities, weak-tie networks are less likely to offer strong emotional or substantive support. Conversely, those in strong-tie networks are likely to offer emotional or substantive support. These networks, though, will not offer much in the way of connections between different types of individuals. As the converse of weak-tie networks, strong-tie networks are likely to yield bonding social capital, but not bridging.

Subsequent research in the field of organizational studies has supported Granovetter's weak-tie hypothesis, showing that more ties are better than fewer ties (Friedkin, 1982), and that the diversity of the weak-tie network leads to greater gains (Burt, 1983). Strong ties, meanwhile, are still important in affecting change within organizations (Krackhardt, 1992). There have been Internet applications of this idea, and a gradual acceptance of the idea that computer-mediated social networks can help maintain both weak and strong ties (Wellman, Salaff, Dimitrova, Garton, & Haythornthwaite, 1996). Email use between strangers (i.e., those with very weak ties) in a large organization has been found to lead to information gains (Constant, Sproull, & Kiesler, 1996), and workers and organizations have been shown to benefit from supporting computer-mediated weak-tie connections (Pickering & King, 1995).

Public opinion researchers have found results that support the importance of different network types for opinion exposure and change. Huckfeldt, Beck, Dalton, and Levine found that the strength of relationships within social networks (i.e., whether the network was a weak-tie or a strong-tie network) was a key variable in access to broader social opinions (1995). When groups were particularly cohesive they tended to shelter the group members from the larger world of public opinion, an example of the exclusive property of strong ties.

To complicate matters further, building social capital may work differently online and offline. Haythornthwaite (2002) has been among the first to speculate on how the tie strength approach may differ online and off. She suggests that new communications technologies such as the Internet are inherently useful for forming and maintaining weak tie networks, but that the more centralized the connection is, the more dependent and fragile the weak-tie networks are. Other research has shown how introducing new communication technologies can grow weak-tie networks (Hampton, 2003) and support

community building, including in low-income areas (Pinkett, 2003). In contrast, some suggest that virtual communities may be comprised primarily of people in bonding situations because they will naturally be people with matching interests, thus limiting differences in the group (Mandelli, 2002; Preece, 1999; Stolle, 1998). Yet still other online interactions may bring together very different people, crossing political, religious, gender, ethnic, and age lines. In an online game, for example, 50-year old lawyers play regularly as equals alongside 17-year olds, an interaction that is much less common offline.

Measuring Online Social Capital

It should be noted that this research is not the first to attempt to create measures of the social capital impact of the Internet. A laudable first effort by Norris (2002) focused exclusively on the presence and homogeneity of social networks created through Internet use, rather than their effects. Establishing the presence of networks is important because it is the causal mechanism in the formation of social capital. However, the present article is more focused on the outcomes, and Norris' effort did not include measures of emotional support, access to information, affective bonds for fellow group members or outsiders, or several other theorized phenomena to be discussed shortly. It also did not make distinctions between online and offline life experiences.

This is a central point. If the measures do not distinguish between online and offline situations, but still purport to measure social capital, we will not be able to say where the changes originate. For example, if a study introduced an Internet stimulus and there was a subsequent gain in bridging social capital, we could not know the different online and offline components of the gain. Perhaps a large gain online obscured a loss offline. Getting at such churn requires a change table to see where those effects are coming from and going to. Illustrated graphically, this framework considers four-way social capital measures:

Online Bonding	Offline Bonding
Online Bridging	Offline Bridging

Figure 1. The matrix of social capital measures

Previously, only the offline bonding square has received sustained attention. The question for this square has primarily been "How will the Internet harm real-world relationships?" What is argued here is that such a question only considers one quarter of the possibilities. Not only does it ignore the possible effects of the Internet on existing weak relationships—and indeed does not differentiate between the two types of relationships—it ignores any possible gains or losses that may occur online. In order to find the net results of what Internet use, or some kind of Internet use, might do to us, we must be more comprehensive in our thinking and explore these ignored areas of the grid to see both where and how change occurs.

Item Development

The ISCS scales are intended to compare across two dimensions: bridging vs. bonding and online vs. offline. This necessitates two parallel scales, one for online use and one for offline use. Each has a

subscale for bridging and bonding measures, resulting in four subscales. Each of these has 10 question items. The validation used five-point Likert scale response sets, meaning that each of the four 10-item subscales range from 10 to 50. Items for the scales were developed by extending Putnam's (2000) arguments and by drawing on existing questions from previous scales. For each set of measures, a starting set of criteria led to the formation of questions that related to a series of theorized underpinning dimensions. These dimensions were assumed to be related and not mutually exclusive.

Developing Bridging Social Capital Measures

Putnam suggested that the social capital derived from bridging, weak-tie networks is "better for linkage to external assets and for information diffusion" (2000, p. 22). This aspect fits Granovetter's (1973) original case study of job seekers particularly well, in that the members of the networks with bridging social capital were best able to find connections with external assets (getting hired) and information diffusion (awareness of the openings). Also, members of weak-tie networks are thought to be outward looking and to include people from a broad range of backgrounds. The social capital created by these networks generates broader identities and generalized reciprocity. Putnam implied some criteria that were the starting points for theorizing: 1) outward looking; 2) contact with a broader range of people; 3) a view of oneself as part of a broader group; and 4) diffuse reciprocity with a broader community. These were used as categories for question development.

Outward Looking

Looking outside of one's narrow daily existence should be an exercise in horizon broadening. To look outside is to be less cloistered, more open minded, and more comfortable challenging one's precepts. Thus, scale questions should address interacting with people outside the local area, trying new things, and being curious about differences in others and different parts of the world.

Contact with a Broad Range of People

If weak-tie networks do in fact have an advantage because they connect people of different backgrounds, then this dimension should measure linkages to ages, religions, genders, classes, professions, and races different from one's own.

A View of Oneself as Part of a Broader Group

The broader group is defined in relation to the respondent (not as an objective group such as "Americans"), and thus may have different meanings to different people. More general question forms that involve the bigger outside world are tested, including the ideas of connections to a larger community and of feeling as if everyone in the world is connected.

Diffuse Reciprocity with a Broader Community

This concept addresses generalized norms of reciprocity, i.e., giving to others without expecting something back from them, as in the case of holding the door open for a stranger who is carrying a heavy load. This general sense of "givingness" stems as much from a charitable feeling as it does from the comfort that someday someone will help us in return (Cialdini, 1993). Measures should therefore attempt to capture the occurrence of reciprocity without immediate gain, such as helping strangers, spending time on general community activities, and doing things without expecting a payoff.

Although these rough dimensions are a good starting point, there is another point to consider. This is the idea of simply meeting new people, regardless of whether they are like or unlike oneself. Thus questions need to address meeting new people by interacting with others or just by being in a particular place.

Developing Bonding Social Capital Measures

Putnam's (2000) conceptualization of bonding social capital is exclusive rather than inclusive. Its effects are argued to be more in the realm of emotional support and access to scarce or limited resources, and the ability to mobilize solidarity. It is Putnam's position that one element of bonding social capital is out-group antagonism that arises from insular thinking. Therefore, the underlying dimensions of social capital generated through strong-tie networks should be: 1) emotional support; 2) access to scarce or limited resources; 3) ability to mobilize solidarity; and 4) out-group antagonism.

Emotional Support

This aspect of bonding social capital is enough like established measures that there are accepted batteries of social and emotional support already in place (Cohen & Hoberman, 1983). The concept is measured by questions about whether or not people trust others to help them solve problems, have someone to turn to for advice, and have someone to go to with intimate personal problems or to alleviate loneliness.

Access to Scarce or Limited Resources

In bonding social capital, a scarce or limited resource should be something that is valuable both to the person giving and to the person receiving, or else there is no real risk borne through the relationship. Therefore, the value that can be obtained through someone else could be a scarce asset, either something tangible such as money, or a social asset that will reflect on the friend, such as the perceived willingness of a person's friends to put their reputation on the line for that person.

Ability to Mobilize Solidarity

The most suspect dimension here is "ability to mobilize solidarity." If bonding social capital is the product of small, insular groups, mobilizing solidarity should be problematic because mobilizing a group may require access to a broad, not narrow, range of people. If the activity were to take place through a larger community, for example, a religious or ethnic one, then the social capital generated likely becomes more diffuse and of the weak-tie variety as the community size increases. One could imagine a very small church's congregation mobilizing along the bonding dimension because the members are all more likely to know each other. But a much larger church or members of an entire religion will by definition have more people, increasing the likelihood of dissimilarities. Mobilizing that group will be more likely to occur through second-order networks, and the social capital in use there will begin to edge toward the bridging variety. Another measure of this concept that is not group-size specific would be whether or not a person's friends could be motivated to do something important or to help that person fight an injustice. There must be some sense of cost, even if it is only time.

Out-Group Antagonism

Of all of Putnam's (2000) suggested dimensions, out-group antagonism is the most straightforward. The mere separation and labeling of another group has proven sufficient to lead to feelings of hostility and

suspicion, and may well be innate human behavior (Sherif, 1988). The online world, much like the offline one, provides a wide range of labels and divisions between populations based on demographics, or even interests. As noted earlier, some Internet researchers have posited this as the dark side of an online life in which exclusive communities of narrow interest might form (Preece, 1999; Stolle, 1998; Sunstein, 2001). Questions here will involve differences in race, country, and age in networks that are not connected to one's social circle.

Once again, there is another dimension to consider, the converse of the "broader community" questions in the bridging battery. These can be considered analogously to the idea of homogeneity and heterogeneity, and were the primary element of Norris' short bonding-oriented battery (Norris, 2002). They involve connecting with people who share similar beliefs and interests.

The final scale items are presented in Table 1.

Bonding Subscale

1. There are several people online/offline I trust to help solve my problems.*
2. There is someone online/offline I can turn to for advice about making very important decisions.*
3. There is no one online/offline that I feel comfortable talking to about intimate personal problems. (reversed)*
4. When I feel lonely, there are several people online/offline I can talk to.
5. If I needed an emergency loan of $500, I know someone online/offline I can turn to.*
6. The people I interact with online/offline would put their reputation on the line for me.
7. The people I interact with online/offline would be good job references for me.
8. The people I interact with online/offline would share their last dollar with me.
9. I do not know people online/offline well enough to get them to do anything important. (reversed)
10. The people I interact with online/offline would help me fight an injustice.

Bridging Subscale

1. Interacting with people online/offline makes me interested in things that happen outside of my town.
2. Interacting with people online/offline makes me want to try new things.
3. Interacting with people online/offline makes me interested in what people unlike me are thinking.
4. Talking with people online/offline makes me curious about other places in the world.
5. Interacting with people online/offline makes me feel like part of a larger community.
6. Interacting with people online/offline makes me feel connected to the bigger picture.
7. Interacting with people online/offline reminds me that everyone in the world is connected.
8. I am willing to spend time to support general online/offline community activities.
9. Interacting with people online/offline gives me new people to talk to.
10. Online/Offline, I come in contact with new people all the time.

Table 1. Bridging and bonding scale question forms with online/offline variants
*Adapted from the ISEL social support measure (Cohen & Hoberman, 1983)

Scale Validation

The initial, much larger, version of the ISCS was administered to a sample of 884 volunteers from the United States through an online survey approved by a university institutional review board (IRB) committee. Volunteers were solicited through message boards across a wide variety of interests, ranging from game playing to pregnancy support groups. The sample was predominately white and male, college educated, and centered around the ages of 25-35 (see Table 2). It included subjects from every U.S. state. Respondents completed a larger survey that took about 35 minutes to complete. The items used here were embedded within that larger survey and constituted approximately 40% of the total questions, including several measures for construct validity tests. A cover story informed respondents that they were completing a general opinion study.

		Min	Max	Mean
Age		14	68	27.04
Education		None	Graduate degree	College degree
Income		$0/year	$80,000 or more	$39,500/year
Other			Total	%
Gender	Male		765	86.5%
	Female		119	13.5%
Race	Asian/Pacific Islander		66	7.5%
	Black/African American		12	1.4
	Hispanic/Latino(a)		33	3.7
	Native American/Indian		10	1.1
	White/Caucasian		736	83.3
	Other		27	3.1

Table 2. Sample statistics

The most recent data from the Pew Internet and American Life Project (see www.pewinternet.org, retrieved January 10, 2006) suggest that this sample is slightly younger, whiter, and more male than a representative sample of all Internet users. Comparing these statistics to more general Internet use statistics, we can infer that this sample is more advanced technologically and probably skews more to the early adopter profile.

To avoid collecting non-opinions (Converse, 1964), the questions included explicit "don't know/not sure" answers. This created case-wise skips, so the number of valid cases for the individual subscales was lower than the total. The master battery of questions validated below had 527 fully complete cases, while the individual subscales each had about 700 complete cases. Post-hoc tests for normality found all of the data to be within the accepted bounds of +2/-2 standard errors of kurtosis.

The online and offline subscales worked in direct parallel to one another, differing only by one word to

ensure comparability, e.g., "There are several people (*online*/*offline*) whom I trust to help solve my problems," etc. Furthermore, an earlier pilot study of the scales revealed that there was a need to frame the questions in order to orient the subjects to these online or offline contexts. Therefore the batteries tested here had explicit introductory phrases about whether the question refers to online life or offline life.[1] This is especially important online, so that it is clear that the concepts being tested are the result of interactions with other people, and not simply online actions done solo such as reading a newspaper's web site. Social capital effects must be social.

Factor Analysis and Reliability

Exploratory factor analysis was used on a large battery of potential question items. Then confirmatory factor analysis (CFA) was chosen as the most appropriate procedure to examine the final factor structure of the survey instrument over two stages. The advantage of CFA is that it is driven by theory, rather than data, and allows the researcher to test an a priori model of the underlying constructs. The data can then be analyzed to determine how well the proposed factors load and how well the model fits the data.

The initial goal of the exploratory analysis was to reduce the batteries to manageable numbers by identifying and eliminating problematic items in favor of stronger ones. This was accomplished first by examining the subclusters of questions thought to relate to the theorized underlying dimensions (see Appendix A). Several variables were found to be worded awkwardly, double-barreled, or simply too confusing, and were eliminated when they did not scale or fit with the other items in the subclusters. For example, the questions involving mobilization of a wide group (e.g., "I could organize a broad group of people to take part in a protest") did not scale or fit with the other bonding items and were dropped.

The next step was to test how well the proposed underlying dimensions fit the overarching concepts of "bridging" and "bonding" social capital. The goal was not to create subscales for each underlying dimension, but to test whether those dimensions were in fact the constituent elements of bridging and bonding social capital. An initial, large exploratory factor analysis of 36 items was tested to check this prediction for both the online and offline versions (see Appendix B). The solution yielded nine factors, with all of the variables loading strongly in clusters with either bridging or bonding, but never strongly with both. This was considered evidence that the bridging variables did in fact belong together and were distinct from the bonding ones, and vice versa. The lack of negative inter-factor loadings also confirmed that, while separate, the two overarching dimensions were obliquely related.

The proposed dimensions loaded as expected, with the notable exceptions of out-group antagonism and homogeneity. The out-group antagonism variables loaded consistently apart from the other proposed bonding variables, regardless of combination, rotation, or item elimination. Norris' homogeneity questions loaded weakly and had low inter-item correlations and so were considered less strongly related to the bonding factor. In sum, this second step provided evidence that the two overarching concepts were in fact different, and that the variables were correctly aligned, but that out-group antagonism and homogeneity were not an element of bonding social capital.

The nine-factor solution was too unwieldy for general use. Thus the final step was to use confirmatory factor analysis to look at particular items to improve the loadings, reliabilities, and measures of fit for the

predicted two-factor model. Items were scrutinized and eliminated one by one. In most cases, questions were eliminated when redundant items could be dropped in favor of similar question forms that had stronger loadings. Some items were dropped due to lower inter-item correlations, relatively lower factor loadings, and changes in overall model fit. This process was carried out separately for both the online and offline versions, with the goal of generating parallel scales that performed similarly online and off. Items were eliminated until a desirable solution was obtained using a 10-item scale for both bridging and bonding that worked equally well in online and offline parallels.

The final 10-item scales were then tested for goodness of fit using the AMOS software package. Because the sample was large, the size-sensitive chi-square statistic (online version, X^2=1091.1, p<.001; offline version, X^2=917.2, p<.001) was abandoned in favor of indices that are not sensitive to sample size. These data were examined with the Non-Normed Fit Index (NNFI; also known as the Tucker-Lewis Index), the Goodness of Fit Index (GFI), parsimony ratio (PR), and Root Mean Square Error of Approximation (RMSEA). For the first three indices, measures of .9 and above indicate an excellent fit for the model. An RMSEA of less than .05 indicates a "close" fit and less than .08 a "reasonable" fit (Browne & Cudeck, 1989). Both the online (NNFI=.85, GFI=.88, PR=.89, RMSEA=.08) and offline (NNFI=.85, GFI=.90, PR=.89, RMSEA=.08) models were reasonable fits for the data. The final scale items for the two-factor "bridging" and "bonding" solutions are reported again in Table 3 with their factor loadings. Loadings over .450 were considered meaningful.

Question text, with online/offline version difference indicated	Online Version		Offline Version	
	Bonding Factor alpha=.896	Bridging Factor, alpha=.841	Bonding Factor alpha=.859	Bridging Factor alpha=.848
Bonding subscale				
There are several people online/offline I trust to help solve my problems.	.818		.747	
There is someone online/offline I can turn to for advice about making very important decisions.	.828		.761	
There is no one online/offline that I feel comfortable talking to about intimate personal problems. (reversed)	.668		.656	
When I feel lonely, there are several people online/offline I can talk to.	.693	.500	.696	
If I needed an emergency loan of $500, I know someone online/offline I can turn to.	.717		.751	
The people I interact with online/offline would put their reputation on the line for me.	.735		.657	
The people I interact with online/offline would be good job references for me.	.656		.548	
The people I interact with online/offline would share their last dollar with me.	.702		.609	

I do not know people online/offline well enough to get them to do anything important. (reversed)	.697		.596	
The people I interact with online/offline would help me fight an injustice.	.655		.653	
Bridging subscale				
Interacting with people online/offline makes me interested in things that happen outside of my town.		.661		.739
Interacting with people online/offline makes me want to try new things.		.671		.699
Interacting with people online/offline makes me interested in what people unlike me are thinking.		.605		.491
Talking with people online/offline makes me curious about other places in the world.		.683		.687
Interacting with people online/offline makes me feel like part of a larger community.		.648		.699
Interacting with people online/offline makes me feel connected to the bigger picture.		.709		.771
Interacting with people online/offline reminds me that everyone in the world is connected.		.610		.678
I am willing to spend time to support general online/offline community activities.		.593		.483
Interacting with people online/offline gives me new people to talk to.		.619		.630
Online/Offline, I come in contact with new people all the time.		.578		.632
% Variance explained by factor	37.75	11.85	33.21	11.71

Table 3. MSCS question forms and factor loadings
Notes. Extraction method: Principal Components. Rotation: Oblimin with Kaiser normalization.
All questions are statements in the form of a five-point "strongly agree to strongly disagree"
Likert scale. Loadings > .490 are shown.

Norris reported a smaller series of bridging and bonding questions (Norris, 2002), but used Varimax rotation, which is appropriate for wholly unrelated dimensions. However, the theory applied here suggests that bridging and bonding are related concepts, with both often found in social networks (Putnam, 2000). Putnam suggested that the two could be thought of as a sliding scale. The analysis found that the two factors were strongly positively correlated (online scales r=.492, p<.001; offline scales r=.527, p<.001), so Oblimin rotation, which allows for related factors, was the more appropriate technique. The alpha for the full online bridging and bonding scale was .900, and for the offline version, .889.

Construct Validity

Establishing construct validity for a new instrument involves testing the new measures alongside others that measure theoretically related concepts. When the concepts are similar, the correlations should be positive, and when they are dissimilar, the correlations should be near zero.

For online bridging, the subscale should have positive correlations with other measures of outward thinking and behaviors, including the extent of contact with people unlike oneself, links to information and assets outside one's daily routine, and behaviors such as meeting new people or visiting chat rooms. Each of these items was positively related to the subscale (see Table 4).

Measure	Correlation with Online Bridging
Contact with a broad range of people in online environments (3-item scale, alpha=.718)	.47*
Linkages to external sources of information and assets (4-item scale, alpha=.622)	.50*
Having met someone new online	.32*
Having visited a chat room	.24*

Table 4. Online bridging scale construct validity: correlations
*$p<.001$

For online bonding, the subscale should have positive correlations with other measures of online closeness, trust, support, and community, including using the Internet to keep in touch with someone geographically distant, having a strong sense of online community, trusting others online, and being able to get help online for a personal problem. Each of these items was positively related to the subscale (see Table 5).

Measure	Correlation with Online Bonding
Using the Internet to keep in touch with someone far away (Kraut et al. item replication).	.37*
"People online give me a strong sense of community."	.43*
"Generally speaking, people online can be trusted."	.40*
Having received help for a personal problem online (Kraut et al. item replication).	.19*

Table 5. Online bonding scale construct validity: correlations
*$p<.001$

For offline bridging, the subscale should again have positive correlations with other measures of outward thinking and behaviors, but this time with non-computer or Internet benchmarks. These include the extent of contact with people unlike oneself offline, links to information and assets outside one's daily routine offline, having a wide variety of personal contacts, and going out for entertainment more often. Personal contacts were tested by using the Saguaro Diversity Index benchmarks, a series of questions that cover friendship links to others of different races, classes, occupations, and sexual orientations (John F. Kennedy School of Government, 2000). The entertainment measure is taken from the DDB Needham studies used by Putnam (2000) in his measures of social engagement. Each of these items was positively related to the subscale (see Table 6).

Measure	Correlation with Offline Bridging
Contact with a broad range of people in offline environments (3-item scale, alpha=.710)	.45*
Linkages to external sources of information and assets offline (4-item scale, alpha=.653)	.48*
Saguaro Diversity Index	.19*
Went to a club, disco, bar or place of entertainment in last month (Putnam, 2000 item replication).	.17*

Table 6. Offline bridging scale construct validity: correlations
*$p<.001$

For offline bonding, the subscale should have positive correlations with other measures of closely-knit social interactions and the closeness of one's best friends. These were measured with two more Needham/Putnam (2000) questions on close social interactions. The second measure is the result of a series of feeling thermometers used by Kraut and his colleagues in the Home.Net studies (Kraut et al., 1996; Kraut et al., 2002). In these, the subjects were asked to name their six closest friends and then report a standard feeling thermometer for each. The mean of these measures is reported in Table 7. Each of the items was positively related to the subscale.

Measure	Correlation with Offline Bonding
Had friends in for the evening in last month	.24*
Went to the home of friends in last month	.19*
Mean closeness of six closest friends	.37*

Table 7. Offline bonding scale construct validity: correlations
*$p<.001$

As noted earlier, the work of Putnam (2000) and many others suggests that there should be a connection between measures of in-group closeness like bonding and out-group antagonism and group sameness, but this was not found in the factor analysis. As a second check of this finding, the out-group antagonism measures were used as subscales (three-item online version alpha=.597; three-item offline version alpha=.689) and correlated with standard measures of trust. The question, "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" and the online version "What about the people online?" did not correlate positively with the out-group antagonism subscales (online trust and online out-group antagonism $r = -.094$, $p<.05$; offline trust and offline out-group antagonism $r = -.383$, $p<.001$). The results suggest that out-group antagonism is not a part of bonding social capital. In fact, in both cases, there are slight negative relationships, meaning that the more bonding social capital people have, the *less* likely they are to have out-group antagonism. This result suggests that, contrary to Putnam's proposition, insularity is not an element of bonding social capital, at least as conceptualized here.

Discussion

Existing approaches to studying social capital online have been stymied by importing measurements from older, functionally different media. This article has reported an attempt to theorize, create, and validate a series of scales to measure social capital in online and offline contexts. Results from a large sample indicated that the final 10-item scales are valid and reliable. Confirmatory factor analysis revealed that bridging and bonding are two distinct but related dimensions of social capital. However, the analysis disconfirmed some concepts that had been theorized to relate to bonding social capital. A discussion follows of the implications and limitations and suggestions for future research using the ISCS, beginning with the unexpected outcome.

Out-group antagonism was found to diverge sharply from the bonding scales. This finding was surprising at first, given that so much theory predicts a relationship between insular closeness and outward antagonism. However, there may be an explanation that fits the results if the closeness online is relatively less intense. Galston's (1999) approach to virtual communities is based on the concepts of entry and exit costs. Drawing on Hirschman's writings (1970), Galston predicted that in any community where entry costs are low, especially virtual communities, we should expect to see people make connections and linkages where they might not otherwise. This ease of entry is particularly relevant when considering the Internet, where joining communities can often be a matter of simply filling out a questionnaire. Galston also noted, though, that it is the cost of exit that keeps communities together. When leaving the group represents a true loss of social, psychological, or practical benefits, a group member will exert effort to stay and contribute. If the Internet has lower entry and exit costs than offline life, this might explain the differences in the way the scales functioned during the validation process. Future research should investigate this possibility.

Using the ISCS

Since the ISCS measures the outcomes of networks, researchers studying the formation of social capital will need to take measures of social networks as well as use the ISCS. If possible, controlled longitudinal uses of these two measurement sets would help establish causal relationships.

The ISCS can be used for the broad application of "the Internet," or it can be used for more specific social Internet activities such as email, chat rooms, game play, etc. Early evidence suggests that Internet use varies by age, gender, education, and psychological profile; different types of people use the Internet for different things (Howard et al., 2001). Because of this, patterns of use may be a more profitable route to explore than gross hours of use (Shah, Kwak, & Holbert, 2001). As Baym, Zhang, and Lin caution, "It is a mistake to collapse use that includes activities as varied as playing *EverQuest*, telecommuting, reading the news, and emailing next door neighbors into global measures such as time online" (2002). The ISCS can be used to measure total impact, but it may ultimately be more useful to measure the impact of chat rooms, email, online video games, or other specific activities.

Researchers want to know whether Internet activities help or hinder the formation of social capital. One speculation is that the social capital generated by online communities is moderated by the relatively low entry and exit costs there compared to offline life. As a result, we should see more of the bridging function online than offline. There is also the converse question of whether the Internet is useful as a bonding mechanism. Do online groups provide the same kinds of psychological, emotional, and practical

support as their real-world counterparts, even without the power of face-to-face interactions? And do Internet users feel the kinds of reciprocal bonds that would lead them to contribute to their online communities? Both sets of questions can be explored using the ISCS.

As with predictions for any set of dependent variables, however, there will be alternative explanations that must be accounted for. Do Internet relationships function differently from those in our offline lives? It may be that any differences between a subject's stock of online and offline social capital might be explained by their level of social extroversion or some other psychological variable. Kraut et al.'s (1996) findings were explained in part by showing that outgoing people experienced more gains and shy people experienced more losses when given Internet access. Likewise, it is reasonable to suggest that education, age, gender, and income might moderate any findings because they have been found to relate to overall Internet use (Coget, Yamauchi, & Suman, 2002; Cole, Suman, Schramm, Bel, & Aquino, 2000; Levy et al., 2002). It is also possible, given the digital divide debate, that race might also be a factor. Each of these alternative explanations should be considered as a control variable in future research.

This research has expanded the framework of social capital to account for bridging and bonding in online and offline contexts. It allows for the fact that the Internet is not television, radio, or any other prior medium, and that social interactions passing through it must be accounted for in a novel way. It also provides social scientists with a measurement tool that can be used in either experiments or surveys. If used carefully and with relevant controls, the ISCS can be a valuable tool for measuring the social capital impact of Internet use.

Notes

1. For example, the online battery is introduced with "When some people are online, they interact with others by exchanging emails, reading message boards and participating in chat rooms. Now we'd like to ask you some questions about how you interact with other people online."

References

Baym, N. K., Zhang, Y. B., & Lin, M.-C. (2002, October). *The Internet in college social life.* Paper presented at Internet Research 3.0, Maastrich, The Netherlands.

Browne, M. W., & Cudeck, R. (1989). Single-sample cross-validation indices for covariance structures. *Multivariate Behavioral Research, 24* (4), 445-455.

Burt, R. S. (1983). Range. In R. S. Burt & M. J. Minor (Eds.), *Applied Network Analysis* (pp. 176-194). Beverly Hills: Sage.

Cialdini, R. B. (1993). *Influence: The Psychology of Persuasion.* New York: Quill.

Coget, J.-F., Yamauchi, Y., & Suman, M. (2002). The Internet, social networks and loneliness. *IT & Society, 1* (1), 180-201.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13* (2), 99-125.

Cole, J. I., Suman, M., Schramm, P., Bel, D. V., & Aquino, J. S. (2000). *The UCLA Internet Report: Surveying the Digital Future.* Los Angeles: UCLA Center for Communication Policy.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, S95-S121.

Constant, D., Sproull, L., & Kiesler, S. (1996). The kindness of strangers: The usefulness of electronic weak ties for technical advice. *Organization Science, 7* (2), 119-135.

Converse, P. E. (1964). The nature and belief systems in mass publics. In D. Apter (Ed.), *Ideology and Discontent* (pp. 206-261). New York: Free Press.

Cooper, W. (2002). *Information Technology and Internet Culture.* Retrieved November 5, 2002, from http://www.brandeis.edu/pubs/jove/HTML/V6/iculture.html

Czitrom, D. (1982). *Media and the American Mind: From Morse to McLuhan.* Chapel Hill, NC: University of North Carolina Press.

DiMaggio, P., Hargittai, E., Neuman, W. R., & Robinson, J. P. (2001). Social implications of the Internet. *Annual Review of Sociology, 27*, 307-337.

Foley, M., & Edwards, B. (1997). Editors' introduction. *American Behavioral Scientist, 40* (5), 550-561.

Friedkin, N. (1982). Information flow through strong and weak ties in inter-organizational social networks. *Social Networks, 3* (4), 273-285.

Galston, W. (1999). *Does the Internet Strengthen Community?* Retrieved November 20, 2001, from http://www.puaf.umd.edu/IPPP/fall1999/internet_community.htm

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78* (6), 1360-1380.

Granovetter, M. (1974). *Getting a Job: A Study of Contacts and Careers.* Chicago: University of Chicago Press.

Hampton, K. N. (2003). Grieving for a lost network: Collective action in a wired suburb. *The Information Society, 19* (5), 417-428.

Haythornthwaite, C. (2002). Strong, weak, and latent ties and the impact of new media. *The Information Society, 18* (5), 385-401.

Hirschman, A. O. (1970). *Exit, voice and loyalty: Responses to decline in firms, organizations and states.* Cambridge, MA: Harvard University Press.

Horrigan, J. B., & Rainee, L. (2002, October 13-16). *Getting Serious Online.* Paper presented at the Internet Research 3.0, Maastricht, The Netherlands.

Howard, P. E., Rainie, L., & Jones, S. (2001). Days and nights on the Internet: The impact of a diffusing technology. *American Behavioral Scientist, 45* (3), 383-404.

Huckfeldt, R., Beck, P. A., Dalton, R. J., & Levine, J. (1995). Political environments, cohesive social groups, and the communication of public opinion. *American Journal of Political Science, 39* (4),

1025-1054.

John F. Kennedy School of Government. (2000). *Social Capital Benchmark Survey, 2000.* Cambridge, MA: John F. Kennedy School of Government, Harvard University.

Katz, J. E., & Rice, R. E. (2002). *Social Consequences of Internet Use: Access, Involvement, and Interaction.* Cambridge, Massachusetts: The MIT Press.

Kestnbaum, M., Robinson, J. P., Neustadtl, A., & Alvarez, A. (2002). Information technology and social time displacement. *IT & Society, 1* (1), 21-37.

Kiesler, S., Kraut, R., Cummings, J., Boneva, B., Helgeson, V., & Crawford, A. (2002). Internet evolution and social impact. *IT & Society, 1* (1), 120-134.

Krackhardt, D. (1992). The strength of strong ties: The importance of philos in organizations. In N. Nohria & R. G. Eccles (Eds.), *Networks and Organizations: Structure, Form, and Action.* Boston: Harvard Business School Press.

Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgegson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues, 58* (1), 49-74.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukhopadhyay, T., & Scherlis, W. (1996). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53* (9), 1011-1031.

Levy, K. K., McConnaughey, J., Lader, W., Brodsky, A., Laousis, S., Price, L., et al. (2002). *Falling Through the Net: Toward Digital Inclusion.* Retrieved December 10, 2002, from http://www.ntia.doc.gov /ntiahome/fttn00/contents00.html

Mandelli, A. (2002). Bounded sociability, relationship costs and intangible resources in complex digital networks. *IT & Society, 1* (1), 251-274.

Markoff, J. (2002, January 21). How lonely is the life that is lived online? *The New York Times*, p. C3.

Neustadtl, A., & Robinson, J. P. (2002). Social contact differences between Internet users and nonusers in the General Social Survey. *IT & Society, 1* (1), 73-102.

Newton, K. (1997). Social capital and democracy. *American Behavioral Scientist, 40* (5), 575-586.

Nie, N. H. (2001). Sociability, interpersonal relations, and the Internet: Reconciling conflicting findings. *American Behavioral Scientist, 45* (3), 420-435.

Nie, N. H., & Erbring, L. (2002). Internet and society: A preliminary report. *IT & Society, 1* (1), 275-283.

Nie, N. H., & Hillygus, D. S. (2002). The impact of internet use on sociability: Time-diary findings. *IT & Society, 1* (1), 1-20.

Norris, P. (2002). The bridging and bonding role of online communities (Editorial). *Harvard International Journal of Press/Politics, 7* (3), 3-13.

Pickering, J. M., & King, J. L. (1995). Hardwiring weak ties: Interorganizational computer-mediated

communication, occupational communities, and organizational change. *Organization Science, 6* (4), 479-486.

Pinkett, R. (2003). Community technology and community building: Early results from the Creating Community Connections Project. *The Information Society, 19* (5), 365-379.

Preece, J. (1999). Empathic communities: Balancing emotional and factual communication. *Interacting with Computers, 12* (1), 63-77.

Price, V., & Cappella, J. N. (2002). Online deliberation and its influence: The electronic dialogue project in campaign 2000. *IT & Society, 1* (1), 303-329.

Provonost, G. (2002). The Internet and time displacement: A Canadian perspective. *IT & Society, 1* (1), 44-53.

Putnam, R. D. (2000). *Bowling Alone: The Collapse and Revival of American Community.* New York: Simon & Schuster.

Qiu, Y., Pudrovska, T., & Bianchi, S. (2002). Social activity and Internet use in dual-earner families: A weekly time diary approach. *IT & Society, 1* (1), 38-43.

Quan-Haase, A., & Wellman, B. (2004). How does the Internet affect social capital? In M. Huysman & V. Wulf (Eds.), *Social Capital and Information Technology* (pp. 113-132). Cambridge, MA: MIT Press.

Resnick, P. (2001). Beyond bowling together: Socio-technical capital. In J. Carroll (Ed.), *HCI in the New Millennium* (pp. 647-672). New York: Addison-Wesley.

Shah, D., Kwak, N., & Holbert, R. L. (2001). "Connecting" and "disconnecting" with civic life: Patterns of Internet use and the production of social capital. *Political Communication, 18* (2), 141-162.

Sherif, M. (1988). *The Robbers Cave Experiment: Intergroup Conflict and Cooperation.* Scranton, PA: Wesleyan University Press.

Shklovski, I., Kraut, R., & Rainie, L. (2004). The Internet and social participation: Contrasting cross-sectional and longitudinal analysis. *Journal of Computer-Mediated Communication, 10* (1). Retrieved January 18, 2006, from http://jcmc.indiana.edu/vol10/issue1/shklovski_kraut.html

Spears, R., Postmes, T., Lea, M., & Wolbert, A. (2002). When are net effects gross products? The power of influence and the influence of power in computer-mediated communication. *Journal of Social Issues, 58* (1), 91-108.

Stolle, D. (1998). Bowling together, bowling alone: The development of generalized trust in voluntary associations. *Political Psychology, 19* (3), 497-526.

Sunstein, C. (2001). *republic.com.* Princeton, NJ: Princeton University Press.

UCLA Center for Communication Policy. (2001). *The UCLA Internet Project: Year Two.* Retrieved January 21, 2006, from http://www.digitalcenter.org/pdf/InternetReportYearTwo.pdf

Wellman, B., Boase, J., & Chen, W. (2002). The networked nature of community: Online and offline. *IT & Society, 1* (1), 151-165.

Wellman, B., Quan-Haase, A., Boase, J., Chen, W., Hampton, K., Isla de Diaz, I., et al. (2003). The social affordances of the Internet for networked individualism. *Journal of Computer-Mediated Communication, 8* (3). Retrieved January 18, 2006, from http://jcmc.indiana.edu/vol8/issue3/wellman.html

Wellman, B., Salaff, J., Dimitrova, D., Garton, L., & Haythornthwaite, C. (1996). Computer networks as social networks: Collaborative work, telework, and virtual community. *Annual Review of Sociology, 22*, 213-238.

Weston, J. (1997). Old freedoms and new technologies: The evolution of community networking. *The Information Society, 13* (2), 195-201.

Appendix A

Exploratory Factor Analysis

These are the original total questions for initial testing. The purpose of the initial factor analysis was to verify that the theorized clusters scaled together and to eliminate variables that did not work with the others. The variables with an * below were dropped when they did not scale with the others in the theorized subclusters. In many cases this was likely due to awkward question wording.

Bridging Questions

Linkage to external assets/Information diffusion.
Based on the people I interact with, it is easy for me to hear about new job opportunities.
Based on the people I interact with, it is easy for me to find a good new doctor.*
Based on the people I interact with, it is easy for me to hear about the best new places to shop.
The people I interact with help me to stay in touch with what is new and popular.
The more I interact with people, the less I keep current on the news. (reversed)*
The people I interact with could help me get good information about how to vote in the next election.

Outward-looking.
Interacting with people makes me interested in things that happen outside of my town.
Interacting with people makes me want to try new things.
Interacting with people makes me less interested in changing my lifestyle. (reversed)*
Interacting with people makes me interested in what people unlike me are thinking.
Talking with people makes me curious about other places in the world.

Contact with a broader range of people.
I hang out with people just like me. (reversed)*
I interact with people who are from different economic backgrounds than me.
I interact with people who are members of a religion different than mine.
I interact with people who are mostly the same gender as me. (reversed)*
I interact with people from different racial or ethnic backgrounds.

A view of oneself as part of a broader group.

Interacting with people makes me feel like part of a larger community.

Interacting with people makes me feel connected to the bigger picture.

Interacting with people reminds me that everyone in the world is connected.

Interacting with people makes me feel cut off from the outside world. (reversed)*

Diffuse reciprocity with a broader community.

People help each other out.

I am happy to help out a stranger.

I won't help out someone unless I get something for it. (reversed)

I am willing to spend time to support general community activities.

Bonding questions to test

Emotional support.

There are several people I trust to help solve my problems.

There is someone I can turn to for advice about making very important decisions.

There is no one that I feel comfortable talking to about intimate personal problems. (reversed)

When I feel lonely, there are several people I can talk to.

I feel like I'm not always included by my circle of friends. (reversed)*

Access to scarce or limited resources.

If I needed an emergency loan of $500, I know someone I can turn to.

The people I interact with would put their reputation on the line for me.

The people I interact with would be good job references for me.

The people I interact with would share their last dollar with me.

The people I interact with could get me into an exclusive organization.

Ability to mobilize solidarity.

The weak-tie variant: I could organize a broad group of people to take part in a protest.

The strong-tie variant: I could organize my close friends to take part in a protest.

I do not know people well enough to get them to do anything important. (reversed)

The people I interact with would help me fight an injustice.

Out-group antagonism.

I only care about my close friends.*

I do not trust people who are a different race than me.

I do not trust people who live in a different country than me.

I do not trust people who are part of other generations.

The people outside of my immediate friends are not at all important.*

I wish I could meet people who aren't like me or my friends. (reversed)*

Homogeneity.

I find that I connect most with people and groups who share my beliefs.

I find that I connect most with people and groups who share my interests.

Appendix B

Bridging vs. Bonding Factor Analysis Test

This factor analysis tested the theory that bridging and bonding were in fact two separate concepts. By putting all of the remaining variables in a single factor analysis, they could be checked for broader patterns. This exploratory factor analysis confirmed that the two concepts are indeed different. It also confirmed that the lesser factors tend to group either within bridging or bonding exclusively as well. The pattern matrix is presented below. Factor loadings over an absolute value of .400 are highlighted.

Because this step was a confirmation of the two concepts and not the establishment of the final scales, some of the items here were dropped because they did not scale or load as well as the final items. Those dropped items are marked with an *.

| | Components | | | | | | | | |
Bridging Variables	1	2	3	4	5	6	7	8	9
Based on the people I interact with, it is easy for me to hear about new job opportunities.*	-.036	.110	-.044	.063	-.038	**.781**	.143	-.022	.119
Based on the people I interact with, it is easy for me to hear about the best new places to shop.*	-.013	-.040	-.164	-.107	.094	**.636**	-.219	.030	-.121
The people I interact with help me to stay in touch with what is new and popular.*	-.009	-.053	-.059	-.048	.054	**.635**	.112	-.107	-.081
The people I interact with could help me get good information about how to vote in the next election.*	-.237	-.138	.021	-.244	.157	.175	.145	.029	**-.453**
Interacting with people makes me interested in things that happen outside of my town.	.127	-.010	**-.724**	-.018	.052	.019	.007	-.105	-.043
Interacting with people makes me want to try new things.	.138	.090	**-.450**	-.077	.293	.056	.072	.028	-.079
Interacting with people makes me interested in what people unlike me are thinking.	-.123	.012	-.348	.099	.312	-.053	**.499**	-.012	.037
Talking with people makes me curious about other places in the world.	-.040	-.114	**-.688**	.079	.207	.006	-.047	.013	-.117
I interact with people who are from different economic backgrounds	.211	-.037	-.120	-.130	**.592**	.019	-.044	.040	.052

than me.*									
I interact with people who are members of a religion different than mine.*	.034	-.139	.130	.022	**.548**	.215	.212	.049	.112
I interact with people from different racial or ethnic backgrounds.*	.108	-.160	-.052	-.041	**.657**	.019	-.014	.060	.042
Interacting with people makes me feel like part of a larger community.	.050	-.060	**-.558**	-.052	-.219	.219	.178	.025	-.067
Interacting with people makes me feel connected to the bigger picture.	.120	-.035	**-.726**	-.089	-.119	.094	.010	.004	.018
Interacting with people reminds me that everyone in the world is connected.	-.007	.065	**-.727**	.010	-.052	.036	-.028	.153	.026
People help each other out.*	.224	.090	-.102	.031	-.003	.108	.228	.435	-.127
I am happy to help out a stranger.*	-.100	-.059	-.011	-.054	.086	-.124	.010	**.846**	.001
I won't help out someone unless I get something for it. (reversed)*	.107	**-.617**	.009	.180	-.130	.112	-.005	.354	-.019
I am willing to spend time to support general community activities.	-.054	-.188	-.288	-.358	-.186	.002	.065	.326	.140
Interacting with people gives me new people to talk to.	.231	.160	-.312	-.013	.407	.136	-.129	.231	-.016
I come in contact with new people all the time.	.189	.155	-.274	.134	.434	.154	-.162	.128	.082
Bonding Variables									
There are several people I trust to help solve my problems.	**.765**	.060	-.110	-.091	.129	-.047	.036	-.001	-.071
There is someone I can turn to for advice about making very important decisions.	.755	-.045	-.021	-.007	.155	-.134	.103	.045	-.117
There is no one that I feel comfortable talking to about intimate personal problems. (reversed)	**.576**	-.290	-.046	.129	-.031	.103	.084	.062	.140
When I feel lonely, there are several people I can talk to.	**.617**	.022	-.178	-.108	.027	.137	.066	-.103	.022
If I needed an emergency loan of $500, I know someone I can turn to.	**.627**	-.009	-.018	-.078	.044	.029	.083	.029	-.149

The people I interact with would put their reputation on the line for me.	.153	-.054	.095	-.006	-.147	.148	**.732**	.049	-.061
The people I interact with would be good job references for me.	.285	-.002	.043	.024	.225	.386	-.069	.231	-.187
The people I interact with would share their last dollar with me.	.185	.040	-.049	-.260	-.080	.000	.509	.053	-.077
The people I interact with could get me into an exclusive organization.*	.079	.114	-.023	-.351	.158	.254	.017	.253	-.079
The weak-tie variant: I could organize a broad group of people to take part in a protest.*	.000	.096	-.105	**-.864**	.021	.048	-.046	.028	.053
The strong-tie variant: I could organize my close friends to take part in a protest.*	.076	-.002	.107	**-.833**	.059	-.060	.131	-.012	-.006
I do not know people well enough to get them to do anything important. (reversed)	.355	-.356	.068	-.295	-.147	.202	.043	-.147	-.041
The people I interact with would help me fight an injustice.	.095	-.021	.035	-.125	.092	.035	**.677**	.047	-.108
I do not trust people who are a different race than me. (reversed)*	-.059	**.660**	-.003	.024	-.272	.037	.041	-.060	-.052
I do not trust people who live in a different country than me. (reversed)*	.135	**.760**	.164	.051	-.053	.131	-.040	.138	.045
I do not trust people who are part of other generations. (reversed)*	-.135	**.718**	-.103	-.059	-.052	-.043	-.023	-.086	.012
I find that I connect most with people and groups who share my beliefs.*	.112	.118	.020	.080	-.146	.038	-.049	.081	**-.715**
I find that I connect most with people and groups who share my interests.*	.038	-.090	-.112	.052	-.051	-.094	.089	-.072	**-.773**

Note. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.
*Dropped from the final model due to lesser fit and loading scores

Appendix C

Correlation Matrix for Scale Items (Offline Version Presented)

Legend

- Bridging Items
    1. Interacting with people makes me interested in things that happen outside of my town.
    2. Interacting with people makes me want to try new things.
    3. Interacting with people makes me interested in what people unlike me are thinking.
    4. Talking with people makes me curious about other places in the world.
    5. Interacting with people makes me feel like part of a larger community.
    6. Interacting with people makes me feel connected to the bigger picture.
    7. Interacting with people reminds me that everyone in the world is connected.
    8. I am willing to spend time to support general community activities.
    9. Interacting with people gives me new people to talk to.
    10. I come in contact with new people all the time.
- Bonding Items
    11. There are several people I trust to help solve my problems.
    12. There is someone I can turn to for advice about making very important decisions.
    13. There is no one that I feel comfortable talking to about intimate personal problems. (reversed)
    14. When I feel lonely, there are several people I can talk to.
    15. If I needed an emergency loan of $500, I know someone I can turn to.
    16. The people I interact with would put their reputation on the line for me.
    17. The people I interact with would be good job references for me.
    18. The people I interact with would share their last dollar with me.
    19. I do not know people well enough to get them to do anything important. (reversed)
    20. The people I interact with would help me fight an injustice.

	1	2	3	4	5	6	7	8	9	10
1.	1	.430**	.293**	.564**	.409**	.508**	.464**	.294**	.369**	.403**
2.		1	.356**	.420**	.419**	.485**	.322**	.288**	.460**	.406**
3.			1	.375**	.250**	.320**	.265**	.175**	.206**	.183**
4.				1	.355**	.458**	.402**	.200**	.285**	.310**
5.					1	.582**	.440**	.366**	.400**	.344**
6.						1	.517**	.317**	.368**	.361**
7.							1	.229**	.272**	.346**
8.								1	.291**	.261**
9.									1	.602**
10.										1
11.										
12.										
13.										
14.										
15.										

16.

17.

18.

19.

20.

	11	12	13	14	15	16	17	18	19	20
1.	.291**	.249**	.168**	.336**	.251**	.197**	.212**	.220**	.174**	.207**
2.	.339**	.235**	.165**	.341**	.277**	.150**	.224**	.268**	.186**	.316**
3.	.207**	.190**	.162**	.231**	.153**	.233**	.148**	.208**	.063	.255**
4.	.228**	.158**	.120**	.233**	.194**	.075	.236**	.169**	.127**	.198**
5.	.306**	.192**	.215**	.357**	.279**	.264**	.203**	.327**	.237**	.313**
6.	.338**	.246**	.192**	.366**	.256**	.173**	.196**	.282**	.189**	.238**
7.	.178**	.072	.100*	.215**	.147**	.083	.133**	.208**	.072	.141**
8.	.155**	.134**	.186**	.230**	.124**	.167**	.152**	.190**	.155**	.191**
9.	.324**	.237**	.208**	.380**	.200**	.165**	.235**	.232**	.234**	.271**
10.	.347**	.212**	.179**	.395**	.225**	.180**	.221**	.237**	.248**	.288**
11.	1	.645**	.468**	.590**	.471**	.324**	.336**	.355**	.389**	.381**
12.		1	.499**	.520**	.597**	.367**	.339**	.304**	.301**	.368**
13.			1	.414**	.474**	.289**	.279**	.214**	.363**	.314**
14.				1	.433**	.325**	.319**	.362**	.381**	.369**
15.					1	.412**	.408**	.445**	.358**	.367**
16.						1	.300**	.494**	.317**	.581**
17.							1	.281**	.306**	.293**
18.								1	.326**	.455**
19.									1	.316**
20.										1

Note. n=527. ** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

About the Author

Dmitri Williams is Assistant Professor in the Department of Speech Communication at the University of Illinois at Urbana-Champaign. His research focuses on the social impacts of new technologies, with emphases on social capital and video games.
Address: Department of Speech Communication, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801 USA