

# Weak Ties in Networked Communities

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**Abstract.** Communities with high levels of social capital are likely to have a higher quality of life than communities with low social capital (Coleman, 1988, 1990; Putnam, 1993, 2000). This is due to the greater ability of such communities to organize and mobilize effectively for collective action because they have high levels of social trust, social networks, and well-established norms of mutuality (the major features of social capital). Communities with 'bridging' social capital (weak ties across groups) as well as 'bonding' social capital (strong ties within groups) are the most effective in organizing for collective action (Granovetter, 1973; Putnam, 2000). People who belong to multiple groups act as bridging ties (Simmel [1908] 1950; Wellman, 1988). When people with bridging ties use communication media, such as the Internet, they enhance their capability to educate community members, and organize, as needed, for collective action. This paper summarizes evidence from stratified household survey data in Blacksburg, Virginia showing that people with weak (bridging) ties across groups have higher levels of community involvement, civic interest and collective efficacy than people without bridging ties to groups. Moreover, heavy Internet users with bridging ties have higher social engagement, use the Internet for social purposes, and have been attending more local meetings and events since going online than heavy Internet users with no bridging ties. These findings may suggest that the Internet – in the hands of bridging individuals -- is a tool for maintaining social relations, information exchange, and increasing face-to-face interaction, all of which help to build both bonding and bridging social capital in communities.

## Social Groups and Weak Ties

We examine differences in community involvement and collective efficacy that may be associated with the strength of social ties and Internet use. We examine these outcomes in the town of Blacksburg, Virginia, home of the community computer network known as the Blacksburg Electronic Village (BEV). The BEV is a well-established community network serving the residents of the university town of Blacksburg (population 47,000), and surrounding Montgomery County (population 35,000) since 1993.

Social networks and groups are maintained through communication among members, whether in face-to-face situations or facilitated by media, such as, letters, telephone calls, or the Internet. Wellman (2001) argues that when computer networks, such as the Internet, link people as well as machines, they become social networks. The Internet, like other forms of communication, helps people maintain contact with members of their social network or group, cultivate ties and garner aid and resources, including information. Social networks and groups with strong ties among members have what Putnam (2000) refers to as 'bonding' social capital. Typically, a person's social network is comprised of their friends, family and acquaintances, whether proximal or distant. A person's social groups are those formal and informal organizations or collections of friends and/or acquaintances that participate in common activities or tasks on a regular basis through in a common affiliation (church, soccer league, and other voluntary associations).

Social networks and groups help to build trust among members. Social trust, also a feature of social capital, increases as people get to know each other, learn who is trustworthy, and experience things together through voluntary associations and clubs, such as the Boy Scouts, church, the PTA, and informal group activities). Williams (1988, p. 8) and Newton (1997, p. 578) distinguish between "thin" trust and "thick" trust in social networks. In small face-to-face communities (tribes, isolated islands, rural peripheries), "thick" trust is generated by intensive, daily contact between people. These tend to be socially homogeneous and exclusive communities, able to exercise social sanctions necessary to reinforce thick trust (Coleman 1988, pp. 105-108). One could also expect to find thick trust within close-knit organizations, such as small churches or within gated communities.

Thin trust is less personal, based on indirect, secondary social relations. It is the product of what Granovetter (1973) distinguishes as weak ties among members, and Putnam (2000) calls 'bridging' social capital. Weak ties link members of different social groups to help integrate diverse groups into a larger social setting, such as a geographic community. Thin trust is also the basis for social integration in modern, large-scale society (Newton 1997, p. 579). Both bonding and bridging types of social capital are important for sustaining healthy

communities (Putnam 2000). Bonding capital creates and continues the connections that keep individual community groups viable. Bridging capital allows connections between otherwise disconnected groups or civic organizations. Bridging ties facilitate the exchange of information between distinct groups, and help to expedite the flow of ideas among groups. As such, they are important to the process of educating the community as a whole, and in organizing or mobilizing for collective action.

The strength of a tie is a combination of the amount of time, emotional intensity, intimacy (mutual confiding), and reciprocal services that characterize the tie (Berkowitz, 1982; Fischer, 1977; Granovetter, 1973; Marsden and Lin, 1982). Strong ties are characterized by (Wellman, 1992, pg. 211-212):

- A sense of the relationship being intimate and special, with a voluntary investment in the tie and a desire for companionship with the tie partner;
- An interest in being together as much as possible through frequent interactions in multiple social contexts over a long period;
- A sense of mutuality in the relationship, with the partner's needs known and supported.

Conversely, weak ties are more instrumental than strong ties – providing informational resources rather than support and exchange of confidences (Wellman, 1992). Weak ties also provide increased reach for an individual's work, such as, promotion opportunities, professional recognition, and social integration (Haythornthwaite, 2001). People with whom the respondent socializes exclusively at school or at work or through a common group affiliation would be considered weak ties, as would be people whom the respondent might ask to be a reference when they apply to a job.

For a community to have many weak ties that bridge, there must be several distinct ways or contexts in which people may form them, such as a rich organizational life, with most people working in the area (Granovetter, 1973; Keyes, 1969). Rich organizational life provides many opportunities for people to serve as weak ties across diverse groups. Simmel ([1908] 1971) is credited with the classic insight that, in essence, intergroup networks simultaneously connect persons and institutions (Wellman and Berkowitz, 1988; Wolf, 1950). Two persons may be connected through an interpersonal tie. But a single person may also connect two groups when he or she is a member of both. Such joint memberships form group-to-group ties that indirectly connect all persons in each separate group. Thus, a person's membership in more than one organization allows them to serve as a weak tie between groups. Leaders of organizations are particularly well suited to serving as weak ties, as they are even more likely than members to carry information from one group to another as part of their organizational duty and role, as long as the information is not of interest only to one group.

Granovetter (1973) argues that if a community consists largely of isolated silo-like cliques, each person bonds to others within his own clique, but not to others outside. Involvement in widely dispersed and instrumental networks provides greater access to resources than does involvement in highly dense and intimate ones. Without bridging ties to different groups, cliques lack the interpersonal ties that help to spread information or innovation conveyed by mass media and other sources, including newspapers, TV/radio, and Internet postings. Diffusion and communication research have shown that while mass media make most people aware of information, new ideas or 'nascent mobilization,' people rarely act on such information unless it is also transmitted through personal ties (Katz and Lazasfeld, 1955; Rogers, 1962.) Thus, the more local bridges in a community and the greater their degree, the more cohesive the community and the more capable of acting in concert (Granovetter, 1973).

## Weak Ties and Internet Use

There is preliminary evidence that the Internet helps to increase the number of weak ties across social groups in communities with high penetration of the Internet (Hampton, forthcoming, 2003; Kavanaugh, 2002). Prior studies in Blacksburg indicate that individuals who are members of several social groups are using the Internet in ways that support both bonding and bridging types of social capital.<sup>1</sup> Interviews conducted between 1996 and 1999 with leaders in the civic community,<sup>2</sup> the religious community,<sup>3</sup> and the arts community<sup>4</sup> noted the importance of Internet services (organizational web site, listserv, and/or email) in strengthening social ties and information exchange within their organization. Several leaders also noted how the Internet was helping to strengthen weak ties between their group and another group or organization in the community. For example, the president of the Arts Council, an umbrella organization of many different artists and groups dispersed across three nearby towns and two adjoining counties, has seen members of previously disparate arts groups linked together through weak ties:

It used to be small groups like the three towns I talked about...Each one of them had a group of people that talked to each other, but not between the

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<sup>1</sup> Federico Casalegno, doctoral candidate at the Sorbonne, Paris at the time, collaborated on the design and conduct of interviews of community leaders in 1998, and on interviews with BEV Seniors in 1996. The author's research assistant, Evonne Noble, assisted with interviews of BEV Seniors and community leaders in 1999.

<sup>2</sup> Specifically, these are: town manager, the Finance Director for town government, a member of the Board of Supervisors for the county, and the president of the League of Women Voters.

<sup>3</sup> Representing a Presbyterian Church, a Baptist Church, a Unitarian Universalist meeting, the Islamic Center of Blacksburg, and the Jewish Community Center.

<sup>4</sup> Specifically, the president of New River Arts Council, an umbrella organization representing local performance and graphic arts groups dispersed throughout two adjoining counties.

three towns. Now all three towns talk to each other. They opened up new lines of communication. Those people then often talk to people in Blacksburg or Christiansburg. And we have now some connections out to Pulaski or Floyd County where they never used to talk very much before.

The arts council web site and listserv are new lines of communication that help individuals act as weak ties between the different arts groups, that are reinforced by face-to-face interaction at art gatherings. In another case, the web master and listserv manager (and trustee) of the local Unitarian Universalist meeting, mentioned that the web site of the Unitarians links to another community organization with similar values and interests. He said the link to the other organization's web pages "allows us to be able to interconnect with them in a way to make us aware of their activities." Here, not only are individuals, such as the web master, able to act as links between two groups, sharing information, but the mirrored web links are themselves 'weak' ties across the two different social groups in the community.

Hampton (2002) argues that computer mediated communication at the local level provides an opportunity for local social interaction that facilitates the formation of weak social ties and community involvement. In a study of the wired suburb of Toronto known as Netville, Hampton (2003) shows that residents of a networked neighborhood were able to organize and mobilize collectively, in large part due to the weak ties among them. He measured the strength of social ties by whether the respondent classified the neighbor as someone whom they recognized but did not talk with, someone they talked with but did not visit, or someone they visited. Hampton and several other researchers emphasize that in a situation where computer networking facilitates knowledge sharing, weak ties may be more important for collective action than strong ties (Kraut, et al, 1996; Nie 2001). In this study, we use collective efficacy as an indicator of respondents' beliefs and perceptions regarding the community's potential for organizing and mobilizing for collective action.

## Collective Efficacy and Internet Use

According to Bandura (2000),

people's shared beliefs in their collective efficacy influence the types of futures they seek to achieve through collective action, how well they use their resources, how much effort they put into their group endeavor, their staying power when collective efforts fail to produce quick results or meet forcible opposition, and their vulnerability to the discouragement that can beset people taking on tough social problems. (p. 76)

Bandura (2001) suggested that new electronic technologies provide "vast opportunities for people to bring their influence to bear" on "collective civic action" (p. 17); however, he warned that "perceived efficacy will shape how the internet changes the face of social activism" (2002 , p. 11). He has suggested

ready access to communication technologies will not necessarily enlist active participation unless people believe that they can achieve desired results by this means. Strong personal efficacy and collective efficacy are key determinants of active participation. While we do not have measures of personal efficacy in this study, we do have measures of collective efficacy that we tested and report in this paper.

We expect that people who serve as weak ties or bridges between distinct local groups and who use the Internet for communication and information exchange (either with the organization or in general) are better positioned to expedite information distribution, collective organization or action in their communities than non-bridges who use the Internet. When people are effective in attempts to influence outcomes in their community, their sense of collective efficacy rises or is reinforced. Collective efficacy is often associated with higher education and social status; however, it has also been found to flourish among lower socio-economic strata. For example, perception of collective efficacy and sense of civic responsibility explained between 23% and 25% of the variance in grassroots neighborhood participation in New York City (Perkins, Brown, & Taylor, 1996). Defining collective efficacy as a composite of informal social control, cohesion, and trust, Sampson, Raudenbush, & Earls (1997) suggested that “collective efficacy of residents is a critical means by which urban neighborhoods inhibit the occurrence of personal violence, without regard to the demographic composition of the population” (p. 919). The researchers found it “a robust predictor of lower rates of violence” (p. 923). Hence, some research has shown that collective efficacy can both (a) help citizens to self-govern and (b) increase citizen’s participation in governance, regardless of SES.

## Methodology

As part of a larger study of community and the Internet in Blacksburg and Montgomery County, we administered a survey questionnaire to a stratified random sample of 100 households. Survey instruments are useful mechanisms for capturing quantitative data in the form of self-reported traits, attitudes, beliefs, and behaviors. We stratified households on the basis of education level, Internet use, and location (town or county). Once a household accepted to be in the study, we had each member complete a survey questionnaire (younger members completed a modified questionnaire which is not included in this paper). We also conducted group interviews (with all members of a given household forming each group) with a subset of households. Finally, we configured the network connections of a subset of households (all that were possible) so that we could monitor household web use (hits, time of use, etc.) and email exchange (headers only). Focusing at the household level allows us to capture interaction and usage patterns related to Internet use in the home. This paper reports findings from only

the survey, although we consulted interview data where clarification to survey data was useful.

The adult survey questionnaire asked respondents about their community involvement, organizational memberships, informal group participation, Internet use, social circles, collective efficacy, psychological attributes, significant life changes, and basic demographics. The questions of greatest relevance to the investigation reported in this paper are those regarding group membership and participation, Internet use, community involvement and collective efficacy. Our survey instrument has six research themes: community involvement, activities and interests, collective efficacy, Internet behavior and effects, social networks, and psychological scales. These six themes define the main sections of the survey, with the addition of demographic data. To the greatest extent possible questions were drawn from existing survey instruments, particularly the HomeNet study (Kraut 1996, 2002) and BEV survey instruments. In this paper we examine relationships among items in the sections on community involvement, activities and interests, collective efficacy, and Internet use. We also looked at demographic and psychological factors (life changes, extroversion). Constructs and variables that were tested, but not significant, are not included in the results, but are included in the discussion section of the paper.

The section of the survey on community involvement organizes questions according to three different topics: community involvement, community attachment, and local organization affiliation and roles (leader, member, attendee). It includes a set of community involvement measures by Rothenbuhler (1986; Shepherd and Rothenbuhler, 2001) on how frequently respondents keep up with local news, get together with others who know what's going on in the community, have ideas for changing things in the community, and work to bring about change in the community. The section on activities and interests uses a frequency scale (ranging from never or almost never to several times a day) over the last six months for questions, such as spending time with friends, taking a class outside of school, discussing politics, watching TV.

We created a typology aggregating variables related to common constructs (community involvement, activities and interests, Internet use). We ran correlations on the variables for each construct and conducted reliability tests. We sought to obtain constructs comprised of one factor, with reliabilities (indicated by Cronbach alpha) greater than 0.7. We developed constructs for all the main items in the survey. We tested all the constructs and variables in the study for this paper, with the exception of social circles and household communication patterns. Among the key constructs tested for this paper are:

- Informed, e.g., keep up with local news, have ideas for change in the community;

- Activism, e.g., work to bring about change in the local community, being active relative to others;
- Belonging, e.g., feeling part of several groups or organizations, having a group of friends;
- Community Attachment, e.g., how happy to live in the community, willingness to move to another community;
- Participation, e.g., level of involvement in local events, activities;
- Trust, e.g., feeling most people can be trusted, feeling people will take advantage of you, (reversed);
- Civic interest, e.g., taking a class outside school or work, helping a neighbor, keeping up to date on local events, voting in elections;
- Political interest, e.g., discussing politics, writing or calling elected officials, working for a political party, attending rallies or speeches; and
- Internet use for political purposes, e.g., online versions of political activity, including emailing government officials, finding political information online, discussing politics online.

For more detail and background on the survey questions and constructs and the statistical analyses please see the project web site (<http://epic.cs.vt.edu>).

The Internet use measures include amount of use (number of hours on an typical day) and the type and frequency of online activity in the past six months (e.g., get news, play games, communicate with friends and family, bank online). This set of questions is adapted from the HomeNet survey instrument to emphasize local versus distant activities and active versus passive behavior. The frequency scale ranges from ‘almost never’ to ‘several times a day.’ We also asked about respondents’ attitudes toward computers and the Internet (Likert scale of agreement with statements about the helpfulness of the Internet for a variety of purposes, such as, political activities, civic affairs, social engagement, shopping). Questions developed by Georgia Tech (1995) and adapted by Kavanaugh in previous BEV surveys provide a third set of questions that measure respondents’ self perception of changes in involvement since getting on the Internet. We asked respondents whether, since getting on the Internet, are they less, equally or more involved in the local community, local people, non-local people, a diversity of local and non-local people, and local and non-local issues of interest.

To investigate respondents’ participation in local groups and organizations, we examined the number of organizational affiliations and the level of participation (non-participant, attendee or member, leader). First, we divided respondents into two main categories (bridges and non-bridges) who are, respectively: 1) members or leaders in two or more organizations and 2) members or leaders in one or no organizations, including non-participants. We further subdivided the bridges into leader bridges and member bridges, and compared these with the subdivision of

non-bridges category into non-bridges affiliated with one organization, and non-bridges affiliated with no organization. We conducted independent samples *t*-tests on these two main categories, and one-way ANOVAs on the four subcategories, with the main study variables of community involvement, interests and activities, Internet use and collective efficacy and its dimensions (active cooperation, social services, and economic development).

We examined the use of various modes of communication by the organizations to which respondents were affiliated, including face-to-face, telephone, email, email discussion list, and online bulletin board. We isolated and checked survey cases to determine whether leader bridges and member bridges indicated that at least two of the organizations with which they were affiliated also used the Internet to communicate or exchange information among members.

In addition to independent samples *t* tests and one-way ANOVA tests on the variables noted above, we investigated differences in Internet use and effects among bridges versus non-bridges by dividing the sample into bridges that are heavy versus light Internet users and non-bridges who are heavy versus light Internet users. Drawing from Nie (2001), we divided amount of Internet use into heavy users, measured as more than one and a half hours per day, and light Internet users (zero to one and a half hours per day). We conducted univariate ANOVA tests on each of the study variables (noted above) comparing heavy versus light usage by bridges versus non-bridges.

The community collective efficacy measure is comprised of a 13-item scale. Each item pertained to a key area of community challenge and/or achievement and a specified obstacle (see Table 1). Directions asked participants to rate the community's ability to achieve each goal on a five-point scale: (1) not well at all, (2) not too well, (3) somewhat well, (4) pretty well, and (5) very well.

1. TOURISM: Our community can present itself in ways that increase tourism.
2. IMPROVE ROADS: We can greatly improve the roads in Blacksburg and Montgomery County, even when there is opposition within the community.
3. QLIFE: I am convinced that we can improve the quality of life in the community, even when resources are limited or become scarce.
4. QEDUC: Our community can greatly improve the quality of education in Montgomery County without help from the Commonwealth of Virginia
5. SETBACKS: As a community, we can handle mistakes and setbacks without getting discouraged.
6. COOP-FACILITIES: Our community can cooperate in the face of difficulties to improve the quality of community facilities.
7. VISION: I am confident that we can be united in the community vision we present to outsiders.
8. COMMON GOALS: Despite our differences, we can commit ourselves to common community goals.
9. WORK TOGETHER: The people of our community can continue to work together, even when it requires a great deal of effort.
10. RESOLVE CRISES: We can resolve crises in the community without any negative aftereffects.

11. FAIR LAWS: Our community can enact fair laws, even when there is disagreement among people.
12. RESOURCE-JOBS: I am confident that our community can create adequate resources to develop new jobs despite changes in the economy.
13. SENIOR SERVICES: Our community can greatly improve services for senior citizens in Blacksburg and Montgomery County without help from the Commonwealth of Virginia

Table 1. The 13 Items Within the Community Collective Efficacy Scale.

We used factor analysis and structure equation modeling to investigate the underlying structure of collective efficacy (Carroll & Reese, 2003). Data indicate a general construct of collective efficacy, composed of three dimensions or factors (see Figure 1). The first, Active Cooperation (Cronbach  $\alpha = .86$ ), is composed of seven indicators. In general, this group of indicators speaks to a perception of the community's ability to cooperate in the face of difficulties.

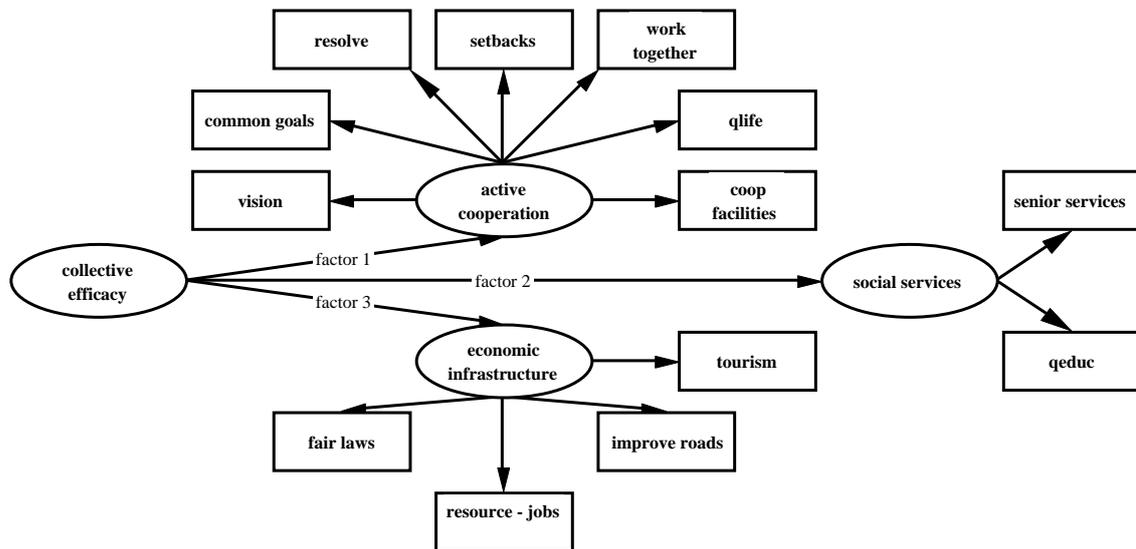


Figure 1. Model of Collective Efficacy Construct, Three Dimensions (Factors), and 13 Indicators

The second factor is Social Services (Cronbach  $\alpha = .77$ ), composed of items involving perception of the community's ability to provide senior services and education. The third factor measures an individual's perception of the community's ability to maintain a strong Economic Infrastructure (Cronbach  $\alpha = .63$ ) through fair laws, creating conditions fostering a strong job market, roads and tourism.

# Results

## Group Affiliation and Weak Ties

For the total sample in our study, the average number of local organizations with which respondents are affiliated is 2.4 groups. This is just above most other studies, which show two local affiliations to be about average (Edwards, 1973, Perkins, et al, 1996). Typically, church is one of the most common affiliations, and this is the case in our study, as well.

Just under half of respondents are classified as bridges (48%, N=75); that is, they are either a member of two or more groups (N=52), or a leader of two or more organizations (N=23) (see Table 2). Just over half of respondents are categorized as a ‘non- bridge (52%, N=83);’ that is, they are not members of any group (N=39), or they are members of only one group (N=44). There are 7 cases in which an individual is a member of at least one organization and a leader in at least another. Since this is such a small group, we included them together with the member bridges.

|            |     |      |                          |      |     |
|------------|-----|------|--------------------------|------|-----|
| Bridge     | 48% | N=75 | Leader Bridge: 2+ groups | N=23 | 14% |
|            |     |      | Member Bridge: 2+ groups | N=52 | 33% |
| Non-Bridge | 52% | N=83 | Affiliation: 1 group     | N=44 | 25% |
|            |     |      | No affiliation           | N=39 | 28% |

Table 2: Bridges and Non-bridges: Descriptives

As shown above, a minority (14%, N=23) are leaders in two or more organizations. The majority of respondents (57%, N=90) are not leaders in any organization; and almost a third (29%, N=45) are leaders in only one organization. Leader bridges report a higher number of weak ties (acquaintances) than both member bridges and non-bridges (approaching significance,  $F(2,148)=2.73, p=.069$ ), and they email a higher percentage of acquaintances than either member bridges or non-bridges do. Member bridges also have a higher number of weak ties than non-bridges, and email a higher percentage of acquaintances than non-bridges. Nonetheless, apart from leader bridges’ number of acquaintances, one-way ANOVA tests show the rest of these differences are not significant.

First, we consider the differences in the two main categories (bridges vs. non-bridges) using independent samples *t* tests across demographics, interests and activities, psychological factors, community involvement, collective efficacy measures, and Internet use. Being online also appears to have different effects on bridges and non-bridges on several measures of community. Then we consider

differences between the sub-categories of leaders bridges (LB), member bridges (MB), non-bridges with a single group affiliation (NB1) and non-bridges with zero affiliations (NB0) using one-way ANOVA.

The first analysis -- the comparison of the two main categories (bridges versus non-bridges) -- is shown in Table 3. Bridges are more extroverted, better educated, more informed and more activist than non-bridges. They have a greater sense of group belonging and higher levels of trust, community attachment, and community participation than non-bridges. They are more interested in civic life and political affairs. They have greater confidence in the community's ability to work together to solve common problems (measured by collective efficacy and its three factors -- active cooperation, social services, and economic development) than non-bridges. They use the Internet for political purposes and civic activities more than non-bridges. Since going online, they have become more involved in the community, more involved in local issues that interest them, and more connected to local people. Since going online, they have been attending more meetings and events of local groups that interest them.

| Construct   | Bridge Mean | Non-bridge Mean |
|---|-------------|-----------------|
| Education ‡ **  | 3.5         | 3.2             |
| Household Income**  | 6.0         | 5.0             |
| Extroversion**  | 3.4         | 3.2             |
| Informed ‡ *  | 3.7         | 3.4             |
| Activism**  | 2.9         | 2.2             |
| Belonging*  | 3.5         | 3.2             |
| Community attachment*                                     | 3.9         | 3.5             |
| Trust ‡ **  | 3.9         | 3.6             |
| Participation**   | 3.2         | 2.5             |
| Computer interest ‡ *                                     | 4.2         | 3.7             |
| Political interest ‡ *                                    | 1.5         | 1.2             |
| Civic interest ‡ **                                       | 2.8         | 2.2             |
| Online political activity ‡ *                             | 1.5         | 1.3             |
| Collective Efficacy (CE) **                               | 3.4         | 3.1             |
| Active Cooperation (CE Factor 1) **                       | 3.6         | 3.2             |
| Social Services (CE Factor 2) *                           | 3.0         | 2.7             |
| Economic Development (CE Factor 3)*                       | 3.4         | 3.1             |
| Since online, involvement in local issues of interest ‡ * | 2.2         | 2.0             |
| Since online, connected with local people ‡ **            | 2.3         | 2.0             |
| Since online, involvement in local community ‡ **         | 2.3         | 2.0             |
| Since online, attendance at local meetings and events**   | 2.2         | 1.9             |

\*\*  $p < .01$ , \*  $p < .05$

‡ Statistics corrected where equal variances not assumed

Table 3. Bridges and Non-bridges: Attributes, Interests, Collective Efficacy, and the Internet

Some of the differences shown above between bridges and non-bridges disappear when we test for differences among the four sub-categories. The next three tables consider these differences, by dividing them into attributes and community measures (Table 4), collective efficacy (Table 5) and Internet use and effects (Table 6). Considering attributes and characteristics using one-way ANOVA tests (Table 4), we see significant differences between these four groups on socioeconomic status and on the constructs of Informed, Activism, Belonging, Community Attachment, Participation and Civic Interest. The differences on measures of attributes and characteristics that disappear when we divide the four sub-categories are: trust and extroversion. The leader bridges appear to be responsible for most of the differences between bridges and non-bridges.

|                          | Leader Bridge<br>(LB)<br>Mean | Member Bridge<br>(MB)<br>Mean | Non-bridge 1<br>(NB1)<br>Mean | Non-bridge 0<br>(NB0)<br>Mean |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Education*               | 5.57 <sup>NB0</sup>           | 5.23                          | 4.90                          | 4.52 <sup>LB</sup>            |
| Household<br>Income**    | 5.95 <sup>NB0</sup>           | 6.0 <sup>NB0</sup>            | 5.26                          | 4.70 <sup>LB, MB</sup>        |
| Informed*                | 3.90 <sup>NB1</sup>           | 3.63                          | 3.4 <sup>LB</sup>             | 3.46                          |
| Activism**               | 3.18 <sup>NB1, NB0</sup>      | 2.78 <sup>NB1, NB0</sup>      | 2.3 <sup>LB, MB</sup>         | 2.1 <sup>LB, MB</sup>         |
| Community<br>Attachment* | 4.0 <sup>NB1</sup>            | 3.75                          | 3.49 <sup>LB</sup>            | 3.53                          |
| Participation**          | 3.51 <sup>MB, NB1, NB0</sup>  | 3.12 <sup>LB, NB1, NB0</sup>  | 2.65 <sup>LB, MB</sup>        | 2.41 <sup>LB, MB</sup>        |
| Civic Interest**         | 3.13 <sup>MB, NB1, NB0</sup>  | 2.71 <sup>LB, NB1, NB0</sup>  | 2.33 <sup>LB, MB</sup>        | 2.1 <sup>LB, MB</sup>         |

\*\* $p < .01$ , \* $p < .05$ ; Tukey post hoc test used on all variables above, since equal variances assumed

Table 4. Bridges versus Non-Bridges on Attributes and Community Measures

Leader bridges are different from the subcategory of non-bridges on most measures shown in Table 4 above except socioeconomic status and community attachment (where they are different from non-bridges with no group affiliations) and being informed (where they are different from non-bridges with one group affiliation). Leader bridges have higher levels of participation and civic interest than all other subcategories (both subcategories of non-bridges *and* the subcategory of member bridges). Member bridges have higher levels of household income than non-bridges with no group affiliation, are more active, and have higher levels of participation and civic interest than non-bridges in both sub-categories.

### Weak Ties and Collective Efficacy

Leader bridges have greater confidence in the community's ability to work together to solve common problems (measured by collective efficacy and three dimensions -- active cooperation, social services, and economic development) than non-bridges with no group affiliation (Table 5). Leader bridges are higher than non-bridges with one affiliation on collective efficacy and the economic development component. Member bridges are higher than non-bridges with no group affiliation on collective efficacy and active cooperation.

|                       | Leader Bridge (LB) Mean  | Member Bridge (MB) Mean | Non-bridge 1 (NB1) Mean | Non-bridge 0 (NB0) Mean |
|-----------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| Collective Efficacy** | 3.55 <sup>NB1, NB0</sup> | 3.35 <sup>NB0</sup>     | 3.18 <sup>LB</sup>      | 3.05 <sup>LB, MB</sup>  |
| Active Cooperation**  | 3.61 <sup>NB0</sup>      | 3.53 <sup>NB0</sup>     | 3.33                    | 3.17 <sup>LB, MB</sup>  |
| Social Services*      | 3.35 <sup>NB0</sup>      | 2.82                    | 2.86                    | 2.55 <sup>LB</sup>      |
| Economic Development* | 3.55 <sup>NB1, NB0</sup> | 3.27                    | 3.09 <sup>LB</sup>      | 3.09 <sup>LB</sup>      |

\*\* $p < .01$ , \* $p < .05$

Tk Tukey HSD post hoc test used on all variables above since equal variances assumed

Table 5. Bridges versus Non-bridges on Collective Efficacy

### Weak Ties and Internet Use

Not all bridging leaders and bridging members report that their groups use the Internet (organizational email, listserv, online bulletin board or web site). While most leaders' organizations do use the Net (19 out of 23), four leaders report that at least one of their organizations does not. Nonetheless, three of these four bridging leaders report that they personally use the Internet. Three of the nineteen leaders who report their organizations do use the Internet, report that they themselves do *not*. We know from interview data that two of these three leaders in fact use the Internet *indirectly*, that is, through a friend or colleague (Dunlap, Schafer, Carroll and Reese, in press). Three of the 52 member bridges report they do not use the Internet personally. For two of these three individuals, however, at least two of the groups in which they participate *do* use the Internet for group communication. Therefore, these non-Internet users may get some indirect exposure to online communication, as we can expect the information contained in the Internet messages would be shared among all members.

The effects of using the Internet are different for the subcategories of bridges and non-bridges (Table 6). There are no differences between leader bridges and member bridges on these measures. But leader bridges are different from non-

bridges. Specifically, both leader bridges and member bridges are more connected with local people since going online than non-bridges with one affiliation. Interestingly, non-bridges with one group affiliation report less connectivity with local people since going online than non-bridges with no group affiliations. Both leader bridges and member bridges report more involvement in the local community since going online than non-bridges with no group affiliations. Member bridges report they have been attending more meetings and events of local groups than non-bridges with no group affiliation.

|   | Leader Bridge (LB) Mean | Member Bridge (MB) Mean | Non-bridge 1 (NB1) Mean | Non-bridge 0 (NB0) Mean |
|---|-------------------------|-------------------------|-------------------------|-------------------------|
| Since online, connected with local people(Tk)**             | 2.42 <sup>NB1</sup>     | 2.27 <sup>NB1</sup>     | 1.97 <sup>LB, MB</sup>  | 2.11                    |
| Since online, involvement with local community (Tm)*        | 2.37 <sup>NB0</sup>     | 2.20 <sup>NB0</sup>     | 2.06                    | 1.96 <sup>LB, MB</sup>  |
| Since online, attendance at group meetings and events (Tk)* | 2.16                    | 2.14 <sup>NB0</sup>     | 1.94                    | 1.89 <sup>MB</sup>      |

\*\* $p < .01$ , \* $p < .05$

Tm Tamhane post hoc test used since equal variances not assumed

Tk Tukey HSD post hoc test used since equal variances assumed

Table 6. Bridges and Non-bridges on Internet Use and Effects

The differences that disappear when we separate out the four groups from the two main categories of bridges and non-bridges are: using the Internet for political activities, and involvement in local issues of interest since going online.

To examine differences among bridges and non-bridges based on Internet use, we used conducted *t* tests on heavy and light Internet users (Table 7). Light users are defined as people who use the Internet 0-1.5 hours per day. Heavy users use the Internet more than 1.5 hours per day. We do not distinguish between bridges that are leaders versus members, just between heavy and light Internet use. Similarly, we do not distinguish between non-bridges who are affiliated with one group and non-bridges with no group affiliations. The *N* (125) is lower than the total sample since this is the subset of Internet users.

|            |      |                     |      |
|------------|------|---------------------|------|
| Bridge     | N=66 | Heavy Internet user | N=33 |
|            |      | Light Internet user | N=33 |
| Non-Bridge | N=59 | Heavy Internet user | N=30 |
|            |      | Light Internet user | N=29 |

Table 7. Bridges and Non-bridges by Heavy and Light Internet Use

Analyses using 2 X 2 ANOVAs show that there are significant interaction effects for Internet usage (heavy versus light) and bridges versus non-bridges on several of the study variables (Table 8). These are: social engagement, use of the Internet for social purposes, and attendance at local group meetings and events since going online. These are the only variables that showed significant interaction, and they are all related to social activities.

|   | Bridge<br>(H)<br>Mean | Bridge<br>(L)<br>Mean | Non-bridge<br>(H)<br>Mean | Non-bridge<br>(L)<br>Mean |
|---|-----------------------|-----------------------|---------------------------|---------------------------|
| Social Engagement †   | 3.47                  | 3.13                  | 2.96                      | 3.10                      |
| Use Internet for Social**                                     | 3.55                  | 2.16                  | 2.74                      | 2.17                      |
| Since online, attendance at local group meetings and events** | 2.27                  | 2.03                  | 1.86                      | 2.00                      |

\*\* $p < .01$ , † Approaches significance ( $p < .1$ )

Table 8. Interactions Between Bridge Status (Bridges or Non-bridges) and Amount of Internet Use (Heavy or Light) on Community Measures

While there were significant main effects for bridge versus non-bridge or for Internet usage (heavy versus light) on many of the variables reported earlier, we do not report them here. The effects for bridge status were shown in previous analyses and the main effects for degree of Internet usage are outside the scope of the present investigation.

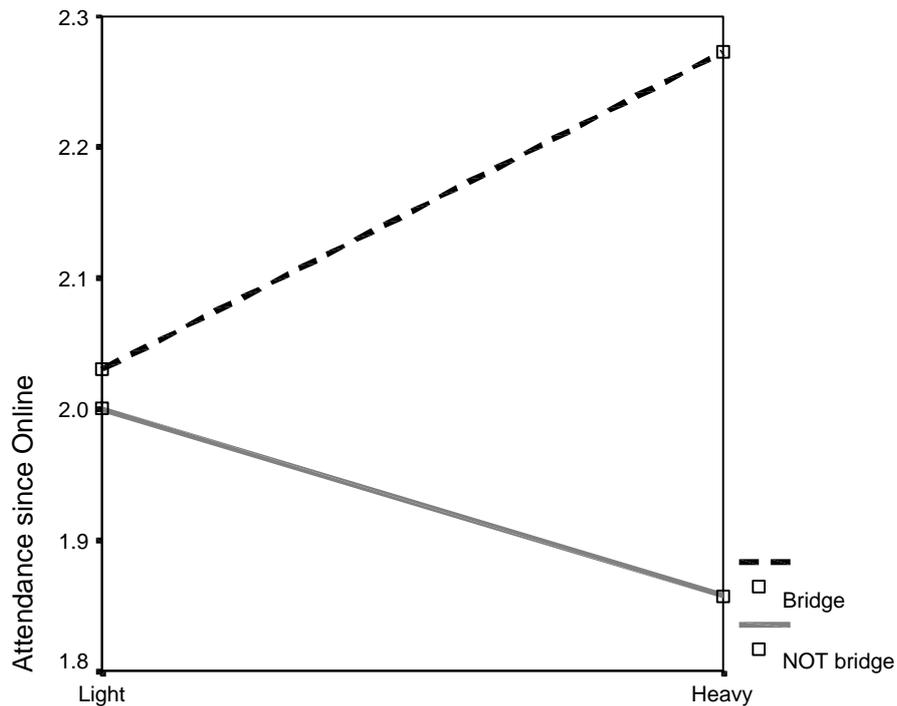


Figure 2. Interaction Between Bridge Status and Internet Usage on Attendance of Local Meetings and Events Since Going Online.

The interaction between bridge status and Internet usage is particularly striking for self-report of attendance at local meetings and events since going online (Figure 2). In this case, both bridges and non-bridges who are light users of the Internet report that their Internet usage has had little effect on attendance. The story diverges for heavy users. While heavy users who are not bridges report that their attendance of local events and meetings has dropped since going online, heavy Internet users who are bridges report that their attendance of local events and meetings has increased.

## Discussion

We have examined evidence of weak ties measured by an individual's participation in two or more local groups, either as a leader or member/attendee. We compared these weak ties (bridges) to individuals who participate in only one organization or in no organizations (non-bridges). We tested for differences in their attributes, interests, involvement, collective efficacy and Internet use related to the local community.

The data show that people who act as weak ties (bridges) between groups are better educated, more informed and more extroverted. They have higher levels of activism, trust, community involvement, participation, civic interest, and community attachment. Bridges have greater confidence than non-bridges in the community's ability to work together to solve common problems (measured by collective efficacy and its three dimensions -- active cooperation, social services, and economic development).

We divided the two main categories of bridges and non-bridges into sub-categories (leader bridges versus member bridges, non-bridges with only one group affiliation and non-bridges with no group affiliation). A closer examination of the sub-categories indicates that leader bridges are highest on all measures, and appear to be responsible for much of the differences between bridges and non-bridges. There is a generally declining trend in the level of the means on each attribute and community measure from leaders, to members, to non-bridges with one affiliation and lastly, non-bridges with no affiliation. Leader bridges have higher levels of community participation and civic interest than all other subcategories (both subcategories of non-bridges *and* the subcategory of member bridges). Leader bridges are *not* different from subcategories of non-bridges on measures of household income (where they are different from non-bridges with no group affiliations), and community attachment, and being informed (where they are different from non-bridges with one group affiliation). Member bridges have higher levels of household income than non-bridges with no group affiliation, are more active, and have higher levels of community participation and civic interest than non-bridges in both sub-categories. Leader bridges have greater confidence in the community's ability to work together to solve common problems (measured by collective efficacy and three dimensions -- active cooperation, social services, and economic development) than non-bridges with no group affiliation. Leader bridges are higher than non-bridges with one affiliation on collective efficacy and the economic development component. Member bridges are higher than non-bridges with no group affiliation on collective efficacy and active cooperation. Both leader bridges and member bridges are more connected with local people since going online than non-bridges with one affiliation. Both leader bridges and member bridges report more involvement in the local community since going online than non-bridges with no group affiliations. Member bridges report they have been attending more meetings and events of local groups than non-bridges with no group affiliation.

The differences between sub-categories that disappear when we separate out the four types are: extroversion, trust, sense of belonging, computer interest, political interest, using the Internet for political purposes, and involvement in local issues since online. The significant differences that persist even when we divide bridges and non-bridges into four subcategories are on being informed,

activism, community attachment, participation, collective efficacy and its dimensions, and involvement since going online.

Many of the differences we find between the main categories of bridges and non-bridges are not particularly surprising. We know from previous studies that organizational affiliation, leadership, community involvement and collective efficacy are generally associated with higher socio-economic status.

What this paper has tried to contribute, having presented the evidence for and characteristics of weak ties across groups, is the link to Internet use and effects. In particular, bridges report using the Internet for political purposes (i.e., finding political information, discussing politics online, exchanging email with a government official). Compared to non-bridges, bridges are more involved in the local community, in local issues of interest and more connected with local people since getting on the Internet.

Further, we compared bridges who are heavy Internet users (more than an hour and a half per day), bridges who are light Internet users (less than an hour and a half a day), non-bridges who are heavy users, and non-bridges who are light users. Heavy Internet users with bridging ties have higher social engagement, greater use of the Internet for social purposes, and have been attending more local meetings and events since going online than non-bridges who use the Internet heavily. This finding emphasizes the social nature of Internet use by bridges. It suggests that, in the hands of bridging individuals, the Internet is a tool for maintaining relations and increasing face-to-face interaction, both of which help to build bonding and bridging types of social capital in communities. As noted at the outset, social capital enables members of a community to act collectively to facilitate social and economic development and solve common problems. When we consider community collective efficacy as a measure of the potential for collective action, higher collective efficacy among bridges suggests they are predisposed to facilitate such activity, as necessary. As Bandura (2002) noted, if people believe that they can achieve desired results by using communication technologies, they will use those tools to help make their voices heard and play an active part in meaningful change. The findings presented here suggest that bridges act on their higher sense of collective efficacy to educate and organize and to facilitate change by all means possible, including the Internet.

In future research we will investigate how leader and/or member bridges compare with the concept of local versus cosmopolitan influential community residents (Merton, 1968). We would expect leader bridges to have traits of both, but for their Internet use to vary according to their local versus cosmopolitan orientation. That is, cosmopolitan influentials would not only keep up with local news, they would also follow closely national and global events, politics and social concerns. An investigation of email use might show similar patterns whereby online communication by local influentials is predominantly with local social circles and organizations. Local influentials are likely to have stronger

attachment to the community than cosmopolitans who are more willing to move out of the area. Nonetheless, cosmopolitans are associated in diffusion theory and research with early adoption and spread of innovation (such as computer networking). The combination of both cosmopolitans and locals – which we have in the university town of Blacksburg and the surrounding rural farming area of Montgomery County – may be the ideal combination for innovation and participation.

We will also examine Putnam's differentiation between the community roles of *machers* versus *schmoozers* in future research. *Machers* is a Yiddish term for people who spend a lot of time in formal organizations and work to bring about change. This comes closest to our construct of 'Activism.' *Machers* are the classic good citizens: they keep up with current events, attend church and club meetings, volunteer, give to charity, work on community projects, read the newspaper, give speeches, follow politics, and attend local meetings (p. 93). *Schmoozers* are more involved in the social side of community life. Their engagement is less formal and goal-oriented than *machers*, more like our constructs of 'Social Engagement' and 'Belonging'. *Schmoozers'* socializing is with friends and family, rather than with influential people and organizations in the community. According to Putnam, distinctions between *machers* (formal community) and *schmoozers* (informal social engagement) reflect differences in social standing, life cycle, and community attachment. *Machers* tend to be better educated and to have higher incomes, whereas informal social involvement is common at all levels in the social hierarchy.

Finally, future research should include a re-examination of Brieger's (1974) conception of the duality of persons and groups. Brieger draws on Simmel's notion of duality to define the value of a tie between any two groups as the number of persons who belong to both groups. Clearly, a weak tie would be one where two groups were linked through only one person. His membership network analysis may prove very fruitful in examining weak ties versus strong ties across community groups and differences in effects of communication and information sharing.

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