RUNNING HEAD: Research and the Internet

Social Psychological Research and the Internet:

The Promise and Peril of a New Methodological Frontier

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The Internet has expanded people's ability to connect with others. People can connect to those with whom they have existing social ties, as well as make new connections with others who may share similar interests and ideologies. These connections can be achieved through a variety of means and with varying levels of social involvement, such as viewing or creating personal web pages, posting to online discussion forums, and communicating via e-mail or instant messaging. These unprecedented advances in communication and the proliferation of Internet-based technologies have led many social psychologists to take advantage of the power of the Internet in their research.

In a similar vein, access to large numbers of potential research participants as well as increased access to special populations have lured many to explore the potential of collecting data to test social psychological hypotheses using web-based samples. The Internet allows for generalization beyond the college student subject pool, while maintaining the virtues of a capacity for experimental manipulation, audio and visual presentation of stimuli, live and spontaneous interaction between participants, and higher degrees of complexity than other methods of data collection typically used outside of the traditional social psychological laboratory. There are many reasons to be excited about the methodological possibilities of using the Internet as a medium for social psychological research.

Taken together, the range of possibilities for conducting research is expanding at approximately the same rate that information technology expands. Just as there are more ways to obtain information and data in general in an escalating information age, there is also an increasing number of ways to obtain social psychological data. The goal of this chapter is to

provide a review of how social psychologists are currently using the web and to present some specific examples of translational, novel, and phenomenological Internet research. We also review the advantages and disadvantages of web-based research, with special attention to issues of sampling and data quality that need to be taken into account when one leaves the familiarity of collecting admittedly biased data from college student subject pools, and turns instead to the less familiar but potentially richer frontier of web-based research.

A. How the Web is Used as a Methodological Tool

To gain a better understanding of the web as a methodological tool, we reviewed a sample of studies that used the Internet to test social psychological hypotheses. To accomplish this end, we invited subscribers to the Society for Personality and Social Psychology Listserv to send us references or copies of papers that reported on research that used the Internet as a data collection tool. From this initial request, we received a total pool of 106 papers that dealt broadly with information technology and psychology. From this pool we obtained a sample of 60 studies (taken from 43 papers) that met our review criteria that the study reported on original research and used the Internet in their data collection effort. Although this sample undoubtedly represents only a portion of the number of social psychological studies that have used the web, like any other study that uses sampling rather than examining every member of a given population, this approach provided a basis for making estimates and inferences about the population of social psychological studies that have used the Internet.

Based on this sample of studies, the majority of web-based social psychological research, like the field overall, use experimental designs (62%). Correlational field designs or studies were the next most frequent form of web-based social psychological research (33%). The remaining studies in our sample (5%) were qualitative in approach.

Despite turning to the Internet for data collection, a large number of these studies nonetheless relied on college student samples (38%). Studies that sampled college students typically used e-mail to invite students to participate. A similarly large percentage of studies used opt-in samples, that is, people who self-selected to participate in the study (30%). Participants in these studies may have stumbled across the study when searching the web for information about personality or psychology in general, or they responded to web postings that invited people to come to the study website. Some researchers (20%) made use of the capacity of the web to identify groups of people with specific characteristics, and recruited participation from people within these specialized groups (e.g., members of a women-only chat room). Twelve percent of the studies in our sample accessed a true random sample of participants.

No single substantive area of inquiry within social psychology appears to have "led the charge" in turning to the Internet for data collection. Instead, researchers interested in a broad array of substantive questions have tested hypotheses using web-based methods, including research on personality, person perception, persuasion, leadership, and much more. However, virtually all of the studies we reviewed could be classified as taking either a translational, novel, or phenomenological approach to their research. Each of these approaches, along with concrete examples, is described in more detail below.

1. Translational web use. Many researchers adapt materials developed for offline use for use instead on the Internet; in other words, they take a translational approach to using the web for social psychological research. Forty-five percent of the studies we reviewed took a translational approach. For example, Srivastava, John, Gosling, and Potter (2003) used the Internet to test the respective predictions of biological and contextualist models of personality development. According to the biological model, personality should become relatively stable by adulthood

(e.g., age 30 and over). The contextualist model, in contrast, predicts that people's life circumstances will continue to influence their personality throughout the lifespan and therefore, changes should be observed in personality regardless of age.

To test these competing hypotheses, Srivastava et al. (2003) adapted a version of the Big Five Inventory for use on the Internet. Potential respondents found the website where the inventory was posted, for example, through various Internet search engines with search terms like "personality tests, " and this website was listed on a popular search engine as a "Pick of the week." In total, 132,515 people completed the inventory, with a range in age from 21 to 60. Although cross-sectional rather than longitudinal in design, the results revealed that there is considerable variability over different age cohorts, including those well past the age of thirty, rather than a relatively common and stable distribution of people across characteristics on the Big Five from age 30-upnward. Therefore, the results were more consistent with the contextualist than the biological view of personality development.

Other researchers have taken similar translational approaches to how they use the Internet to facilitate research. For example, various other personality inventories have also been converted from paper-and-pencil measures to web-based forms (e.g., Foster, Campbell, and Twenge, in press), and Milgram's (1977) lost letter technique has been successfully adapted for use on the Internet using "lost" e-mails (Stern & Faber, 1997). The lost letter technique allows researchers to assess general attitudes toward various issues or issue stands by sending messages ostensibly meant for political organizations to naïve subjects instead. How many of these "lost" e-mails are subsequently forwarded to the presumed correct address can be used as a measure of the degree of implicit support for the issue addressed in the e-mail (e.g., Stern & Faber, 1997). Other researchers have converted experiments or experimental stimulus materials that were

originally designed for computer presentation in the laboratory for online use (e.g., Guèguen and Jacob, 2001; Nosek, Banaji, & Greenwald, 2002). In short, personality and social psychologists have found it relatively easy to translate preexisting methods of research for use on the Internet. Other researchers, however, have found that the Internet affords some unique opportunities to study social psychological phenomena and have developed more novel approaches to data collection.

2. Novel web use. Approximately 8% of the studies we reviewed reported on research that used novel methods of data collection. For example, Rentfrow and Gosling (2003, Study 4) made creative use of information freely available on the Internet to inform social psychological theory. Specifically, they explored the underlying dimensions of music preferences by coding people's web-based music libraries. Many people post their music libraries on specific websites set up for the purpose of sharing and downloading of music (e.g., Audiogalaxy.com, Morpheus.com, Napster.com). Rentfrow and Gosling (2003) obtained a random sample of users' music libraries by selecting 10 users' libraries from each state in the U.S., to yield a total sample size of 500. Each user's music preferences were classified as a function of the number of songs they had within different music genres. These data were then used to confirm, with considerable success, the underlying pattern of dimensionality in music preferences that they had developed based on college students' responses to questionnaires (Rentfrow & Gosling, 2003, Study 2).

Other researchers have made serendipitous use of spontaneous behavior on web discussion boards to study questions of social psychological interest. For example, most, if not all, previous work on rumor transmission involved studying how participants passed along experimenter-created rumors in the lab, a method frequently criticized for being low in realism (Bordia, 1996). Bordia and Rosnow (1998), in contrast, examined rumor transmission by

studying postings on an electronic bulletin board after a rumor surfaced that a specific Internet provider was tapping into the hard drives of its subscribers. The researchers coded the content of these postings using categories developed from theories of rumor transmission (e.g., statements of apprehension, disbelief, or interrogation) and examined the prevalence of these statements over time and across postings on the bulletin board. The Internet discussion over several days of this real rumor, of genuine concern to the participants on the discussion board, provided Bordia and Rosnow with a novel and unobtrusive way to gain insight into the dynamics of rumor transmission. The results of their analysis indicated that patterns of rumor transmission in this field setting were consistent with existing theories of rumor transmission, and that patterns of rumor transmission in this computer-mediated context were quite similar to those found in face-to-face rumor transmission. These results suggest that existing models of social interaction developed in face-to-face and in-person encounters replicated on the web, and therefore provided some validation of the web as a methodological platform for social psychological research.

Other novel uses of the Internet to study social psychological questions included a study that used German online auctions to study ethnic discrimination. Sellers with Turkish names (a minority group kin Germany) reportedly took longer to receive winning bids than did those with German names (Shohat & Musch, in press). Another novel approach involved posting different "problems" on hate-group discussion lists to examine whether participants advocated different levels of violence as a function of problem content (Glaser, Dixit, & Green, 2002). Both studies found ways to use the web as a novel solution to the problem that demand characteristics can introduce into the study of phenomena like ethnic discrimination.

The vast information and communication resources available via the Internet open many new possibilities and we suspect that the examples of novel uses of the web discussed here have

only begun to scratch the surface of the creative potential of the web for future research on social psychological questions. Translational and novel uses of the web for research, however, tend to use the Internet more as a means to an end, rather than as an end in itself. Research that takes a phenomenological approach focuses instead on the social dynamics of interaction on the web as an interesting focus of research in itself.

3. Phenomenological approaches. The largest percentage of articles we reviewed (47%) took a phenomenological perspective in their research. Unlike translational and novel approaches that use the web as a method to study questions that are not substantively web-bound (e.g., people had music preferences before web-sharing of music became available), phenomenological studies extend social psychological theory and research by exploring the potentially unique impact of web-based social interaction on people's thoughts, feelings, and behavior.

The Internet offers individuals unprecedented access to a wide array of information and new channels of communication. People can connect with friends and family as well as strangers with similar interests. On the Internet, individuals are able to explore aspects of themselves they might otherwise be reluctant to share with others, and can do so in relative anonymity and in the safety of their own homes (McKenna & Bargh, 1998, 2000). They are able to meet and interact on a regular basis with others whom they may have never met in person. Moreover, this communication can take place instantaneously (e.g., via instant messaging) or over more protracted periods of time (e.g., via posts to online message boards or newsgroups). As tenuous as some of these social relationships may seem, they are often very real and of great importance to those involved in them (McKenna & Green, 2002; McKenna, Green, & Gleason, 2002).

The unique features of the Internet as a communication medium can affect psychological functioning in any number of complex ways (McKenna & Bargh, 2000; Tyler, 2002). Phenomenological research strives to make sense of this complexity by examining the interface between web technology and psychology. Many of the general areas of inquiry of web-based research are those that have always interested social psychologists, such as persuasion (e.g., Guandagno & Cialdini, 2002), relationship formation (McKenna, et al., 2002), and group dynamics (McKenna & Green, 2002; Williams, et al., 2002). Researchers in each of these disciplinary areas are exploring the degree that web-based persuasive appeals, relationships, and group dynamics differ from face-to-face and in-person social interaction.

One example of the phenomenological approach is work conducted by Kraut and colleagues on the relationship between Internet use and psychological well being (Kraut, et al., 1998; 2002). Because the Internet is a social medium, it might be expected that Internet use enhances connections with others and therefore increases psychological well-being. However, because time spent on the Internet is time that could otherwise be used for face-to-face and in-person social encounters instead, it may increase people's sense of social isolation rather than promote a sense of social connection. In an initial study of Internet use and psychological well being (Kraut et al., 1998), the Internet-use habits were tracked in 93 households (participants were provided Internet access as part of the study). This initial study revealed that higher levels of Internet use (based on server logs of hours spent online, volume of e-mail, and number of websites visited per week) were related to decreased social involvement, increased loneliness, and increased reported depressive symptoms relative to pre-trial levels. In a subsequent follow-up of the same people about two years later (Kraut et al., 2002; Study 1), many of the negative effects people experienced when initially getting Internet access had dissipated. This follow-up

survey revealed that higher levels of Internet use were associated with a significant decrease in depressive symptoms and no longer had any effect on reported loneliness. In short, these results suggest even if there are short-term negative effects of gaining access to the web, over time increased Internet use facilitates people's degree of social support and therefore their mental health.

Another example of the phenomenological approach to Internet-based research is McKenna and Bargh's (1998) program of research designed to explore what seems to be the relatively unique capacity of the web to allow people to try out or develop new or less well-accepted aspects of their identity. The Internet provides a non-threatening forum for people to explore aspects of themselves that others in their social circle might find objectionable. People can form social networks with others in cyberspace who share these same attributes. Participation in these online groups can help individuals come to terms with aspects of themselves that they are reluctant to share with others in their current social environment.

For example, McKenna and Bargh (1998) contacted samples of people who were frequent posters on forums for those with stigmatized sexual identities (e.g., alt.homosexual, alt.bondage; Study 2) or political ideologies (e.g., alt.skinheads, misc.activism.militia; Study 3). Lurkers, that is, individuals who read but do not post messages to newsgroups, were recruited by posting invitations for participation in the study in these same forums. Consistent with predictions, participation in these "virtual" groups facilitated people's coming to terms with their marginalized identities. Participation led to an increased sense of the importance of the person's marginal identity, and this increased importance led to increased self-acceptance and greater likelihood of revealing the concealed identity to friends and family.

Cyberostracism, that is, being ignored or excluded from various forms of online interaction, is another example of a web-based phenomenon that is of interest to researchers. In one study of cyberostracism (Williams, et al., 2002, Study 1), participants were recruited through posting notices around the campus of the University of New South Whales, by sending notices about the experiment to social psychology instructors at universities and by posting links to the experiment on various social psychology websites. After responding to a preliminary questionnaire, participants were led to believe that they were playing a game of virtual catch with two other online research participants. In actuality, participants interacted with "players" who were computer generated and programmed to vary how often they gave the "ball" to the research participant (five times in the inclusion condition and only one time in the ostracism condition). Higher levels of exclusion from the game led participants to report lower levels of mood, self-esteem, and feelings of belongingness.

Similar results were found when cyberostracism was studied in the context of Internet chat rooms in which confederates either included or excluded targeted participants during computer-mediated communication (Williams et al., 2002, Studies 2-4). Other results indicated that people are more likely to react aggressively when ostracized online than in face-to-face encounters (Williams et al., 2002, Study 4).

In sum, the Internet is used by an increasing number of social psychologists to expand our understanding of existing social psychological phenomena and to begin to explore the potentially unique impact of computer-mediated social interaction on people's thoughts, feelings, and behavior. As a methodological approach, it is probably already apparent that the Internet has advantages and disadvantages, the specifics of which we turn our attention to next.

B. Advantages of Web-based Research

There are a number of advantages of turning to the Internet to conduct social psychological research. Quite simply, Internet-based research has the capacity to compensate for many of the disadvantages of lab-based experimentation with college student samples, as well as to compensate for some of the disadvantages of some of the other methods for obtaining more representative samples, such as telephone surveys. Relative to these other approaches, advantages of Internet-based research generally include (a) increased efficiency, (b) increased access to people with special characteristics, (c) larger and more diverse samples more generally, and usually at lower cost than a telephone survey, and (d) increased data quality relative to both telephone and paper modes of data collection.

1. Efficiency. Internet research has a number of features that can save time and money. With only a modest investment in learning some basic programming, collecting data can be as simple as designing a form and copying it to a server. It is also relatively easy to program a study so that data are automatically entered into a spreadsheet or data file, avoiding manual data entry (see Birnbaum, 2000, 2001; Fraley, in press, for excellent "how to" resources). Collecting data on the web is a paperless process and, therefore, avoids costs associated with paper and copying of paper questionnaires. A variety of mail merge programs allows one to field a survey to thousands of potential participants with no more than a keystroke. Therefore, labor costs in the form of either time or research assistant funding are clearly minimal, and because participants need not be run individually or even in small groups, the time required for data collection is relatively independent of sample size.

2. Access to underrepresented groups. In addition to the benefit of increased efficiency, the web also facilitates access to people who have characteristics that are relatively low in

incidence in the general population. Social psychologists are sometimes interested in studying specific groups of people who are inadequately represented in college student subject pools; turning to the Internet can solve the problem of both finding and accessing these kinds of specialized samples. For example, social psychologists have long been interested in trying to account for the psychology of evil, or the psychological factors that are likely to lead to actions of violence toward out groups (e.g., Newman & Erber, 2002; Staub, 1989). However, the typical college undergraduate is unlikely to be so ethnocentric as to be a member of a hate group, much less admit to being so. Similarly, most people are unlikely to feel comfortable advocating intergroup violence either in a psychology lab or in a telephone interview even if it is something they were to otherwise advocate (cf. Evans, Garcia, Garcia, & Baron, 2003). In short, studying intergroup hatred and related phenomena in the lab is plagued with problems associated with demand characteristics, social desirability pressures, and possible psychological reactance, each of which can undermine the validity of results.

Given that hundreds of hate group-sponsored chat rooms, archives, websites, and more have popped up on the Internet (Franklin, 2000; Klanwatch, 1998), and people seem to feel relatively free to express their racist views using this medium, new avenues for studying overt racist beliefs and support for intergroup violence have emerged. In one study, an interviewer acted as a newcomer to a White supremacist online group and posed a problem, such as "my sister is talking about getting married to a Black man," or "I found out this Black couple is moving next door to me" (prompts varied as a function of threat and threat type in a 3 X 3 factorial design; Glaser, et al., 2002). Of interest was the degree of advocated violence that different prompts elicited. Results supported the notion that extremists are more likely to

advocate violence in response to threats to a group identity than to material or economic interests.

Other researchers have similarly used the Internet to obtain access to difficult-to-reach and empirically underrepresented populations such as gays, lesbians, and bisexuals (e.g., Mathy, Schillace, Coleman, & Berquist, 2002), people with hearing loss (Cummings, Sproull, & Kiesler, 2002), and pet owners of a wide range of different animals (Gosling & Bonnenburg, 1998). Given the huge number of special interest, news, support, and chat groups that have emerged online, any number of heretofore difficult-to-find populations are suddenly more accessible.

3. Access to larger and more diverse samples. In addition to providing access to heretofore difficult-to-reach groups of people, the Internet also has the advantage of providing social psychological researchers with access to large, diverse, and affordable samples of potential research participants more generally. Even if the practice of sampling from university subject pools is widely accepted, building a science on the foundation of this narrow of a database is less than ideal (see Sears, 1986 for a review). Subject pool participants are disproportionately white, female, young, and financially secure relative to the population at large (Birnbaum, in press). Not only do participant characteristics correspond poorly to typical populations of interest to researchers (e.g., people in general), not even college students have an equal probability of being in university subject pools.

Although social psychological research can be argued to be the study of general social processes that are unlikely to vary as a function of demographic characteristics like age, income, or education, there has not been sufficient research to empirically establish the credibility of this claim. Therefore, the large numbers of “real people” that can be accessed on the web potentially

allows social psychologists to better address and assess the generalizability of their research findings.

There are, of course, other ways to get more representative samples to test social psychological hypotheses. For example, social psychologists have turned to secondary analysis of archived large-scale telephone surveys or in-person interviews, such as the National Election Study or General Social Survey data (e.g., Crandall, 1995; Skitka, Mullen, Griffin, Hutchinson, & Chamberlin, 2002), or contracted independent telephone surveys that use random digit dialing to get probability samples (e.g., Lind, Tyler, & Huo, 1997; Skitka, 1999, 2002a). Just as the web has advantages over lab-based research on college undergraduates, it also has advantages over these alternative strategies as well.

For example, unlike telephone surveys that are limited to audio stimulus presentation and response, one can use text, pictures, and movies to present stimuli via the web. Studies conducted on the web are also likely to be lower in cognitive load and respondent burden than those conducted over the phone. Responding to questions over the phone requires participants to (a) understand and interpret the question; (b) search memory for relevant thoughts or feelings; (c) integrate different thoughts and feelings into a coherent judgment; (d) recall the response alternatives; and finally (e) map their response unto one of the provided response alternatives (Tourangeau & Rasinski, 1988; see also Zaller, 1992). Not surprisingly given the number of steps involved and the burden on people's working memory, telephone survey responses are vulnerable to a number of different biases based on question framing, wording, and order effects (e.g., Schuman, Presser, & Ludwig, 1981; Strack, Schwarz, & Wanke, 1991; for a review see Schwarz, Groves, & Schuman, 1998). Recent research indicates that collecting data on the web avoids some of these data quality problems. Specifically, web-based surveys are lower in

measurement error, survey satisficing, and social desirability bias than surveys conducted over the phone or via intercom (Chang & Krosnick, 2003a, 2003b). Other research reveals that computerized data presentation and response has similar advantages relative to either paper questionnaires or face-to-face interviewing (Richman, Kiesler, Weisband, & Drasgow, 1999).

People might also be more likely to persist rather than abandon participation in studies that involve a lot of "if then" branching conducted on the web than via paper questionnaires, because branching can be programmed to occur entirely outside of the awareness of research participants. Moreover, participants are generally volunteers, so data quality may be improved because their motivation for participating may be better than that of college students who mindlessly participate as a means to other ends. People might also respond more naturally when they participate in studies in familiar contexts (e.g., their homes) than they do when they participate in the unfamiliar and often sterile context of the social psychology laboratory.

C. Disadvantages of Web-based Research

Although using the Internet for research has many advantages, it also has some limitations. Potential disadvantages of the Internet for social psychological research include that (a) web-users differ from non-users in a number of ways that may be important; (b) participants are often recruited using non-probability sampling and therefore, most web-samples are not particularly representative of even web-users; (c) people are less likely to positively respond to invitations to participate in web than other kinds of research; (d) the high anonymity and low accountability of the web, relative to other methods of data collection, may introduce a number of problems; (e) there are various technical constraints on both stimulus presentation and response; (f) there may be increased error due to uncontrolled features of participants' context;

and finally, (g) there are some ethical considerations and constraints that limit the methodological options for research on the web.

1. Non-representative samples. One serious limitation of Internet data collection, at least for researchers who take either a novel or translational, rather than phenomenological approach to using the web for research, is sample representativeness. Although many are likely to feel that Internet samples represent a leap forward over the heavy reliance of social psychologists on college student samples, social psychologists may be simply replacing one flawed sampling approach with another when they turn to convenience samples of web-users. People who use the Internet are not representative of the general population, nor are online special interest groups representative of their specific groups (e.g., disabled people who are online differ in important ways from disabled people who are not online, Lenhart et al., 2003). Even if web-users were representative of either the general or a given specific population, or if one is only interested in studying web-based phenomena, there is no database from which one can draw probability samples of potential participants.

To date, there has been relatively little research that has directly examined just how well social psychological findings generalize with more representative samples of the mass public. However, very recent research has found that a number of presumed social psychological truisms in fact have limited generalizability outside of the lab. For example, Skitka (2002b) tested whether the classic Ross et al. (1977) "quiz game" study replicated with a large representative national sample, as well as large oversamples of Blacks, Hispanics, and Asians. Participants were given a description of a game that involved two volunteers, one of whom was randomly assigned the role of a "Quizmaster" and another who was assigned the role of a "Contestant." The Quizmaster was asked to generate five questions to pose to the Contestant, with the only

condition being that Quizmaster had to know the correct answer to all five questions. The Quizmaster subsequently posed his questions to the Contestant, who performed relatively poorly (he answered only one question correctly). Research participants were then asked to evaluate both the Quizmaster's and Contestants' intelligence. People demonstrate evidence of making the fundamental attribution error—that is, the tendency to neglect to take into account possible situational explanations for behavior, in favor of dispositional causes – if they fail to take into account the Contestant's relative disadvantage because of the random assignment to roles, and evaluate him (or her) as less intelligent than the Quizmaster.

Blacks, Hispanics, and Asian Americans showed virtually no evidence of making the fundamental attribution error. Moreover, all differences between Whites and the other groups of participants were fully explained by differences in income and political orientation. All groups rated the Contestant as about average in intelligence (a rational response), however, the white, wealthy and conservative tended to rate the Quizmaster as above average in intelligence. Although more research will be needed to see if similar limits are revealed on other tests of the generalizability of the tendency to make the fundamental attribution error, these results are at least suggestive that social psychologists should be cautious about assuming that their findings will in fact generalize well to populations besides college students.

Many researchers, however, are likely to believe that (a) getting larger samples of more diverse people is better than the alternative of using college student samples, and (b) the problem of lack of representativeness of those with web access is likely to resolve itself. It is therefore important to explore these assumptions.

Sampling from a biased portion of the population yields a biased sample, no matter how large of a sample one draws. Because web-users are different in a number of ways from non-

web-users, any sample drawn from only those who use the Internet will yield biased estimates and inferences about populations generally of greater interest (e.g., people in general). Moreover, because there is not a good sampling frame from which one can take a random draw of web-users, most web samples do not even allow one to make accurate estimates or statistical inferences about web-users. Even web-users do not have an equal probability of being included in any given web sample given the methods most researchers currently use to sample this population. Confidence intervals and inferential statistics will therefore all be misleading estimates because they inevitably are based on a non-probability sample of web-users (see Couper, 2000 for a detailed review).

Are web samples in fact non-representative of the general population? Based on national representative telephone surveys that explored differences between web-users and non-users, web-users are younger, wealthier, and higher in education than non-users (Lenhart et al, 2003). Web-users are also higher in trust of others, have broader social networks, and generally believe that people are more fair than are non-users (Lenhart et al, 2003). Opt-in samples of web-users are also more politically knowledgeable and engaged than are random samples of the population (Chang & Krosnick, 2003a). Other research reveals that, although both college students and Internet samples are both prone to certain decision-making biases, there are nonetheless differences between them in degree (Birnbaum, 1999). Both college student and Internet samples deviated from normative models of decision-making, but student samples were generally more biased than Internet samples (Birnbaum, 1999).

One source of information about potential psychological differences between people who have web access versus those who do not is data collected using the Knowledge Networks (KN) panel. KN has blended the advantages of the web as a vehicle for research with the benefits of

using random-digit-dialing (RDD) to obtain a representative probability sample of the U.S. public. They contact potential panelists using RDD telephone survey methods. Those who agree to participate on the panel receive a free device to access the web (e.g., a WebTV) and a free web connection in exchange for their household members' participation in occasional surveys. Each household member ages thirteen and above gets his or her own password protected e-mail account. Panelists receive e-mails with embedded links to surveys about once every week or two. Panel characteristics closely match those from the U.S. census, and because it is a true probability sample, sample weights can be calculated to correct for sampling error. About 50% of KN's panelists had no prior access to the web before joining the panel (see http://www.knowledgenetworks.com/ganp for more details).

A number of social psychological researchers have conducted studies using the KN Panel (e.g., Chang & Krosnick, 2003a; Lerner, Gonzalez, Small, & Fischhoff, 2003; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002), the first author included (e.g., Skitka, 2002a, 2002b; Skitka & Mullen, 2002; Skitka, et al., 2002, Study 4). Analysis of some the data available to us reveals that there are some potentially important social psychological differences between people who were web-users versus non-web-users before they were asked to join the Knowledge Networks panel. For example, people without home computers and independent web access had different reactions than those with independent web access to the September 11, 2001 terrorist attacks on the World Trade Center and the Pentagon. Panelists who had been non-users were higher in perceived threat; less supportive of civil liberties for Arab Americans, Muslims, and first generation immigrants; higher in immediate post-attack anger, as well as anger about the attacks four months later; and were more authoritarian than those with home computers and previous access to the Internet. Interestingly, non-users were nonetheless more

likely to feel that to some degree, the U.S. brought the attacks upon itself, and that the perpetrators of the attacks were caught up in circumstances that were beyond their personal control (Skitka, 2003a; for more substantive results see Skitka, Bauman, & Mullen, in press).

Other data revealed differences between KN members who had been web-users versus those who were non-users before joining the panel in reactions to the Iraq War as well. Non-users reported that they felt higher levels of fear, anger, and sadness than users when thinking about the war with Iraq; they were also less likely to report that the war brought to mind thoughts about their own death (self-reported mortality salience). Although non-users were less tolerant of dissent and more authoritarian than web-users, non-users were nonetheless also more opposed to the war than were users (Skitka, 2003b).

Taken together, these results indicate that there are affective, attitudinal, and attributional differences between people who are likely to have web access versus those who are not. Although some differences between web-users and non-users disappear when differences in education, income, and age are controlled in both our data and others', some differences persist even after controlling for these differences (see also Flemming & Sonner, 1999; Taylor, 2000).

Many researchers are likely to believe that the problem of non-representativeness of web-users is a problem that will solve itself, and that it will not be long before the penetration of the Internet into people's lives across all strata of society will be as complete as the penetration of the telephone. However, recent research indicates that the non-coverage area of the Internet may be expanding, rather than retreating. Unlike other technological advances (e.g., the telephone, television), some people have been opting out of the web after they have access to it. Forty-two percent of Americans report that they do not use the Internet at all; 17% of these are net dropouts, that is, former users who have abandoned using the web (Lenhart et al., 2003). The

number of net dropouts has increased substantially between 2000 and 2002, suggesting that the growth of web use has not only slowed, but may be reversing (Lenhart et al., 2003). Therefore, the Internet may not increase in use to the point that one can obtain truly representative samples of the population on the web without using something like Knowledge Networks or their strategies to get representative samples.

It is interesting to note that similar trends to "drop out" have not existed with most other forms of communication technology. Once people get radios, televisions, or telephones, they rarely then decide to no longer use these forms of technology. However, large numbers of people have abandoned the Internet. Why people drop out from the Internet is a question that might be of interest to explore in future phenomenological research.

2. Non-response. Non-coverage error refers to the sampling error introduced because not everyone has access to the web; non-response error refers to the fact that not everyone recruited to participate in a given study will choose to do so. Non-response error increases as the number of non-respondents increases, and as the differences between respondents and non-respondents grows, even if response rate is held constant (Couper, 2000). Non-response can be difficult to calculate for web studies that post with an open invitation for participation, because the number of people who could potentially participate but chose not to is unknown. Estimates of response rates of web users to e-mail solicitation is about 10%, and between 20-25% in response to specifically targeted banner ads (see Couper, 2000 for a review).

Comparisons of traditional versus e-mail methods of recruitment indicate that response rates are lower in response to e-mail solicitations (27%) than traditional mail for the same study (42%; Kwak & Radler, 2000; see also Couper, Blair, & Triplett, 1999 and Schafer & Dillman, 1998 for reviews). Although a number of explanations might account for these differences in

response rates (e.g., technical difficulties accessing web surveys; concerns about confidentiality on the web), it seems likely that people are already overwhelmed with requests for their attention on the web. SPAM, or unsolicited e-mail, accounted for 30% of all e-mail in 2002, and is expected to account for more than 50% of all e-mail by the middle of 2003 (Legard, 2002). It seems likely that unsolicited e-mail will have the same negative impact on willingness to participate in web surveys as the increase in unsolicited phone calls has had on telephone survey research.

3. Technical constraints. Although the Internet affords greater flexibility in presentation of stimuli than, for example, paper questionnaires or telephone surveys, one nonetheless cannot deliver stimuli that can be touched, tasted, or smelled via the web. Moreover, although one can deliver audio or visual stimuli, without special equipment one cannot receive audio or visual responses from research participants. Although virtual interaction is possible in real time, for example, in chat-rooms or with instant messaging, face-to-face social interaction with all its non-verbal cues and nuance, is not currently possible on the web without adding specialized equipment.

There are also potential concerns about both precision and control. People's ability to load web pages, and how quickly they do so, vary dramatically as a function of (a) whether they access the Internet via modem, cable, or a wireless connection; (b) the browser they use; (c) features of the device used to connect to the web (e.g., RAM, processing speed); and (d) monitor refresh rates. That said, some researchers have found that they can easily replicate previously established laboratory effects, and in particular effects related to cognitive or visual processing, on the web. For example, when using relatively homogeneous populations of college students as subjects, McGraw and Wong (1992) replicated the lab finding of a right-visual-field advantage

on the web. Other researchers have also had very good success replicating a number of cognitive effects such as Stroop task interference (Krantz & Dalal, 2000; McGraw, Tew, & Williams, 2000; Musch & Reips, 2000). However, because monitor refresh rates are often slower or similar in speed to the response latencies researchers are trying to detect, the Internet may not be optimal for research that is dependent on detecting reactions to small differences in exposure, or small differences in response time.

4. Context. In addition to error variance introduced through software and hardware variation across respondents, the experimental context is also free to vary in most Internet research, whereas it is generally kept constant in laboratory studies. Some people may participate in a given web study in the presence of others, whereas others will participate while alone; some participants may be highly distracted by other features of the environment that compete for their attention, whereas others will have little in the way of distraction, and so on. How big of a potential problem this might be probably depends on the phenomena being studied.

5. Anonymity. A related issue is that social interaction and communication on the web are often highly if not completely anonymous: People can and do take on alternative identities or make efforts to explicitly protect their offline from their online identity. People can easily set up free e-mail accounts with false identities and therefore there is often no way to establish the veracity of any given web identity. For example, Mathy et al. (2002) report that it is not unusual for males to pose as lesbians interested in "cybersex" (i.e., sexual gratification via role play in cyberspace) in chat rooms for gay and bisexual women. Although phenomenological researchers are likely to see this as an interesting feature of web-based communication and one worthy of study, the tendency to take on false identities on the web poses a problem for those whose research is either taking a translational or novel approach. Mathy et al. (2002) have developed

some interesting methods for outing these kinds of imposters, but the apparent frequency of adopting different identities on the web may present a problem for these latter forms of research.

Higher levels of anonymity are also likely to lead to diminished levels of self-awareness and individuality (i.e., deindividuation), that in turn can lead to reduced self-regulation of behavior (e.g., Deiner, 1980; Zimbardo, 1970). Consistent with this notion, a considerable amount of research has revealed that people are more likely to respond with hostile and aggressive responses in computer-mediated than face-to-face interactions (Culnan & Markus, 1987; Dubrovsky, Kielser & Sethna, 1991; Kiesler, Siegal & McGuire, 1984; Siegal, Dubrovsky, Kiesler & McGuire, 1986, Williams et al., 2002).

Increased anonymity is also associated with lower levels of accountability (see Lerner & Tetlock, 1999 for a review) that in turn is likely to have implications for the degree of integrative complexity people bring to bear to anything they do on the web. Considerable research has found that people exhibit more bias when they are low rather than high in social accountability for their judgments, decisions, or behaviors. Low levels of accountability are associated with stronger primacy effects in impression formation (Tetlock, 1983), an increased tendency to make the fundamental attribution error (Tetlock, 1985), stronger over-confidence effects (Tetlock & Kim, 1987), as well as greater persistence due to "sunk costs" (Simonson & Nye, 1992). Whether positive or negative, the anonymity and low accountability of Internet communication are distinctive and important differences between it and other forms of social interaction, issues that researchers need to take into account when designing and interpreting Internet-based research.

6. Ethical constraints. There is considerable debate about whether behavior on the web is part of the public domain, and therefore whether researchers need to get informed consent before using web postings for research (see Frankel & Siang, 1999 for a review). For example, if one

uses content on the web for analysis, such as music libraries (e.g., Rentfrow & Gosling, 2003), chat room postings (e.g., Bordia & Rosnow, 1998), or reactions to prompts planted in online discussions (e.g., Glaser et al., 2002), should one first obtain the consent of those involved? Although one can argue that information posted on the web is public, one can also argue that exploiting this material for research purposes is a violation of privacy. In fact, there are a number of documented examples where people have felt quite violated when they learned that researchers had studied their online participation in discussion groups or chat rooms without obtaining consent (e.g., Finn & Lavitt, 1994; King, 1996).

The anonymity of Internet communication also makes it difficult to implement the informed consent process. Researchers cannot verify age and mental competency, and the lack of direct contact between researchers and participants makes it difficult for researchers to assess participants' comprehension of risks that may be involved.

Deception is another particularly problematic issue. Deception is considered by many to be ethical if the risks to participants are small, the hypothesis cannot be tested in non-deceptive ways, and participants can be effectively debriefed (Smith & Richardson, 1983). Debriefing, however, is a difficult thing to accomplish online. People are one mouse-click away from closing their participation in a chat room never to return, or similarly may leave an online experiment before reaching the debriefing. Even when researchers have e-mail addresses for participants to whom they could mail a debriefing, there is no way to be sure that they read debriefings sent to them (Azar, 2000).

Moreover, there has been considerable concern that deception may spoil the pond when conducting research with college student subject pools. People may become more distrustful and change their behavior and attitudes about research after learning that they have been deceived

(Kelman, 1967). The risk of spoiling the online pond seems even greater and potentially more disastrous in the impact it could have on public perception of psychological research and those who do it. At a minimum, researchers have a responsibility to consider the potential vulnerability of the populations they study online, the level of intrusiveness of their research, and how best to protect the confidentiality of those they study.

D. Conclusions

Social psychologists have already found many useful ways to employ the Internet to facilitate research. Many of the methods we use in the lab can be easily translated for use on the web, and the Internet also provides opportunities for developing new ways to test social psychological hypotheses. Moreover, because the Internet is a forum for social interaction and one that is increasingly being used by significant portions of society, it is becoming the focus of social psychological study in and of itself.

Our review suggests that the Internet has some potential major benefits, for example, access to larger numbers of people or more specialized populations, than has heretofore been available to most social psychological researchers. However, it also reveals a number of potential areas for concern about the responsible use and interpretation of what we learn from Internet-based social psychological research. For example, 27% of the studies we reviewed involved deception of people on the Internet; of these studies, only slightly more than half reported that they fully debriefed their participants. Although the question of the ethicality of deception on the web for research purposes remains an issue that will have to be worked out both as a field and through the Institutional Review Boards that evaluate our research, it is our opinion that deception and the Internet are not a responsible combination. Not only do deceptive research practices on the web have the potential of creating increased distrust of research and those who

do it, it also has the potential consequence of poisoning what for some has become a safe way to seek out social support and connections with others.

Similarly, turning to the Internet for more diverse or specialized samples of research participants brings into sharper relief the fact that social psychology as a field does not give enough serious attention to the potential limitations of the samples we use for research (see Sears, 1986 for an excellent discussion of this problem). Although there is likely to be more diversity with web- than college-student samples, replacing one biased sample with another does not fully address the fact that social psychological studies are too rarely conducted with representative samples. At a minimum, we should be training both ourselves and our students to think more carefully about questions of sampling, response rates, and related methodological issues and concerns. Clearly, cost has always been a major barrier to doing work with more representative samples. There are, however, creative ways to overcome these kinds of problems, including writing grant proposals to either foundations or Federal agencies for support for one's research, or by making use of a new program that is designed to provide broader opportunities for original data collection with nationally representative samples. Specifically, the National Science Foundation has funded an interesting pilot program for data collection with representative samples using either telephone surveys, or KN's web panel. Researchers can apply for free access to these means of data collection through the Time-sharing Experiments for the Social Sciences (TESS) program (see http://www.experimentcentral.org/tess for more information).

Taken together, the Internet provides greater flexibility for conducting research in social psychology than we had before. Future changes in communication and information technology are likely to continue to expand the ways that we can collect data to test social psychological

hypotheses. Our task will be to try to use these advances in ways that allow us to not only expand the ways that we collect data, but to also advance the methodological rigor and quality of social psychological research. Technological changes in communication also may fundamentally change interpersonal interaction, and the consequences of these changes are an important new arena for social psychologists to explore. The other chapters included in this book are an important step in exploring exactly these questions; each delves into different aspects of the new frontier of web-based social interaction and the consequences of Internet use on people's subsequent thoughts, feelings, and behavior.

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