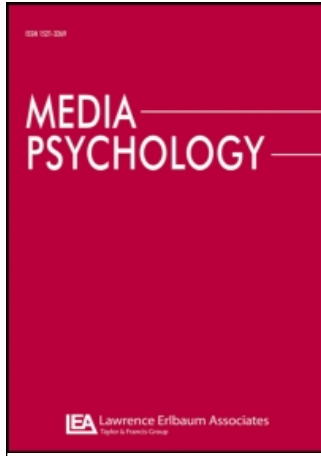


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### Antecedents and Consequences of Online Social Interactions

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# Antecedents and Consequences of Online Social Interactions

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Online social interactions occur in many venues, from e-mail lists and Usenet news-groups to real-time chat-rooms and multiuser domains (MUDs). We conceptualize such online interactions as *intentional social action* and study its individual-level antecedents (attitudes, perceived behavioral control [PBC], anticipated emotions) and social-level antecedents (subjective norms, group norms, social identity). Further, we examine a number of its key behavioral outcome consequences such as changes in offline interactions with family and friends, engagement in neighborhood activities and hobby groups, and the use of such mass media as television, radio, and print publications. An empirical study involving 545 members of 7 different types of high- and low-interactivity online venues not only supports our theoretical framework but uncovers interesting venue- and gender-related differences among participants.

As the Internet becomes widely accepted into the fabric of everyday life alongside such traditional media as the telephone and the television, researchers are beginning to focus more and more on its social functions and influences (e.g., Flanagin & Metzger, 2001; Shah, McLeod, & Yoon, 2001; Spears, Postmes, Lea, & Wolbert, 2002). Through its origin in computer networks, the Internet

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inevitably fosters social interactions, bringing together people for different purposes and in different contexts, whether specific or broad, for education or work, for social support or leisure (McKenna & Bargh, 1999). As in the case of other media, communication plays a critical role in sustaining social interactions on the Internet. Perhaps for this reason, the Internet has been construed as a “non-place realm of computer-supported relationships” by social scientists (Little, 2000, p. 1816).

Online social interactions occur in many different venues, from those that offer relatively little interactivity such as e-mail lists and Usenet newsgroups to those such as real-time online-chat systems and multiuser domains (MUDs), which allow a high degree of interactivity. Moreover, for many participants, such interactions are characterized by a significant degree of social influence in the sense that the individual becomes identified with and emotionally attached to the online group as well as supportive of its norms, values, conventions, and practices.

Even though members can disengage quite easily and participation in such interactions is usually voluntary, researchers have noted that online social interactions influence participants significantly in many ways—from shaping members’ opinions on important issues to influencing their decisions and relationships and occupying considerable amounts of their time (McKenna, Green, & Gleason, 2002). Further, as people spend more time interacting socially online on a regular basis, there is increased interest in understanding how this impacts their offline social interactions, such as those with family and friends in “real life,” their engagement in neighborhood activities and hobby groups, as well as their use of other established media (e.g., Kraut et al., 1998, 2002; UCLA Internet Report, 2003).

Our goal in the research presented here is to build on the growing interest and knowledge regarding online social interactions (e.g., Kraut et al., 2002; McKenna & Bargh, 1999; Spears et al., 2002) by contributing in three ways. First, we posit that such interactions may be construed as *intentional social action* from multiple participants’ standpoints and with mutual understandings in the sense that intentions to participate become “we-intentions”—that is, intentions to act as a group, jointly, to perform a group act, rather than merely the result of the more commonly studied “I-intentions”—that is, intentions to act autonomously, to perform a personal act (Bagozzi, 2000). We elaborate on the value of the we-intentions concept for studying online social interactions in particular and social interactions more generally, thereby complementing existing individual-centric studies of Internet use (e.g., Flanagin & Metzger, 2001; UCLA Internet Report, 2003).

Second, we adapt a new social psychological model (e.g., Bagozzi & Lee, 2002), derived from two well-known theoretical frameworks, the Theory of Planned Behavior (TPB; Ajzen 1991; see Hunter & Allen, 1992, for an

application), and the Model of Goal-Directed Behavior (MGB; Perugini & Bagozzi, 2001), both of which focus primarily on individual-level constructs, to study online social interactions in seven different venues. This reformulated and extended model introduces critical social-influence variables that communication researchers (e.g., Postmes, Spears, & Lea, 2000) and social psychologists (e.g., Kelman, 1974; Tajfel, 1981) have identified as important in explaining intentional behaviors. We do this to better understand not only individual motivators but also the social reasons for participation in online social interactions, where the focus is on the individual's we-intentions instead of I-intentions, as discussed later. In this analysis, we also make and elaborate on the distinction between high- and low-interactivity online venues. Our reasoning is that social interactions differ structurally in these two types of venues, and we uncover some interesting differences, with generally supportive results in this regard.

Third, we seek to better understand how participating in online social interactions relates to the participant's offline (face-to-face and telephone) interactions with family members and friends; activities with neighbors and hobby groups; use of mass media such as television, radio, and print publications (magazines and newspapers); and reading of books. Our contribution here is to the emerging literature on the effects of Internet use (e.g., Flanagin & Metzger, 2001; Kraut et al., 2002; Shah et al., 2001; UCLA Internet Report, 2003) through the study of the specific functional consequences of participating in online social interactions. We not only incorporate these behaviors as implications in our theoretical framework by use of structural equation modeling (SEM) but also study them in-depth separately afterward through analyses of variance (ANOVAs) to obtain a better understanding of venue and gender-related differences in these effects.

The rest of the article is organized as follows. We begin with a presentation of our theoretical framework of the antecedents and consequences of online social interactions. We then consider venue interactivity in-depth and point out similarities and differences between high- and low-interactivity venues. This is followed by the results of a two-wave, survey-based empirical study conducted with 545 regular participants of seven different types of high- and low-interactivity venues. We conclude with a discussion of the theoretical and practical implications of our framework and results.

## A THEORETICAL FRAMEWORK OF ANTECEDENTS AND CONSEQUENCES OF ONLINE SOCIAL INTERACTIONS

Almost since computer networks were invented, they have been employed by users for social interactions. The reminiscence of early Internet pioneer Bob Bell is insightful in this regard: "Around about 1973–1975, I maintained PDP10

hardware at SRI. I remember hearing that there was an ARPANET ‘conference’ on the Star Trek game every Friday night. Star Trek was a text-based game where you used photon torpedos and phasers to blast Klingons” (Gromov, 1998).

Such cooperative online social interactions may be formally defined as those occurring between two or more individuals, in which each person is aware of both his or her own membership in the group and relationships to and with others that belong to the group and in which the interactions occur primarily through an Internet venue to achieve mutually shared goals. The mutual goals shared by the group may be functional, such as the give and take of useful information regarding a particular subject, or hedonic, which refers to simply the creation and consumption of a pleasant experience. Regardless of types of goals, text-based communication processes are crucial in enabling online social interactions among members. In this research, we studied social interactions occurring in a variety of online venues, namely, e-mail lists, bulletin boards, Usenet newsgroups, real-time chat rooms, messaging systems, networked video games, and MUDs. It should be acknowledged that online social interactions are not always cooperative, and at times people enter online interactions with selfish, deceptive, ulterior, or otherwise uncooperative motives in mind.

An important objective of this research is to understand the antecedents and the consequences of participating in online social interactions for individuals across these different venues. We present a theoretical framework that is broadly applicable to online social interactions. It incorporates (a) individual-level antecedents, such as attitudes, perceived behavioral control (PBC), and anticipated emotions; (b) social-level antecedents, such as subjective norms, group norms, and social identity with the group; (c) key mediating variables, such as desires, and we-intentions; (d) participation behavior; and (e) behavioral outcome consequences, such as changes in participants’ face-to-face and telephonic interactions with family and friends; engagement in neighborhood activities and hobby groups; use of television, radio, and print media; and reading of books. Figure 1 provides a graphical summary of this theoretical framework that we elaborate on later. Because of the survey nature of our study, we emphasize that no claims of causality are made with regard to our research (see the Discussion section for further perspective on this issue).

### We-Intentions to Participate in Online Social Interactions

As a useful starting point, consider how individuals might conceptualize their intentions to act when on the Internet. At least two distinct types of intentions are possible. In some cases, the individual may form intentions pertaining to act online independent of any collective entity per se. One’s intentions to check on the latest news stories or to bid for a product in an online auction are activities that represent such intentions, which may be referred to as *personal intentions* and defined

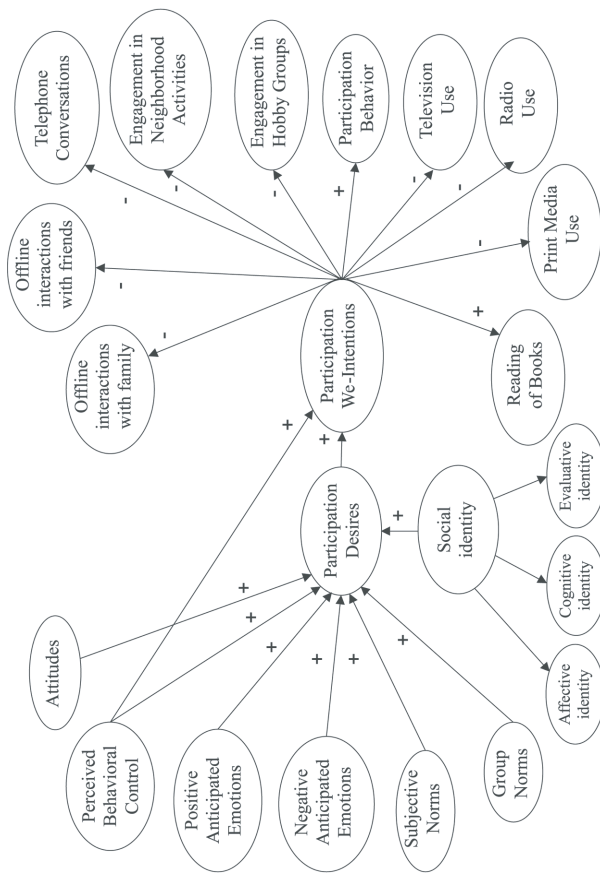


FIGURE 1 Theoretical framework of antecedents and consequences of online social interactions.

as the “person’s motivation in the sense of his or her conscious plan to exert effort to carry out a behavior” by him or herself alone (Eagly & Chaiken, 1993, p. 168).

A second distinct category of intentions that the individual may form online, which are more suitable in the context of online social interactions studied here, pertains to *group intentions* formed to engage in some activity jointly, together with others. In this case, the intentions are explicitly formed with reference to the collective entity of the group, rather than the singular “self” and are generally based on the idea of a shared consciousness with other individuals that motivates such interactions. Importantly, such group intentions require different conceptual and logical schemes than personal intentions (Bagozzi, 2000; Gilbert, 1989; Tuomela, 2000).

Philosophers have given a great deal of attention recently to this construct of group intentions, using such labels as “collective intentions,” “we-intentions,” and “shared intentions” (e.g., Bratman, 1993, 1997; Searle, 1990; Tuomela, 1995, 2000; see Bagozzi, 2000, for a review). For instance, Tuomela (1995) defined a we-intention as a “commitment of an individual to participate in joint action, and involves an implicit or explicit agreement between the participants to engage in that joint action” (p. 2). Such group intentions are predicated on the individual’s membership in a social group (Gilbert, 1989) and are applicable when members think of themselves as “us” and remain jointly ready to act in a group action together to accomplish the group’s collective goals. As noted previously, we focus on online social interactions that are largely cooperative and entail a certain degree of mutuality.

A we-intention has at least two aspects that differentiate it from personal intentions. First, as Gilbert (1989) noted, “we” refers to a plural subject in the sense that the user includes him or herself and at least one other person, where all are considered together and all share in the action of a verb. Second, a we-intention consists in a joint commitment and has nonrestrictive force on the persons who conceive of themselves as “we.” Under a joint commitment, “each party is answerable to all parties for any violation of the joint commitment” (Gilbert, 2002, p. 77). This implies that the holders of a we-intention have rights against and obligations toward each other. The rights occur as claims to conformity to the commitment, and the obligations refer to felt duties to conform. It is important to point out here that even though the referent in the individual’s we-intentions to participate is the group as a whole, both individual and social variables can influence the person’s we-intentions (e.g., Bagozzi & Lee, 2002; Gilbert, 1989). However, unlike most research to date, in which the referents in measures of individual and social variables refer to individual actions, the direct and indirect determinants of we-intentions and many behavior outcomes have been formulated to maintain proper correspondence with regard to level of analysis (Bagozzi & Lee, 2002). The participant’s we-intentions is a key endogenous variable (i.e., it functions as an independent and dependent variable) in our model of online social interactions. Consistent with the TPB and the MGB, we also hypothesize a significant positive relation between the participants’ we-intentions and actual participation behavior (see Figure 1).

### *The Role of Participation Desires*

In this analysis, consistent with the MGB (e.g., Bagozzi, 1992; Bagozzi & Kimmel, 1995; Perugini & Bagozzi, 2001), we construe the person's participation desires to be an important motivational mediator between the individual and social antecedents (described later) on the one hand and we-intentions and behavior on the other hand. A number of researchers over the years have pointed out that attitude theory and the TPB both fail to consider how decisions become energized (e.g., Bagozzi, 1992; Fazio, 1995).

The criticism of these researchers is that attitudes, subjective norms, and other commonly specified direct determinants of intentions provide reasons for acting but do not necessarily incorporate the motivational content needed to induce an intention to act within a person. A person may have a positive attitude toward an action, for example, but may lack a desire to act and consequently never develop an intention to act. Favorability toward an object or act does not necessarily imply an intention to act, whereas an intention to act requires a desire to act as a personal commitment. Hence, only when attitudes and other reasons for acting, some of which may be emotional and even nonrational, lead to a desire to act will we expect intentions to develop. Desires are necessary mediators.

Philosophers, too, have noted that we-intentions require commitment, in a motivational sense, to provide mutual support to the group's activities, such that the member may not only be committed to performing his or her preassigned part but also to furthering the group's joint action, as well as helping others in performing their parts (e.g., Tuomela, 1995). Supporting these ideas, recent research has confirmed the conceptual distinction between desires and intentions and empirically demonstrated that the two constructs are different with regard to level of abstraction, temporal construal, and perceived feasibility (Armitage & Conner, 2001; Perugini & Bagozzi, 2004a, 2004b).

In our theoretical framework, we hypothesize that desires will be a significant predictor of group member's we-intentions to participate in online social interactions, and the remaining antecedents described later will influence we-intentions through desires (except for PBC, which is expected to have both indirect and direct effects on we-intentions in correspondence to the TPB; see Figure 1). That is, a joint commitment to act together in the form of a we-intention is dependent on the desires that individual members have for the collective goal, and desires in turn function to channel and transform reasons for acting (personal and social) into motivations for acting.

### *The Role of Attitudes*

Attitudes are often proposed as central determinants of behavior, either through a spontaneous and direct link whose impact is determined by their accessibility (Fazio, 1995) or through deliberative processing whereby intentions mediate the impact of attitudes on behavior (e.g., Ajzen, 1991). Contemporary theories and empirical research focus either on the multiplicative combination of



beliefs and evaluations as distal causes or, more often, on overall attitudes (i.e., attitude toward the act) as proximal causes of intentions and measured by evaluative semantic differential scales such as good–bad and positive–negative items, as we do (e.g., Ajzen, 1991). We hypothesize that desires to participate in online social interactions will be functions of attitudes toward these interactions, where the attitudes only have motivational force to the extent that they become transformed into a desire to act so as to achieve joint goals.

It is important to note that to remain consistent with the we-intentions construct, the referent in our study for attitudes is social action, not an individual action (see our later discussion on measures). We do this not only to keep our analysis at the social level but also to maintain the proper correspondence of referents across all measures in the study (see Bagozzi & Lee, 2002, for further discussion of this issue). Similar comments apply to the other variables in our theoretical framework described later as well.

### *The Role of PBC*

Another individual determinant of intentional action in the TPB and the MGB is PBC, defined as the person's perception of control, that is, how difficult or easy performing the behavior is viewed to be (Ajzen, 1991). PBC is similar to self-efficacy, the confidence that one can successfully do what one sets out to do. In both the TPB and the MGB, it is postulated that PBC influences behavior directly, as well as through its effect on intentions. PBC plays a salient role in explaining intentions in cases in which action is not straightforward but instead is effortful and laden with conflict or pitfalls and in which motivational and volitional processes are necessary to successfully enact it (see Eagly & Chaiken, 1993, for a review).

In many cases, actual participation in online social interactions is not straightforward in the sense that not only does the individual have to manage the contingencies and constraints arising to impede his or her own participation, but he or she is also susceptible to uncontrollable contingencies and constraints other group members might face that might prevent their participation in the joint group interaction. For instance, when engaging in chat or playing a networked game, the online connection may malfunction or be unavailable for one or more group members, other activities or obligations may intrude, and so on. In the same way, it is also possible that participation may be imposed on the member due to prior group membership, or responsibilities, or even because of anticipated detrimental consequences (such as getting a low grade in one's class or a negative evaluation on job performance) from not participating in online interactions. Consequently, behavior in these cases is not straightforward but potentially laden with conflict and contingencies. As such, based on this reasoning and consistent with the TPB and the MGB, we expect PBC to be a significant individual-level predictor of participation desires as well as we-intentions of participants (Figure 1).

### *The Role of Anticipated Emotions*

According to the MGB (Perugini & Bagozzi, 2001), in addition to the two evaluative and cognitive constructs of attitudes and PBC, anticipated emotions, defined as prefactual appraisals in which the individual imagines the emotional consequences of achieving and not achieving a goal, are also important bases for desires. The role of anticipated emotions occurs as people, when deciding whether to act in goal-directed situations, such as online social interaction participation, take into account the emotional consequences of both enacting and not enacting that behavior (Bagozzi, Baumgartner, & Pieters, 1998). This is done through a particular form of counterfactual thinking that Gleicher et al. (1995) termed *prefactuals*. When describing how prefactuals work, Gleicher et al. stated that "individuals may think about imaginary alternatives to events in terms of the implications of these events for the future" (p. 284) thereby becoming the bases for appraisals and the experience of positive and negative emotions.

We expect that forward-looking positive emotions will result when the participant imagines the pleasant aspects of the upcoming experience from successfully interacting online and negative forward-looking emotions to be experienced when the person imagines not being able to interact online. We hypothesize that both positive and negative anticipated emotions will significantly predict participation desires of individuals (Figure 1).

### Social Bases of Participation in Online Social Interactions

As models of individual decision making, the TPB and the MGB consider social influence variables only cursorily or incompletely. Group influences are considered in both models solely through the normative construct of subjective norms, defined in terms of the felt social pressure from significant others to perform a particular behavior. In the literature that considers social influence more fully, however (e.g., Bagozzi & Lee, 2002; Bergami & Bagozzi, 2000; Kelman, 1974), three distinct processes of social influence have been identified as important predictors of goal-oriented group behaviors: compliance, internalization, and identification. We expect each of these processes to play a role in influencing desires to act and thus intentions and include them in our theoretical framework.

### *The Role of Subjective Norms*

The first social variable, subjective norms, is derived from the TPB and reflects the expectations of others. It comprises what Kelman (1974) called "compliance." Compliance is thought to depend on the need for approval. In many attitude studies, subjective norms are operationalized in a rather general sense by specifying

“other people whose opinions are important to me” as the source of normative influence (Ajzen, 1991). A particular group influence, if any, is not singled out, limiting its effectiveness in predicting intentions to interpersonal processes.

For some participants, the “expectations of significant others” may pertain to one’s family or friends instead of individuals belonging to the online group. Subjective norms will therefore be predictive of participation desires for such participants only to the extent that these significant others view the online social interaction as interfering with or supporting the person’s other pursuits, including his or her engaging in interactions with them. However, for other participants, it is possible that family and friends may actually be members of their online group. Here subjective norms may be significant predictors of participation desires. Thus, the traditional conceptualization of subjective norms as reflecting input from “other people who are important to me” can be vague in the online context and further may inject error into predictions to the extent that referents differ for individuals in the typical across-subjects study.

Although we model a positive influence of subjective norms on desires to incorporate these possibilities, our expectation is that group norms and social identity with the group (described later), which correspond roughly to Kelman’s (1974) concepts of internalization and identification, respectively, will be more influential in predicting desires, because they capture the influences from the online group more explicitly.

### *The Role of Group Norms*

Group norms, the second social influence variable included here, refer to processes of internalization (Kelman, 1974), whereby the participant adopts the values, conventions, and practices of the online group. Such a process may occur in one of two ways. First, internalization may occur to the extent that the new member finds his or her values, proclivities, and objectives to be consistent with that of others during online social interactions. Related to this, in many cases, participants actively tend to seek out online venues in which they are likely to find other individuals sharing their values, interests, or goals, thereby facilitating the acceptance of group norms (McKenna et al, 2002). Second, internalization processes may also develop through ongoing interaction whereby, over time, the participant learns about, and comes to adopt, the group’s norms. Such an emergent view of group norms is well endorsed by recent studies (e.g., Postmes, et al., 2000; see Spears, et al., 2002, for a review).

In either case, internalization occurs via group norms from the ongoing communication processes and resides in the personal meaning of that information for the participant. In this research, we operationalized group norms through the shared values or goals perceived by the participant between oneself and other group members. We hypothesize that group norms should significantly predict

participation desires in online social interactions enroute to predicting intentions (Figure 1).

### *The Role of Social Identity With the Group*

Social identity, in contrast to personal identity, is an integral part of group membership and confers a collective sense of who one is (Hogg & Abrams, 1988). Recent research suggests that social identity consists of three highly related yet distinct dimensions: awareness of group membership, affective commitment to the group, and evaluative significance of group membership (e.g., Bergami & Bagozzi, 2000; Ellemers, Kortekaas, & Ouwerkerk, 1999).

Awareness of group membership is a cognitive sense of oneself as an instance of a social category (Ashforth & Mael, 1989; Turner, 1985). Such thoughts concern judgments about similarities to in-group members and dissimilarities to out-group members. Indeed, early research in what has been called the minimal group paradigm showed that mere membership alone produced in-group favoritism when people were randomly assigned to new groups arbitrarily labeled with colors and involving no face-to-face or even actual contact with other persons in the group (Tajfel, 1978).

Affective commitment to a group is manifest in two senses of emotionality. One is feeling attachment to the group. Another is experiencing a feeling of belongingness to the group (Bagozzi and Lee, 2002).

Evaluative significance of group membership has been termed *group-based self-esteem* (Bergami & Bagozzi, 2000) or *collective self-esteem* (Luhtanen & Crocker, 1992). It is expressed in two related forms: a sense that one is an important member of the group and that one is a valuable member of the group (Bagozzi & Lee, 2002).

Past research has shown that social identity can be represented as a second-order latent variable, with cognitive self-awareness, affective commitment, and evaluative significance as first-order factors loading on the second-order factor. Bagozzi and Dholakia (2002) found that social identity was a strong determinant of desires to participate in online chat venues. In our study, we investigated seven online venues, ranging from low to high interactivity, in addition to studying online chat venues.

### *Offline Behavioral Outcomes of Online Social Interactions*

Considerable research on media use demonstrates the inherent competition among various media for the user's time and attention (e.g., Dimmick & Rothenbuhler, 1984; Flanagin & Metzger, 2001), but relatively little is known regarding the effects of participating in online social interactions on the use of other media. From both theoretical and practical standpoints, it is important to understand these impacts. In a related sense, recent social psychological research

has shown that using the Internet significantly influences the individual's offline social involvement (Kraut et al., 1998, 2002), raising interesting questions for our research as well.

In our research, we focus on both these issues, namely, understanding how participants' offline interactions (face-to-face and via telephone) with family and friends; engagement in neighborhood activities and hobby groups; and use of television, radio, print media, and books are influenced by online social interactions.

*Offline interactions with family and friends.* Existing research findings provide mixed guidance regarding the direction and extent of the effects to be expected. In an early study, Kraut and colleagues (1998) found that Internet use tended to reduce participants' offline interactions with family and friends; however, in more recent research (Kraut et al., 2002), they reported a dissipation of these negative effects among the original sample of participants and generally positive influences in a new sample relative to a control group. In contrast, the UCLA Internet Report (2003) revealed that, although the use of e-mail appears to increase the number of people that users stay in contact with, overall Internet use has little influence on the amount of time that users spend with family and friends. Whereas these studies have focused on Internet use in general, our interest here is on how social interactions via the Internet specifically influence offline (face-to-face and telephone) interactions with family and friends.

Two possibilities are evident, both of which suggest a negative influence. On the one hand, to the extent that the person's online social interactions are with his or her family members and existing friends, such intercourse may take the place of face-to-face or telephone interactions, to a lesser or greater extent, thereby reducing these offline interactions. Lending indirect support to this possibility, Flanagin and Metzger (2001) recently found Internet conversation and e-mail to cluster together with the telephone in their comparative study of media use (see also Dimmick, Kline, & Stafford, 2000). They also found e-mail, face-to-face interactions, and telephone use to all be deemed suitable by their participants for fulfilling the same persuasion, social bonding, and relationship maintenance needs, thereby raising the possibility of substitution effects.

A second possibility is that instead of interacting with one's family and existing friends, the individual makes new friends online and spends time interacting with them (e.g., McKenna et al., 2002). Here, too, we may expect a moderate to strong negative relation between we-intentions and face-to-face and telephone interactions with family and friends, as these online and offline interactions compete with each other for the person's time. These hypothesized relations are modeled in our theoretical framework (Figure 1).

*Neighborhood activities and hobby groups.* It is also important to obtain an understanding of how the individual's broader social participation, beyond that

with family and friends, relates to online social interactions (Kraut et al., 1998). We considered two aspects of such offline interactions here: engagement in neighborhood activities and participation in hobby groups such as book clubs, sports teams, and so on. In both cases, relying on the media displacement argument presented previously, namely that online social interactions compete with these other activities for the participants' time, we hypothesized negative relations, modeling direct negative paths from online we-intentions to both engagement in neighborhood activities and hobby groups (Figure 1).

*Use of mass media.* Further, communication researchers note that media are substitutable to the extent that they satisfy the same needs of users and that each medium has a niche of need fulfillment that defines its overlap with other media (e.g., Dimmick & Albarran, 1994; Flanagin & Metzger, 2001). Research has also revealed that for most people media choices and usage can be effectively described through a small set of core motivations such as obtaining information, learning, entertainment, and social support (e.g., Ang, 1995; see Flanagin & Metzger, 2001, for a review). It can be argued that for many people online social interactions fulfill many of the same core needs that are satisfied by mass media.

Moreover, and from a practical standpoint, mass media also compete with online social interactions for the individual's time. As people spend more of their leisure time online interacting with others, they may have less time to use the other mass media at their disposal. Supporting these ideas, the UCLA Internet Report (2003) recently reported that "Internet users may be 'buying' their time to go online from hours previously spent watching television" (p. 9). Both these arguments lead to the same conclusion: We-intentions to participate in online social interactions should relate negatively to the use of mass media (television, radio, and print media). These hypothesized relations are summarized in Figure 1.

*Reading books.* We also included participants' changes in reading fiction and nonfiction books due to online social interactions in our analysis. On the one hand, the "competing for time" argument articulated previously might hold here as well. But at the same time, we expect that the wide and convenient availability of author- or genre-specific interest groups online, the ability to purchase a wide variety of titles conveniently and for a reasonable price, and positive market trends generally supporting success of online book sales should all point to a positive influence of online social interactions on book reading. Supporting our prediction, an early study of home computer use found that hours spent using the computer on a weekly basis for entertainment correlated positively with reading books (Robinson & Kestnbaum, 1999). In our model, we hypothesize a positive association between we-intentions and reading books (Figure 1).

## LOW-INTERACTIVITY AND HIGH-INTERACTIVITY ONLINE VENUES

In the empirical study to validate our proposed theoretical framework, we included participants from a total of seven different types of venues in which online social interactions occur. The first type, e-mail lists, refers to specialized mailing lists organized around particular topics of interest. Messages posted to the list by individual members are generally transmitted to all of its membership and may or may not be edited by a list moderator beforehand. The second type, Web site bulletin boards, are company-sponsored venues that host ongoing discussions regarding a particular topic or a variety of topics. After registering, participants can post, read, and respond to messages within the bulletin board. For instance, the Multiple Sclerosis Society of America hosts a bulletin board that allows those with multiple sclerosis or their family members to communicate and share social support. The third type of online venue included here are Usenet newsgroups—currently over 16,000 in number—to which subscription is free. These Usenet newsgroups have diverse focuses, including politics (e.g., feminism), ethnic or national groups (e.g., African Americans, Malaysians), technical problems (e.g., Linux installation), therapeutics (e.g., alcoholism), hobbies (e.g., antique pottery collecting), and so on.

The fourth type of online venue included are real-time online-chat systems such as ICQ and AOL instant messenger that allow participants to interact with each other in real time by typing and sending (usually short) text messages back and forth. The fifth type of venue are Web-based chat rooms, such as those found on the AOL, Excite, and MSN Web sites, whereby interactions between participants occur in real time on the Web site itself. The sixth type of venue we considered were multiplayer virtual, wherein players can play with one another by simultaneously logging online together. During game-play, players normally engage in spirited conversations regarding the game as well as other topics. Examples include *Dungeon Siege* and *Neverwinter Nights*. Finally, the seventh online social interaction venue in our study are MUDs, in which participants adopt identities and role-play in games or engage in work-related communal interactions in real time.

### Interactivity of Online Venues

In classifying these venues meaningfully, perhaps the most important dimension is the degree of interactivity afforded by the venue, because this significantly and systematically influences both the processes and the outcomes of communication therein (Burgoon et al., 2002). Communication researchers have viewed interactivity as a condition of communication in which simultaneous and continuous exchanges occur between participants, where later messages in the sequence take



into account not just preceding messages but also the manner in which previous messages were reactive (Burgoon et al., 2002; Rafaeli & Sudweeks, 1997). The potential for such interactivity has been noted to be a characteristic of the communication medium itself (Burgoon et al., 2002); here, it is a characteristic of the online venue in which the social interactions take place.

The online venues described previously differ along a number of key structural aspects that determine the degree of interactivity afforded by each one. First, an important attribute of the venue that fosters interactivity is *synchronicity of communication*—the capability of a venue to enable a response to be formulated and delivered in real time and for a real-time dialogue to occur (Burgoon et al., 2002). Whereas some of the venues such as the real-time online chat systems, Web-based chat rooms, networked video games, and MUDs enable synchronous communications, others such as e-mail lists, Web site bulletin boards, and Usenet newsgroups only permit asynchronous communication. In a related sense, the four venues that afford synchronous communications also permit greater degrees of *contingent communication* and *mutuality*, two important properties of interactivity (Burgoon et al., 2000, 2002). Contingency of communication refers to the extent to which one person's queries, responses, and comments are dependent on prior ones, and mutuality is the extent to which users perceive and create a sense of relational connection, interdependence, coordination, and understanding with one another. The three asynchronous communication venues allow lower levels of contingent communications among participants and lesser mutuality.

A second important set of characteristics that fosters interactivity pertains to the breadth of input that the user has in modifying the environment. Lombard (2001) described three characteristics in this regard: the number of inputs the venue accepts, the number of environmental attributes that can be modified by the participant, and the range of responses possible for each of these attributes. Within e-mail lists, bulletin boards, and Usenet newsgroups, participants may only input text, suggesting that these venues are the most constrained and the least interactive along these criteria. Within online chat rooms and Web-based chat rooms, participants have control not only over the text input but also over the target of their response and its timing, indicating much greater interactivity (Lombard, 2001; Trevino & Webster, 1992). In addition to these affordances, within networked video games and MUDs, participants also have control over the representations of their characters and their movements. Using Lombard's (2001) criteria, too, the first three venues—e-mail lists, Web site bulletin boards, and Usenet newsgroups—may be classified as *low-interactivity venues*, whereas the remaining four—real-time online chat systems, Web-based chat rooms, networked video games, and MUDs—may be considered *high-interactivity venues*. We used this classification to study differences in online social interactions and their consequences.



## Similarities and Differences Between Low- and High-Interactivity Online Venues

Before studying interactions in these venues empirically, it is useful to briefly consider salient similarities and differences among these venues. Examining similarities first, we see that text-based communication represents the primary formative force for the evolution, growth, and sustenance of online social interactions in all the venues. Voice or video may nowadays augment the written word, but text still remains the primary medium of communication. Second, social interactions in all of these venues may be viewed as being goal-directed for participants in a social sense, that is, arising from the individual's need to attain specific group-oriented objectives. Participation may therefore be construed as *we-intentional* in all of these venues. We therefore expect our theoretical framework to apply, and predict participation well, for both high- and low-interactivity venues. Indeed, we took care to emphasize this type of interaction to the participants in our study through the initial instructions (see the Method section).

At the same time, a key difference between high- and low-interactivity groups pertains to the structural differences in the two cases. Based on the previous discussion, we may surmise that high-interactivity venues are more suitable for social interactions in which participants are highly involved and know others within the group well. Greater interactivity generally entails greater spontaneity, the possibility of interrupting or preempting others (and being interrupted or preempted by others), as well as mutuality and patterns of turn-taking. Under such circumstances, participants should be able to engage in different topics of conversation, move on to other topics, and have at least some shared history or mutual knowledge to be able to sustain highly interactive communications. On the other hand, interaction in low-interactivity venues have none of these requirements.

Thus, relatively speaking, it is possible that high-interactivity venues may be more preferred by existing family, friendship, or work groups to interact together online, whereas low-interactivity venues may be better suited for interactions involving weaker (or no) prior relations among group members. This is also because of greater contingency of communications and greater mutuality in high-interactivity venues. This distinction raises interesting possibilities of differences that can be tested within our theoretical framework. First, given higher levels of involvement and the possibility of shared history, we expect social influence variables, particularly social identity with the group and subjective norms, to be operative to a greater extent in high-interactivity relative to low-interactivity groups. Second, we also expect participation in high-interactivity venues as more likely to substitute for offline interactions with family and friends, taking its place to a lesser or greater extent. This should result in a significant negative relation

between we-intentions and offline and telephone interactions with family and friends for the high-interactivity group. Both these differences should allow us to corroborate our reasoning regarding structural differences in the two types of online social interactions.

## METHOD

### Participants and Procedure

Participants in our empirical study were existing members (and regular participants), belonging to one of the seven venues described earlier. Data were collected by conducting an Internet-based survey, which was publicized by contacting approximately 75 organizers and administrators of popular online venues for each of the seven categories. The organizers and administrators then informed their membership about the survey and encouraged them to participate by visiting a Web site where we had placed the survey. The use of an Internet survey such as the one we conducted does not permit us to assess response rates, because we cannot determine how many potential respondents were reached through our Web site. Thus the nature and extent of response bias are unknown. Nevertheless, as the number of specific instances of groups from each venue and the total sample are large, we think that the convenience sample is relevant for testing hypotheses, although we cannot make any conclusions as to generalizability.

The study was introduced to participants as an “opinion survey” regarding group interactions on the Internet. Participants were first given a list of the seven types of venues and asked to indicate the one in which they most frequently interacted with others. This gave them the opportunity to complete the survey regarding the type of social interaction with which they were most familiar and most often engaged. After this choice was made, participants described their chosen interaction in some detail such as the name of the venue, the date they first joined, who they normally interacted with, and details regarding their interactions.

Participants who had chosen one of the four high-interactivity venues were then branched to another section of the survey in which they were told: “Imagine that you are logging on to the Internet to engage in the group interaction that you described above. You have a number of friends within that group that you regularly interact with. Please picture briefly in your mind the name and image of each online friend. Then write your first name and their first names/handles in the table below. *You may include up to, but not necessarily, five group members.* Please be sure to include only friends that are *part of the group* you regularly

interact with on the Internet.” We provided this instruction because pretests had shown that most participants in such venues interact with a specific group of individuals in most cases.

Participants of the remaining three low-interactivity venues were then branched to a section in which they described their last online interaction in detail. They were then told to visualize the average group members of the venue. This was based on our understanding from pretests that a majority of participants interact online without any prior expectation of meeting specific group members. Regardless of the venue selected, all participants then responded to the same set of measures as described later. The sample size was 545. Measures of participation behavior were collected by e-mailing respondents approximately 2 weeks later, as described later. As an incentive for participating in the study, 2 randomly selected participants received the opportunity to donate \$250 each to their favorite charity. At Time 2, the sample totaled 465.

### Sample Characteristics

Table 1 provides details of the sample for each of the online venues. After the survey was completed, we found that only 6 individuals had responded for the networked video games venue. These responses were therefore combined with the MUDs subsample and are reported in that category in Table 1. Respondents ranged in age from 18 to 79 years, with a mean age of 33.1 years ( $M = 30$ ,  $SD = 13.43$ ). Most (387, or 71%) were U.S. residents; the other 29% belonged to a total of 27 other countries. Canada ( $n = 42$ , 7.7%), Australia ( $n = 23$ , 4.2%), and Germany ( $n = 21$ , 3.9%) were the three next largest subgroups by nationality represented in the sample.

To convey a better sense of the data, we next list examples of some of the online venues represented in the sample. Among e-mail lists participants, the Michelle Kwan fan club, the ASCFG–L list for professionals in the specialty cut-flower business, the ACCESS–L list discussing issues pertaining to the Microsoft Access computer software, the Internet Bonsai Club, and the Texas Archaeological Society’s mailing list were all represented. The Web site bulletin boards represented in our survey included the Ultimate Rollercoasters Web forum, the Salon Table Talk, the X-Files fan forum, and the Cultural Diffusion Board. Members of the rec.arts.bod-yart, rec.art.dance, alt.religion.christian.episcopal, rec.arts.disney-parks, and alt.guitar.amps Usenet newsgroups also all participated in our survey. For high-interactivity venues, the Internet relay chat AOL Instant Messenger, Microsoft Messenger, Yahoo Messenger, and ICQ were all represented within the real-time online-chat system subsample. Members of the Barlman’s chat room at TheOneRing.net, the Park teens lobby, “The Pork” community, and chat rooms at Yahoo.com and Excite.com all participated in the study within the Web-based

TABLE 1  
Descriptive Statistics for Samples From the Six Internet Venues

Internet Venue	Sample Size	% Female Respondents	% Male Respondents	Average Age		Average Years of Internet Use	
				M	SD	M	SD
E-mail lists	158	57.0	40.5	43.9	13.24*	7.8	4.0
Bulletin boards	68	32.4	63.2	31.5	12.7	6.3	3.9
Usenet newsgroups	39	28.2	66.7	37.9	13.4	8.7	4.7
Real-time online chat systems	51	62.7	35.3	27.7	8.4	7.4	3.1
Web-based chat rooms	35	57.1	40.0	28.7	10.1	7.0	3.1
Multi-user domains <sup>a</sup>	192	27.6	67.7	25.8	8.3	7.6	3.1
Total	545	41.8	54.3	33.1	13.4	7.5	3.6

<sup>a</sup>Includes the six respondents of "networked video games".

real-time chat-rooms subsample. Finally, the MUDs represented in this sample included Porta Unica, Another World, Mozart, Aurealan Realms, Nexus Kingdom of the Winds, Xyllomer, Alexandria, and Avatar. The details of the measures are provided next.

## Measures

**Attitudes.** Four items were used to measure the attitudes construct (Ajzen, 1991). Participants were asked to respond to the following: "On the following scales, please express your attitude toward interacting together with the group you identified above sometime during the next two weeks."<sup>1</sup> Four 7-point semantic differential items were then presented, ranging from -3 (*foolish / harmful / bad / punishing*) to +3 (*wise / beneficial / good / rewarding*).

**PBC.** Two items were used to measure PBC (Ajzen, 1991). The first was a 7-point item that asked respondents to react to the query, "How much control do you have over interacting together on the Internet with the group you identified above during the next 2 weeks?" The scale ranged from 1 (*no control*) to 7 (*total control*), with 4 (*moderate control*) as the midpoint. The second item was rated on a 7-point from 1 (*difficult*) to 7 (*easy*) and asked participants to respond to the statement, "For me to interact together on the Internet with the group I mentioned above during the next 2 weeks is:".

**Anticipated emotions.** A 20 one-item scale developed by Bagozzi et al. (1998) was used to measure anticipated emotions. Nine positive anticipated emotions (relief, contentment, excited, delighted, happy, glad, satisfied, proud, self-assured) were introduced with the statement, "If I am able to interact on the Internet with the group I identified above during the next 2 weeks, I will feel:" and were measured on 7-point scales ranging from 1 (*not at all*) to 7 (*very much*) with 4 (*moderately*) as a midpoint. Similarly, 12 negative anticipated emotions (angry, frustrated, guilty, ashamed, sad, disappointed, depressed, worried, uncomfortable, anxious, agitated, nervous) were introduced with the statement, "If am unable to interact on the Internet with the group I identified above during the next 2 weeks, I will feel:" and were measured with the same response alternatives as with positive anticipated emotions.

**Subjective norms.** Two 7-point items were used to measure subjective norms and were introduced with the statement "Please express how strongly most people who are important to you feel you should or should not interact together on the Internet with the group you normally interact with" (Ajzen, 1991). Then the two items were presented as follows:

Most people who are important in my life think I (circle appropriate number):  
 should 1: 2: 3: 4: 5: 6: 7: should not  
 interact together on the Internet with my group sometime during the next 2  
 weeks.

Most people who are important to me would (circle appropriate number):  
 approve 1: 2: 3: 4: 5: 6: 7: disapprove  
 of me interacting with the group sometime during the next 2 weeks.

*Group norms.* Group norms were indicated with 5-point items measuring the degree of shared goals between the self and group members (Bagozzi & Lee, 2002). The items were introduced with the following statements: "Interacting together sometime during the next 2 weeks with your online group can be considered a goal. For each of the people listed below, please estimate the strength with which each holds the goal." Each group member and the self were listed after the statement. The responses were recorded on a scale of 1 (*very weak*), 2 (*weak*), 3 (*moderate*), 4 (*strong*), or 5 (*very strong*). To operationalize group norms, the item measuring strength of shared goals by the self was used as one indicator, and the average of the items measuring strength of shared goals for the other group members was used as a second indicator.

*Social identity.* Two items were used for each of the three aforementioned dimensions of social identity (see Bagozzi & Dholakia, 2002; Bagozzi & Lee, 2002). For affective social identity, one item asked, "How attached are you to the group you mentioned above?" and the other asked, "How strong would you say that your feelings of belongingness are toward the group you mentioned above?" Responses were recorded on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). For cognitive social identity, one item instructed respondents to "Please indicate to what degree your self-image overlaps with the identity of the group of friends you mentioned above as you perceive it?" The same 7-point scale was used to record responses. The second cognitive social identity item asked, "How would you express the degree of overlap between your personal identity and the identity of the group you mentioned above when you are actually part of the group and engaging in group activities?" An 8-point scale ranging from 1 (*not at all*) to 8 (*very much*) was used to record responses. For evaluative social identity, respondents were asked to respond to "I am a valuable member of the group" and "I am an important member of the group" on a 7-point scale ranging from 1 (*agree*) to 7 (*disagree*).

*Desires.* Three items were used to measure desires to participate in online social interactions (Bagozzi & Dholakia, 2002; Perugini & Bagozzi, 2001). The first item, rated on a 7-point scale from 1 (*disagree*) to 7 (*agree*), asked participants to respond to the statement "I desire to interact together on the Internet with

the group I mentioned above during the next 2 weeks.” The second item asked participants to react to the statement, “My desire for interacting together on the Internet with the group I mentioned above during the next 2 weeks can be described as:” and was rated on a scale of 1 (*no desire at all*), 2 (*very weak desire*), 3 (*weak desire*), 4 (*moderate desire*), 5 (*strong desire*), 6 (*very strong desire*), or 7 (*very, very strong desire*). The last item presented the statement, “I want to interact together on the Internet with the group I mentioned above during the next two weeks.” A 7-point scale ranging from 1 (*does not describe me at all*) to 7 (*describes me very well*) was used to record the participants’ responses.

**We-intentions.** Two items were used to measure the we-intentions construct (Bagozzi & Lee, 2002). The first was measured on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) in response to the statement “I intend that our group (i.e., the group that I identified before) interact on the Internet together sometime during the next 2 weeks.” The second item was measured on the same scale in response to the statement “We (i.e., the group that I identified above) intend to interact on the Internet together sometime during the next 2 weeks.”

**Participation behavior.** Participation in online social interactions was measured with a follow-up e-mail sent to participants approximately 2 weeks after they had responded to the first survey. Respondents were told “Several weeks ago, you responded to a survey regarding [type of online social interaction inserted here]. We want to thank you for doing so. ... We would appreciate it if you would take a minute of your time and respond to the following questions regarding your recent participation in [appropriate venue inserted here].” The questions were customized for each of the seven venues. Instances used for those responding to Web-based chat rooms were as follows. The first question was “How many times did you chat online with your (group) in the past 2 weeks? (Please count each session as one time)” The second question was “How many times did you chat online with your (group) on average during a 2-week period in the past 6 months?”

**Offline behavioral outcomes of online social interactions.** To measure the impact of participating in online social interactions, we instructed respondents as follows: “Participating in group interactions on the Internet often influences other activities and interactions of individuals. For each of the following, please tell us how your amount of interactions with others and media use has changed now when compared to before you engaged in Internet-based group interactions?” Responses were obtained on 5-point scale ranging from 1 (*very much less than before*) to 5 (*very much more than before*). Because respondents reported that they had used the Internet for, on average, between 6.3 and 8.7 years, depending on the venue, we expect that reported changes should have

stabilized by the time of the questionnaire administration for most respondents and therefore should be relatively accurate indicators of offline behavioral outcomes for testing their association with the antecedents shown in Figure 1. Face-to-face interactions with family was measured using a single item, "visiting with family members." Face-to-face interactions with friends was measured using a single item, "visiting with friends." Telephone interactions was an average of two items, "telephone conversations with family" and "telephone conversations with friends." Neighborhood activities was measured using a single item, "activities with neighbors." Engagement in hobby groups was measured with a single item, "activities with hobby groups (book clubs, sports teams, etc.)." Television use was measured with a single item, "watching television." Radio use was similarly measured with a single item, "listening to the radio." Print media use was an average of two items, "reading newspapers" and "reading magazines." Reading books was measured with a single item, "reading fiction and nonfiction books."

## TESTS OF HYPOTHESES

We first calculated separate covariance matrices for each of the six venue subsamples (recall that the six networked video-game participants were included in the MUD subsample). Statistical tests to determine if the covariance matrices were equal (Morrison, 1990) were conducted for the first three venues (e-mail lists, Web site bulletin boards, and Usenet newsgroups) and the remaining three venues (real-time online chat rooms, Web-based chat rooms, and MUDs). Results showed that the matrices were not significantly different from one another in either case. Consequently, we combined the first three venues and analyzed them together as low-interactivity venues and combined the last three groups, analyzing them jointly as high-interactivity venues. All subsequent analyses were conducted for these two groups separately.

SEM was used to test the model presented in Figure 1, whereas additional ANOVAs were done to compare the high- and low-interactivity groups on effects of online social interactions, as well as to uncover gender-related differences. The LISREL 8.52 program (Jöreskog & Sörbom, 1999) was employed for the SEM analyses. The goodness of fit of the models was assessed with chi-square tests, the root mean square error of approximation (RMSEA), the nonnormed fit index (NNFI), and the comparative fit index (CFI). Discussions of these indexes can be found in Bentler (1990), Browne and Cudeck (1993), and Marsh, Balla, and Hau (1996). Satisfactory model fits are indicated by nonsignificant chi-square tests, RMSEA values less than or equal to .08, and NNFI and CFI values greater than or equal to .90. Tests of differences between groups were performed with chi-square difference tests.



Two indicators were used to operationalize each latent construct in the SEM. For latent constructs in which more than two measures were available (attitudes, positive and negative anticipated emotions, and desires), these were combined to produce two indicators according to the so-called partial disaggregation model (Bagozzi & Edwards, 1998; Bagozzi & Heatherton, 1994). This yielded models with fewer parameters to estimate and reasonable ratios of cases to parameters while smoothing out measurement error to a certain extent. All analyses were performed on covariance matrices (Cudeck, 1989).

## Results

Table 2 summarizes the number of measures, range, as well as the means, standard deviations, and Cronbach alpha reliabilities of the 16 constructs for the high- and low-interactivity groups. The reliabilities were adequate in all cases except for the PBC construct in the high-interactivity group, where it was .63. It is useful to note here that this low value would most likely make it more difficult to find any significant relations with this variable in the SEM, and the results should err on the conservative side in tests of hypotheses.

Results showed that for the high-interactivity group, the overall fit of the structural model of Figure 1 was very good:  $\chi^2(417) = 909.49$ ,  $p \approx .00$ , RMSEA = .056, NNFI = .92, and CFI = .94. Similarly, the structural model for the low-interactivity group also fit very well:  $\chi^2(417) = 1012.57$ ,  $p \approx .00$ , RMSEA = .068, NNFI = .92, and CFI = .93. When direct (i.e., unmediated) paths were added to the model of Figure 1, 4 of 16 were found to be significant (see the following). This led to even better goodness-of-fit measures than reported earlier. The second and third columns of Table 3 provide the standardized estimates for path coefficients for the high- and low-interactivity groups, respectively.

As can be seen from Table 3, and from the goodness-of-fit measures, our proposed theoretical framework applies well to both the high- and the low-interactivity groups. Considering the high-interactivity group first, two individual influence constructs, attitudes ( $\gamma = .165$ ,  $t = 2.55$ ) and negative anticipated emotions ( $\gamma = .165$ ,  $t = 2.81$ ), significantly predicted participation desires. However, neither PBC nor positive anticipated emotions did so significantly. Of the three social influence variables, two—group norms ( $\gamma = .252$ ,  $t = 3.70$ ) and social identity with the group ( $\gamma = .245$ ,  $t = 3.38$ )—were significant predictors of participation desires, but subjective norms was not. Fifty percent of the variance in desires was explained by these antecedents.

Further, and as expected, both desires ( $\beta = .396$ ,  $t = 6.93$ ) and PBC ( $\gamma = .516$ ,  $t = 5.96$ ) significantly predicted we-intentions, which in turn predicted participation behavior ( $\beta = .497$ ,  $t = 7.44$ ). The effects of PBC on we-intentions were direct only, without any partial mediation by desires, for the high-interactivity group. Fifty-six percent of the variance in we-intentions was explained by these

TABLE 2  
Means, Standard Deviations, and Reliabilities of Construct Measures

Scale	No. of Items	Range	High-Interactivity Group			Low-Interactivity Group		
			M	SD	Reliability	M	SD	Reliability
Attitudes	4	4-28	20.47	3.61	.83	21.46	17.40	.87
PAE	9	9-63	38.21	11.81	.91	37.00	13.32	.93
NAE	12	12-84	25.84	13.97	.92	25.13	13.53	.92
Subjective norms	2	2-14	10.38	3.00	.83	11.54	2.67	.81
PBC	2	2-14	8.07	2.67	.63	9.18	2.99	.89
Group norms	2	2-10	7.15	1.88	.83	7.26	2.00	.83
Affective identity	2	2-14	10.16	2.89	.77	9.58	3.07	.83
Cognitive identity	2	2-15	6.97	3.45	.82	7.14	3.42	.78
Evaluative identity	2	2-14	10.25	3.19	.89	8.74	3.73	.89
Desires	3	3-21	15.96	3.49	.84	15.86	3.61	.84
Participation	2	2-10	7.73	1.75	.85	8.05	1.66	.80
We-intentions								
Participation behavior	2	—	4.88	1.58	.92	5.89	1.82	.98
Offline interaction with family	1	1-5	2.84	.64	—	3.05	.58	—
Offline interaction with friends	1	1-5	2.96	.83	—	3.11	.71	—
Neighborhood activities	1	1-5	2.84	.62	—	2.93	.53	—
Engagement with hobby groups	1	1-5	2.91	.89	—	3.23	.86	—
Telephone interactions <sup>a</sup>	1	1-5	2.87	.74	—	2.84	.63	—
Television use	1	1-5	1.90	.90	—	2.22	.85	—
Radio use	1	1-5	2.67	.96	—	2.79	.78	—
Print media use <sup>a</sup>	1	1-5	2.60	.78	—	2.68	.72	—
Reading books	1	1-5	2.97	.99	—	3.03	.86	—

Note. PAE = positive anticipated emotions; NAE = negative anticipated emotions; PBC = perceived behavior control.

<sup>a</sup>A single measure that was the average of the two items was used in the structural model.

TABLE 3  
Standardized Path Coefficients for Structural Model and Tests for  
Statistical Differences Between High- and Low-Interactivity Groups

<i>Path</i>	<i>High-Interactivity Group</i>	<i>Low-Interactivity Group</i>
We-Intentions → Participation behavior	.50***	.26***
We-Intentions → Offline interactions with family	.08	.18**
We-Intentions → Offline interactions with friends	.11	.19**
We-Intentions → Engagement with neighbors	.04	.18**
We-Intentions → Participation in hobby groups	-.07	.11
We-Intentions → Telephone use	-.17*	.07
We-Intentions → Television use	-.03	-.17**
We-Intentions → Radio use	-.13*	.01
We-Intentions → Print use	.04	-.06
We-intentions → Reading books	.16*	-.03
Desires → We-Intentions	.40***	.18*
PBC → We-Intentions	.52***	.79***
Attitudes → Desires	.17*	.09
Positive anticipated emotions → Desires	.07	.19*
Negative anticipated emotions → Desires	.17**	.24**
PBC → Desires	-.02	.20*
Group norms → Desires	.25***	.17*
Subjective norms → Desires	-.03	.09
Social identity → Desires	.25**	.02
Social identity → Affective component	.99***	1.00***
Social identity → Cognitive component	.75***	.80***
Social identity → Evaluative component	.72***	.73***

*Note.* PBC = perceived behavior control.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

antecedents, whereas 25 percent of the variance in participation behavior was explained (see later discussion for increase under revised model). Considering the offline behavioral outcomes for the high-interactivity group next, as hypothesized, the paths from we-intentions to both telephone interactions ( $\beta = -.169$ ,  $t = -2.64$ ) and radio use ( $\beta = -.125$ ,  $t = -1.96$ ) were negative and significant, suggesting that participants appear to be reducing these activities as a result of engaging in online social interactions. As expected, the path from we-intentions to reading books was significant and positive ( $\beta = .155$ ,  $t = 2.43$ ). None of the other consequences was significantly influenced by we-intentions for this group in the model. Considering the low-interactivity group next, of the four individual influence variables, three—positive anticipated emotions ( $\gamma = .193$ ,  $t = 2.50$ ), negative anticipated emotions ( $\gamma = .240$ ,  $t = 3.52$ ), and PBC ( $\gamma = .199$ ,  $t = 2.06$ )—significantly predicted desires, whereas attitudes did not. Of the social influence variables, group norms ( $\gamma = .167$ ,  $t = 3.60$ ) but neither subjective norms ( $\gamma = .088$ ,  $t = 1.68$ ) nor social identity ( $\gamma = .015$ ,  $t = 1.94$ ), had significant paths to desires. Sixty-two percent of the variation in participation desires was explained by these antecedents. For this group, too, both desires ( $\beta = .182$ ,  $t = 2.15$ ) and PBC ( $\beta = .320$ ,  $t = 5.90$ ) predicted we-intentions significantly, with 69% of the variance explained in this construct. We-intentions in turn significantly predicted participation behavior ( $\beta = .262$ ,  $SE = 4.19$ ), with 7% of the variance being explained therein (see later discussion for increase in  $R^2$ s under revised model).

Considering the offline behavioral outcomes next, for the low-interactivity group, three of four of the offline interaction variables—face-to-face interactions with family ( $\beta = .177$ ,  $t = 2.73$ ) and friends ( $\beta = .192$ ,  $t = 2.97$ ) and neighborhood activities ( $\beta = .180$ ,  $t = 2.78$ )—had significant positive paths from we-intentions, whereas television use had a significant negative path ( $\beta = -.167$ ,  $t = -2.57$ ). The other variables—engagement with hobby groups, telephone interactions, radio, print media, and book reading—were not influenced significantly by we-intentions in the structural model for this group.

### Testing the Robustness of the Structural Model

To test the robustness of the structural model, we added direct paths from the antecedent exogenous variables to we-intentions and to participation behavior and from desires to participation behavior. This was done to investigate whether the mediation mechanisms implied in Figure 1 were sustained. To the extent that the direct paths are found to be nonsignificant, full mediation will be demonstrated; to the extent that the direct paths are found to be significant, partial mediation (i.e., both indirect and direct paths) will be demonstrated. Chi-square difference tests were used to test each path.

Looking first at the high-interactivity group, we found that 4 of 16 possible direct paths were significant. Specifically, attitude predicted we-intentions

( $\gamma = .159$ ,  $t = 2.40$ ), negative anticipated emotions predicted participation behavior ( $\gamma = .145$ ,  $t = 2.21$ ), PBC predicted participation behavior ( $\gamma = .238$ ,  $t = 2.75$ ), and group norms predicted we-intentions ( $\gamma = .177$ ,  $t = 2.27$ ). These findings, in conjunction with the results presented previously for the test of the model shown in Figure 1, suggest that the effects of social identity and desires are fully mediated and the effects of attitudes, negative anticipated emotions, group norms, and PBC are partially mediated. The respective  $R^2$  values for desires, we-intentions, and participation behavior were .50, .56, and .30, which represent a net change only for participation behavior, in which the increase was by .05.

Looking next at the low-interactivity group, we found that 4 of 16 possible direct paths were significant. Specifically, positive anticipated emotions predicted we-intentions ( $\gamma = .264$ ,  $t = 2.96$ ), desires predicted participation behavior ( $\beta = .151$ ,  $t = 2.16$ ), group norms predicted we-intentions ( $\gamma = .412$ ,  $t = 5.41$ ), and group norms predicted participation behavior ( $\gamma = .589$ ,  $t = 5.63$ ). These findings, in conjunction with the results presented earlier for the test of the model shown in Figure 1, suggest that the effects of negative anticipated emotions and PBC are fully mediated and the effects of positive anticipated emotions, group norms, and desires are partially mediated. The respective  $R^2$  values for desires, we-intentions, and participation behavior were .62, .69, and .18, which represents a net change only for participation behavior, in which the increase was by .11.

### Intergroup Differences in Consequences of Engaging in Online Social Interactions

We conducted these additional analyses to both verify the effects found in the SEM analysis and to better understand specific effects and differences across interactivity- and gender-based groups. Recall that we had measured all of these consequences in terms of changes from before they engaged in online social interactions using 5-point scales from 1 (*very much less than before*) to 5 (*very much more than before*). In these additional analyses, first we compared the reported changes in levels of each measure to a baseline of 3, which indicated unchanged levels, using a paired-samples  $t$  test. This allowed us to test whether the particular behavior had significantly increased or decreased on account of engaging in online social interactions at the group level and as reported by the participant (see comments in the Method section).

Second, we analyzed these measures by comparing statistical differences between (a) members of high- and low-interactivity groups and (b) male and female respondents. These analyses were done by running 2 (high, low) Interactivity Level  $\times$  2 (female, male) Gender ANOVAs with the reported change in level of the behavior as the dependent variable.

*Face-to-face interactions with family.* Studying face-to-face interactions with family members first, we compared the changed level of interaction to the baseline. A within-sample  $t$  test showed that the entire sample reported a significantly reduced level of face-to-face interactions with family when compared to before engaging in online social interactions ( $M = 2.94$ ) relative to the baseline,  $t(524) = -2.107, p < .05$ .

Comparing specific intergroup changes next, we discovered that the results of the ANOVA showed that both interactivity level,  $F(1, 514) = 12.03, p < .01$ , and gender,  $F(1, 514) = 5.51, p < .05$ , had significant main effects, but the two-way interaction between interactivity level and gender was not significant. Planned contrasts showed that whereas low-interactivity group members increased their interactions ( $M = 3.05$ ), relatively speaking, the high-interactivity group significantly reduced their face-to-face interactions with family members ( $M = 2.84$ ). Female respondents ( $M = 3.02$ ) also reported slightly increased, and significantly higher levels, when compared to male participants ( $M = 2.88$ ).

*Face-to-face interactions with friends.* In the case of face-to-face interactions with friends, the entire sample reported a slightly increased level of interaction compared to the baseline ( $M = 3.03$ ), but this difference was not statistically significant,  $t(522) = 1.01, p > .30$ . However, results of the intergroup comparison showed that both interactivity level,  $F(1, 512) = 3.11, p \approx .07$ , and gender,  $F(1, 512) = 3.11, p \approx .07$ , had marginally significant main effects, and the two-way interaction between interactivity level and gender was not significant,  $F(1, 512) = .93, p > .30$ . Here, too, the low-interactivity group ( $M = 3.11$ ) reported increases when compared to the baseline, and these were marginally higher than the high-interactivity group ( $M = 2.96$ ). Female respondents ( $M = 3.00$ ), too, reported marginally higher levels when compared to male participants ( $M = 2.88$ ).

In addition to confirming the effects we found in the SEM analyses, these results show that low-interactivity group members and female respondents seem to be maintaining or even slightly increasing their face-to-face interactions with family and friends, whereas high-interactivity group members and male respondents show decrements.

*Telephone interactions.* Our reasoning (discussed earlier) was that telephone conversations with family and friends should decrease to the extent that such interactions shifted to online venues. Indeed, a within-sample  $t$  test confirmed this result, with the entire sample reporting a significantly reduced level of telephone interactions relative to before engaging in online social interactions ( $M = 2.73$ ),  $t(524) = -8.76, p < .001$ . Results of the ANOVA further showed that where interactivity level had a significant main effect,  $F(1, 514) = 4.88, p < .05$ , neither gender,  $F(1, 514) = .80, p > .35$ , nor the two-way interaction between interactivity level and gender was significant,  $F(1, 514) = 2.13, p > .14$ . Whereas

both groups reduced telephone interactions significantly, the high-interactivity group ( $M = 2.65$ ) reported significantly lower levels than the low-interactivity group ( $M = 2.80$ ), supporting the SEM results and our reasoning regarding migration from telephone to interactive online social participation for many participants.

*Engagement in neighborhood activities.* Our initial expectation was that neighborhood activities would be negatively impacted by participation in online social interactions. We indeed found this to be the case with the entire sample reporting small but significant decrements in this activity ( $M = 2.88$ ),  $t(521) = -4.62$ ,  $p < .001$ . Results of the ANOVA showed no statistically significant effects of either interactivity level or gender. Interestingly, these results lead to a conflicting conclusion from the SEM analyses, suggesting that degree of participation that was included in the SEM may be a potential moderator in determining the direction and extent of these effects.

*Engagement with hobby groups.* In this case, too, we hypothesized a negative influence. Surprisingly, results showed slight but not significant increases in this activity for the entire sample ( $M = 3.07$ ),  $t(522) = 1.67$ ,  $p \approx .10$ . Intergroup differences were interesting here, with interactivity but not gender having a main effect. Whereas members of low-interactivity groups reported significant increases ( $M = 3.23$ ), those of high-interactivity groups reported significant decreases ( $M = 2.91$ ),  $F(1, 512) = 11.80$ ,  $p < .001$ . These results generally support the SEM findings.

*Watching television.* We also expected that participants would report lowered mass-media use as these media competed with online social interactions for the user's time. This hypothesis was generally supported by the data. The entire sample reported a significantly reduced level of television watching compared to before engaging in online social interactions ( $M = 2.06$ ),  $t(523) = -24.25$ ,  $p < .001$ . Further, results of the intergroup comparison showed that here, too, there was a significant main effect of interactivity level,  $F(1, 513) = 16.65$ ,  $p < .001$ , but neither gender,  $F(1, 513) = .56$ ,  $p > .45$ , nor the two-way interaction was significant,  $F(1, 513) = .05$ ,  $p > .80$ . As in the case of telephone use, decrements were significantly greater for the high-interactivity group ( $M = 1.70$ ) relative to the low-interactivity group ( $M = 2.22$ ). These results generally support the SEM analyses, as well as recent studies on the effects of Internet use (UCLA Internet Report, 2003).

*Listening to the radio.* When asked how they had changed their radio listening habits relative to before engaging in online social interactions, the entire sample reported a significantly reduced level of radio listening ( $M = 2.73$ ),  $t(518) = -6.97$ ,

$p < .001$ . Results of the ANOVA showed that there were no significant intergroup differences in this case. All respondent groups, regardless of interactivity levels and gender, showed similar significant decreases in radio listening.

*Reading magazines and newspapers.* Participants also reported significantly reduced levels of reading print media (magazines and newspapers):  $M = 2.64$ ,  $t(522) = -10.94$ ,  $p < .001$ . In this case, the main effect of interactivity level was not significant,  $F(1, 512) = 1.52$ ,  $p > .20$ , but that of gender was significant,  $F(1, 512) = 5.46$ ,  $p < .05$ . The two-way interaction between interactivity level and gender was not significant,  $F(1, 512) = .89$ ,  $p > .30$ . Female respondents ( $M = 2.55$ ) reported significantly lower levels of print media use when compared to male respondents ( $M = 2.70$ ).

*Reading books.* For this last outcome considered, our expectation was that reading books may be positively influenced by online social interactions, due to the opportunity to share this interest with like-minded others. The full-sample results showed no perceptible difference from the baseline ( $M = 3.00$ ),  $t(523) = .047$ ,  $p > .95$ . Further, there were no significant intergroup differences in this case either. Here, the results were in contrast to the SEM analysis, again raising the possibility of including degree of participation as a potential moderator.

In general, although corroborating the SEM results, the ANOVAs provide more fine-grained evidence that participation in online social interactions appears to adversely affect the overall use of all three mass media considered here: television, radio, and print (magazines and newspapers) across the entire sample but with some interesting intergroup differences. Although there were no significant gender differences for either television or radio, women did report significantly higher decrements in print media use when compared to male respondents. Interactivity level played a role only for television viewing such that high-interactivity groups reported significantly higher decrements when compared to the low-interactivity group. We stress that the SEM analyses and ANOVAs have different purposes. The SEM analyses test hypotheses concerning functional and potential causal relations. The ANOVAs test hypotheses concerning overall levels of use (i.e., main effects).

## GENERAL DISCUSSION

In contrast to a personal intention that has the action that one will perform a behavior alone as its referent (e.g., "I intend to check my e-mail before lunch"), we conceptualized online social interactions as invoking intentions with group action as the referent. We argued that the resulting we-intentions—best described



as a shared intention expressed by the individual either in the form “I intend that our group performs group activity X” or the form “We intend to perform group activity X”—are more accurate descriptors of the psychological processes underlying such interactions. This is because, in the online situations we investigated, people were part of groups and shared both group goals and commitments with comembers. Future research examining social interactions in either the online context or more traditional settings may beneficially draw on the conceptual and logical formations of the we-intentions construct introduced here and originally proposed by philosophers (e.g., Bagozzi, 2000; Bratman, 1997; Tuomela, 1995). This theory has been recently extended to encompass we-based constructs of all variables under the MGB and to operationalize the MGB in which responses of all members of groups are incorporated (Bagozzi, 2005).

Another contribution of this research was to identify a common set of individual and social variables that determine participation in social interactions across a variety of online venues and organize these in a model (Figure 1) that is similar to the TPB and MGB yet goes beyond them to include social antecedents of the desire and intention to pursue common goals. We showed that the model applies to both interactive and noninteractive venues and uncovered interesting differences between the two groups. Still another contribution was to study how online social interactions influence a variety of offline behavioral outcomes. Our findings in this regard can be summarized as showing that the effects are complex. Whereas some activities such as face-to-face interactions with friends, engagement with hobby groups, and reading books remained at more or less the same levels as before, others such as telephone conversations, watching television, neighborhood activities, reading magazines and newspapers, and listening to the radio were all reduced by participants significantly. Further, the magnitudes and directions of these changes were found to be functions of both the type of the online venue as defined by its interactivity level and, to a lesser extent, the participant’s gender.

A number of interesting differences can be pointed out between the high-interactivity and low-interactivity groups. First, social identity played a strong role in the former but not the latter group. That is, social identity directly predicted desires and, through desires, indirectly predicted we-intentions and participation behavior for people in the high-interactivity group. But social identity neither directly nor indirectly predicted desires or intentions for people in the low-interactivity group. Apparently, the greater synchronicity and breadth of input of communication and the higher level of involvement characteristic of high-interactivity venues permit the development, experience, and reinforcement of social identity, compared to the less engaging low-interactivity venues. Second, the oft-studied subjective norms variable, which has been found to capture interpersonal influence in a variety of situations, failed to predict desires, intentions, or participation behavior for high- and low-interactivity venues. This is probably a consequence of the difficulty in

monitoring compliance and administering rewards and punishments in, and the ease of disengaging from, virtual communities. Supporting this conclusion, we point out that group norms predicted desires in both the high- and low-interactivity groups. As group norms work through mechanisms of internalization (Eagly & Chaiken, 1993; Kelman, 1974), these findings establish that social influence has effects without the need for face-to-face interactions and compliance processes but rather can become incorporated into the values and goals of decision makers that are shared with comembers of their salient groups.

Third, considerably more explained variation in participation behavior occurred for the high-interactivity venue ( $R^2 = .30$ ) than the low-interactivity venue ( $R^2 = .18$ ). This seems to be a consequence of the greater involvement and social identification with comembers in the former compared to the latter.

Despite the aforementioned differences, many commonalities exist between the processes found in the two venues. The following effects were found in both venues: Negative anticipated emotions predicted desires, group norms predicted desires, desires predicted we-intentions, PBC predicted we-intentions, we-intentions predicted participation behavior, and group norms predicted we-intentions. Social influence in the form of group norms seemed particularly operative in both venues, and desires performed an important motivational role, as well as channeling individual, as well as social, level effects onto volitional processes.

In addition to the theoretical and practical value of the findings described here, this study raises some interesting questions for future research. First, it is important to point out that for all the online social interactions considered here, we investigated ongoing cooperative social action. In this case, the social groups had already been formed, and the shared intention to participate in the social interaction together was, in a sense, a standing arrangement to act jointly in the future, whenever certain predetermined conditions arise, such as at a particular time or occasion. Our focus on such existing groups restricts the scope of inquiry to "returning" participation we-intentions, rather than we-intentions to join or participate for the first time. Without a doubt, the process of creation of such online groups and the evolution of first-time we-intentions (i.e., how the "I" evolves to "we") are topics in need of future study (Bagozzi, 2000). At the same time, it is worth noting that our emphasis on existing, real social groups complements nicely the existing communications research on the study of groups without any preexistence and prior knowledge of group members (e.g., Postmes et al., 1998; Spears & Lea, 1994; Walther, 1997).

Second, with regard to group dynamics, the online social interactions considered here constitute group actions that vary in degree of cooperation. Some such interactions may be fully cooperative in the sense that group members negotiate, plan, and enact actions that are fully coordinated with each other so as to achieve mutually held goals. An example of such an interaction would be when a group of far-flung friends or family members meets online at a specific time every week

to chat together. A second type of online social interaction may be characterized as partially cooperative, whereby members perform coordinated individual actions but coordination governs only a portion of the group action. E-mail lists, devoted to specific topics such as computer software use, or online groups, emphasizing commercial transactions that we studied, may be instances of such partially cooperative action. In these cases, the individual may participate in response to earlier communications or may even originate communications that result in interaction, but these actions lack the extent of mutual understanding, commitment, and coordination characteristic of fully cooperative group action.

A third distinct type of online social interaction may be referred to as minimally cooperative group action (Bagozzi & Lee, 2002). In this case, group members engage in collective action and have a common goal, and perhaps may even mutually believe in their shared goal, but share no perceptible coordination in enacting their behaviors. An example of such actions may be a classroom of students listening to a lecture and taking notes, wherein each student may have similar goals of learning but without any joint intention. Many online social interactions such as technical support groups and some news bulletin boards fit this bill. Here, most members have a common goal such as “to get help in using the software” or “to get information on job openings,” but the extent of their we-intentions may be weakly formed. In this research, we focused on these differences only indirectly, through studying the role of venue interactivity. It might be of value to consider how the extent of cooperation is formed and sustained in online groups over time and whether certain venues support certain types of cooperative group action.

Finally, in this research, we focused mostly on active group members in cooperative models—members who take a strong interest and participate actively in the online social interaction for shared goals. Such individuals, who consider themselves to be integral members of the online group (and are viewed by other group members in these terms), may have a strong sense of “groupness.” One way in which online social groups differ from traditional groups is that such groups may have “lurkers”—individuals who consume the beneficial outcomes of the social interaction among others in the group without contributing to it (McKenna & Bargh, 1999). An interesting extension to the research reported herein is to study the bases of participation of such lurkers and whether social variables exert any influence on their continued lurking within the venue in which online social interactions occur.

In contrast to cooperative online social interactions, it is important to acknowledge that people may enter online interactions with ulterior motives, such as is reflected in online predators, participants who pursue personal gain alone and even attempt to sabotage or disrupt cooperation, or people who adopt false identities for deceptive purposes. These noncooperative online social interactions are obviously worthy of study.

As a caveat, we repeat that we do not make claims that our findings prove causality. Nevertheless, our methodology constitutes a type of quasi-experimentation (e.g. Shadish, Cook, & Campbell, 2001). This study is a survey, and to address challenges to validity we took a number of precautions. First, rather than merely testing a saturated model in which “everything is related to everything,” we performed formal tests of mediation wherever appropriate. For example, in our framework, attitudes were expected to influence participation we-intentions but only through desires. To test these hypotheses, we compared the model shown in Figure 1 to the model in which a direct path from attitude to we-intentions was added. As reported in the Results section, the comparison was done with an  $\chi^2$  difference test and implements a procedure essentially equivalent to the one recommended by Baron and Kenny (1986) for mediation under multiple regression models. In all, given the hypothesized model, there were a total of 16 such rival hypotheses to test for both the high- and low-interactive cases, for a total of 32 formal tests of mediation. Second, we tested hypotheses across groups, rather than merely doing a single-sample study. Finally, our tests of hypotheses were performed on longitudinal data. All of these practices fall short of a true experiment but go beyond the typical correlational study and implement a kind of quasi-experiment.

To conclude, there is little doubt that the importance of online social interactions is only going to increase. As the networks that constitute the Internet become bigger and more resilient, individuals using them will inevitably be drawn to others using them for diverse purposes and in a multitude of ways. The French sociologist Maffesoli's (1996) words underscore this point:

The paradigm of the network can then be seen as the re-actualization of the ancient myth of community; myth in the sense that something that has perhaps never really existed acts, effectively, on the imagination of the time. This explains the existence of those small tribes, ephemeral in their part, but which nevertheless create a state of mind that, for its part, seems called upon to last. ... It forces us to rethink the mysterious relationship uniting “place” and “we.” (p. 148).

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## NOTES

<sup>1</sup>All of the measures in the survey adopted a common time frame of “the next 2 weeks.” This served two purposes. First, it gave participants an appropriate closed-ended context in which to

respond to the measures in the first wave. Second, it allowed us to approach participants again after that time period had elapsed and refer to the same time period when collecting participation behavior measures, thus permitting temporal consistency in measures across the two waves.

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