Cyberostracism: Effects of Being Ignored Over the Internet

Kipling D. Williams, Christopher K. T. Cheung, and Wilma Choi
University of New South Wales

Ostracism is such a widely used and powerful tactic that the authors tested whether people would be affected by it even under remote and artificial circumstances. In Study 1, 1,486 participants from 62 countries accessed the authors' on-line experiment on the Internet. They were asked to use mental visualization while playing a virtual tossing game with two others (who were actually computer generated and controlled). Despite the minimal nature of their experience, the more participants were ostracized, the more they reported feeling bad, having less control, and losing a sense of belonging. In Study 2, ostracized participants were more likely to conform on a subsequent task. The results are discussed in terms of supporting K. D. Williams's (1997) need threat theory of ostracism.

Ostracism, the act of ignoring and exclusion, has been widely documented as ubiquitous and powerful (Gruter & Masters, 1986; Williams, 1997). Animals have been described as using it to regulate social behavior by excluding noncontributing members (Goodall, 1986; Lancaster, 1986). In humans its use has been observed in primitive (Boehm, 1986; Mahdi, 1986) and modern (Woods, 1978) cultures, tribes (Basso, 1972), military academies (Davis, 1991), schools and academic institutions (Heron, 1987), the workplace (Faulkner & Williams, 1999; McInnis & Williams, 1999), religious groups (Gruter, 1986), and interpersonal relationships (Sommer, Williams, Ciarocco, & Baumeister, in press; Williams, Shore, & Grahe, 1998; Williams & Zadro, 1999).

Recently, Kraut and colleagues (Kraut et al., 1998) reported that individuals who used the Internet for just a year or two were more likely to become depressed and lonely—a finding that to some was counterintuitive. Unlike television, which involves passive nonsocial attention, most Internet usage is in fact devoted to active social communication (Kraut et al., 1998). Nevertheless, Kraut and colleagues argued that Internet usage takes time away from face-to-face contacts and replaces stronger ties with weaker ones. As a result, the quality of interaction decreases, resulting in feelings of loneliness, depression, and generally a lowered sense of belonging.

This deleterious effect is further compounded when we consider observations that Internet users often perceive that they are being ignored (Rintel & Pittam, 1997a, 1997b). Acts of ignoring may be deliberate, as when a group of MUD (multiuser dungeons) or chatroom users choose to ignore members who violate the group's norms (e.g., by straying from the topic or by being profane), or may simply reflect typical delays and difficulties associated with technical problems of the Internet. Whether deliberate or not, one can only imagine the impact that being ignored may have on individuals who are using a medium that already predisposes them to depression and loneliness.

The goal of this article is to take this notion from our imagination to our laboratory—in our case, our virtual laboratory. We present two on-line experiments that manipulated ostracism over the Internet. Individuals were ignored and excluded while they were participating in a triadic game of toss. In Experiment 1, we manipulated ostracism and measured their perception of being ostracized as well as their self-reported feelings and thoughts. In Experiment 2, we tested whether being subjected to cyberostracism would lead participants to conform. We first review the relevant literature on ostracism and present a theory from which our hypotheses are derived.

Ostracism

Ostracism occurs across the life span. Young children use forms of ostracism on each other during supervised play (Barner-Barry, 1986), and adolescents, particularly girls, are likely to use ostracism in their conflicts (Cairns, Cairns, Neckerman, & Ferguson, 1989). Most adults will at some point in their lives be targets and sources of ostracism (we use the terms "target" and "source" to

refer to the individuals who are ostracized and who ostracize, respectively). In a representative survey of over 2,000 Americans, 67% admitted to using "the silent treatment," a punitive form of ostracism, on a loved one, whereas 75% indicated that they had been a target of the silent treatment by a loved one (Faulkner, Williams, Sherman, & Williams, 1997). Elderly citizens' reports of feeling ignored by society, colleagues, and family members are positively correlated with lower life satisfaction (Madey & Williams, 1999). Among the ill, there are semantic and metaphorical links between ostracism—sometimes called "social death" (Sudnow, 1967)—and biological death. Sweeting and Gilhooly (1992) reported that loved ones and health care professionals had been observed to cease interacting socially with dying persons, often discussing postmortem tasks and responsibilities with others in the dying person's presence, as if they were not there.

Research on Ostracism

Its prevalence across time, cultures, and species has led to an increased interest in ostracism. In a special edition of *Ethology and Sociobiology*, anthropologists, sociologists, biologists, physiologists, ethologists, zoologists, and legal experts examined ostracism (see Gruter & Masters, 1986). Ostracism was viewed as evolutionarily functional for the sources (it kept the group cohesive and made it more likely to survive) but devastating to the targets (who usually died or were forced to join other groups).

Social psychologists have also increased their interest in the nature, causes, and consequences of ostracism. In fact, the basis of many phenomena in social psychology resides in the assumption that individuals fear exclusion, rejection, and being ignored. Because of this fear, individuals conform, comply, obey, ingratiate, improve their appearance, and manage their impressions to others in order to be included and feel like they belong (Baumeister & Leary, 1995). Whereas early studies examined the effects of being completely physically isolated from other people (e.g., Schachter, 1959), subsequent studies focused on what we call social ostracism, being ignored and excluded in the presence of others.

Research on social ostracism has shown that it causes a host of psychologically aversive reactions in targets of ostracism. These reactions include reports of depressed mood, loneliness, anxiety, frustration, invisibility, and helplessness (Geller, Goodstein, Silver, & Sternberg, 1974; Leary, 1990; Pepitone & Wilpizeski, 1960; Sommer, Williams, Ciarocco, & Baumeister, in press; Williams & Sommer, 1997; Williams & Zadro, in press). The aversive impact of social ostracism has been shown to increase when targets attribute the ostracism to their own personal shortcomings (Dittes & Kelley, 1956; Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997; Pepitone & Wilpizeski, 1960) or when the ostracism is done more blatantly than subtly (Snoek, 1962). Being ignored or rejected produced negative self-evaluations even when individuals merely imagined (Craighead, Kimball, & Rehak, 1979; Samolis, 1994) or role-played being ostracized (Williams, Bernieri, Faulkner, Gada-Jain, & Grahe 2000; Zadro & Williams, 1998). Targets of social ostracism usually feel less positively about the sources who ostracized them (Geller et al., 1974; Pepitone & Wilpizeski, 1960), but when the opportunity is presented, they often try to get back into the good graces of the sources (Snoek, 1962; Williams & Sommer, 1997).

Williams (1997; Williams & Zadro, in press) recently developed a model that attempts to unify the many conceptualizations of ostracism, to provide predictions of consequences of ostracism based on its impact on four fundamental needs. Prior to the development of this model, researchers used the term ostracism to refer to everything from derogatory humor (Alexander, 1986) to capital punishment (Mahdi, 1986). Although there may be a common thread to these widely divergent phenomena, the model restricts the definition of ostracism to acts of being excluded and/or ignored, subjectively defined from either the sources' or targets' perspective. In the present article, we will focus on the predictions related to the targets' perception of being ostracized.

Whereas the definition is more restrictive than formerly used ones, the model recognizes the diversity of forms of ostracism, which can range from exile to averted eye contact. It can be perceived when unintended, attributed to mundane explanations (as might occur when one is not acknowledged in an elevator) or to reasons that are more strategic and punitive. Unintentional ostracism may be perceived to be relatively meaningless (e.g., "the other person did not hear me") or extremely self-relevant (e.g., "the other person thinks so little of me as to not notice my existence"). Because of the many ways to interpret such acts, we believe ostracism is rather unique in terms of its inherent ambiguity. Questions like, "Is it happening or not?" and "If it is, why is it happening?" may be more common with ostracism than with other forms of interpersonally aversive behaviors. Because silence usually accompanies being ignored, these questions are left unanswered. Ambiguity by itself has been shown to be aversive (Edwards, 1998; Grieve & Hogg, in press; Lieberman, Cathro, Nichol, & Watson, 1997), but when linked to ostracism, it can lead to damaging introspections and attributions. When attributions for ostracism can reflect plausibly on the self, it can be even more aversive, because it has the potential to threaten fundamental needs.

The core of the model is the proposition that ostracism, compared with other aversive interpersonal behaviors, uniquely and quickly threatens four fundamental needs: belonging, self-esteem, control, and meaningful existence. There is an abundance of research and theory that supports the importance of each of these needs for human motivation, efficacy, and survival. Humans need and seek to increase their sense of belonging (Baumeister & Leary, 1995), self-esteem (Steele, 1988; Tesser, 1988), control (e.g., Burger, 1992; Peterson & Seligman, 1984; Seligman, 1975), and meaningful existence (Greenberg, Pyszczynski, & Solomon, 1986; Greenberg et al., 1990; Greenberg et al., 1992).

Ostracism deprives targets of their sense of belonging, because all signs of bondedness are severed. Ostracism is not simply disagreeing with targets or pointing out their shortcomings—it is an active denial of being connected with the target. Furthermore, because ostracism is associated with punishment, it carries with it the implicit accusation that the target has done something wrong. Implicit negative feedback, perhaps especially when it is not linked to any specific behavior, should threaten targets' sense of self-esteem. Ostracism threatens targets' perceived control over the interaction with the source(s). Although exchanging verbal accusations or punches with sources is unpleasant, they can still provide the target with a sense of control or influence over the interaction. A sense of control is lost when targets are unable to elicit any reactions from sources. Finally, ostracism, perhaps more

than any other form of aversive control, is a poignant metaphor for what life would be like if the target did not exist. Indeed, as discussed earlier, ostracism is often referred to as social death. Like other forms of mortality salience, ostracism should threaten people's sense of meaningful existence and remind them of the fragility of their lives.

As a result of these threatened needs, targets of ostracism are hypothesized to react initially with psychological discomfort, including negative mood, anxiety, physiological arousal, and hurt feelings. Williams's (1997) model proposes that, to defend against this psychological discomfort, individuals will cope by attempting to regain or refortify their lost or threatened needs. They will do this cognitively, emotionally, or behaviorally. For example, threats to belonging can be refortified by selectively remembering group information (Gardner, Pickett, & Brewer, 2000), reminding oneself of groups to which one belongs, intensifying the love one has for others, or conforming to group norms (Baumeister & Leary, 1995).

Whereas prior research has focused on the impact of physical and social ostracism, we believe that perceptions of exclusion and ignoring can also occur in virtual reality. To test this idea, unknown and unseen others ostracized individuals in cyberspace. We call this form of ostracism *cyberostracism*, by which we mean any intended or perceived ostracism in communication modes other than face-to-face. This includes, but is not limited to, failing to receive a reply in the mail, a phone call, or in the present case, being ignored over the Internet. Cyberostracism may be more or less frustrating and debilitating than social or physical ostracism. It has the potential to be more ambiguous (e.g., what appears to be ostracism may be intended or it may reflect a technological problem) and it lacks useful cues usually available to targets in face-to-face interactions that might help clarify the situation. On the other hand, the ambiguity might offer the target a nonthreatening excuse for being ignored (e.g., a technological difficulty), and the paucity of cues may allow the target enough anonymity and distance to deflect any possible effects of being ignored.

Accordingly, in Experiment 1, we hypothesize that targets of cyberostracism will report lower levels of belonging, self-esteem, control, and meaningful existence. As a consequence, they will report psychological discomfort. In Experiment 2, we hypothesize that when targets of cyberostracism have the opportunity to cope with their psychological discomfort, they will be more likely to conform to others as a means to refortify their sense of belonging.

Experiment 1

The first goal of Experiment 1 was to test a new paradigm for studying ostracism, specifically cyberostracism. Previous laboratory research (Williams & Sommer, 1997) indicated that in a relatively short and seemingly innocuous face-to-face triadic ball-toss interaction, participants who were not thrown the ball readily perceived being excluded and felt bad compared with participants who were included. In this experiment, we went a step further. Our participants would take part in a virtual tossing game, in which they were only led to believe that they were "tossing" an object in cyberspace with two other people whom they did not see or know anything about. Would these individuals also feel ostracized when the object was not tossed to them? By manipulating levels of inclusion and ostracism, we examined whether participants per-

ceived the differential levels and if they would report any negative psychological reactions to ostracism.

Secondly, we wanted to examine the impact of varying quantities of ostracism on the participant. Although partial ostracism may produce doubts and frustration, it could also be misperceived and dismissed. Complete ostracism, however, should leave participants with no plausible interpretation other than that they are being excluded. Another reason for varying quantity of ostracism is that it allows us to eliminate an alternative explanation. Being a target of ostracism may be unpleasant simply because the individual feels conspicuous or self-aware (Carver & Scheier, 1981). Being included as an equal partner in a triadic tossing game would not make the participant feel conspicuous. Therefore, we added an overinclusion condition in which participants should feel conspicuous and self-aware but not ignored or excluded. We felt that being the object of inattention was not the same as being the object of attention, so we hypothesized that overinclusion would not be aversive, whereas ostracism would be. Our general prediction for quantity of ostracism was that greater amounts of ostracism would lead to stronger aversive reactions.

Third, we measured participants' responses to a trait self-esteem scale. Research on rejection sensitivity of people low in self-esteem led us to test whether, compared with those higher in self-esteem, low self-esteem individuals would experience greater negative impact to ostracism relative to inclusion. For instance, Schneider and Turkat (1975) reported that low self-esteem individuals were more dependent on the evaluations of others in determining their sense of self-worth. Baldwin and Sinclair (1996) found that low self-esteem individuals held negative cognitive schemata that predisposed them to interpret socially ambiguous responses as rejection. Finally, Nezlek et al. (1997) found that individuals who had either scored low on trait self-esteem or high in depression tended to feel less accepted when they believed they were personally rejected by others in the group but more accepted when they were personally included by the group. For these reasons, we examined whether this pattern would emerge for ostracism as well. Thus, we predicted that there would be a main effect for self-esteem, such that lower levels of self-esteem would lead to higher levels of aversive impact, but we also were looking to see if self-esteem would interact with quantity of ostracism. If lower self-esteem predisposes individuals to perceive negative feedback, then they should be more likely to perceive and react negatively, even with partial ostracism.

Finally, based on our theoretical model, we expected that the effect of ostracism on self-reported psychological discomfort would be mediated by the degree to which the four needs were threatened. Therefore, we propose to conduct mediational analyses to test this prediction.

Method

Participants. Initially, 1,720 individuals accessed the web site (described below), but 234 logged off early and were eliminated from the analyses, leaving a total of 1,486 participants. These participants accessed the site through various avenues. About half were undergraduate students from various universities, whereas others were recruited though listservs, newsgroups, or links on relevant web sites. There were more females (64%, $n = 941$) than males (36%, $n = 545$) and they came from 62 different countries, with the majority from the United States ($n = 1,008$), followed by Canada ($n = 126$), Australia ($n = 67$), and others ($n = 285$). Partici-

Table 1

Means and Standard Deviations for Each Dependent Variable as a Function of Quantity of Ostracism in Experiment 1

| | Quantity of ostracism | | | | | | | |
| | Overinclusion ($n = 372$) | | Inclusion ($n = 397$) | | Partial ostracism ($n = 382$) | | Complete ostracism ($n = 335$) | |
Variable	M	SD	M	SD	M	SD	M	SD
Needs threatened (combined)	13.55	5.72	14.98	5.81	16.68	6.19	19.47	5.54
Belonging	3.09	1.84	4.01	2.15	5.12	2.27	7.01	1.97
Control	3.49	2.19	3.35	2.11	3.46	2.29	3.54	2.31
Meaningful existence	2.53	2.35	2.66	2.29	2.62	2.36	2.55	2.28
Self-esteem	4.45	2.04	4.96	2.18	5.48	2.19	6.37	2.00
Aversive impact index	24.45	9.85	27.73	11.00	34.58	13.09	44.75	12.76
Mood	12.76	6.75	13.44	6.74	15.95	7.63	19.27	7.50
Intensity of ostracism	4.33	2.93	6.29	3.60	8.93	4.30	12.98	3.93
Group cohesiveness	7.36	3.21	8.00	3.55	9.70	3.77	12.50	3.78

pants from the age ranges of 13 to 18 years (26%, $n = 380$), 19 to 25 years (37%, $n = 542$), and 26 to 55 years (36%, $n = 531$) were most prevalent. Forty percent ($n = 590$) of the participants indicated that they had 2 to 3 years' experience with the Internet, and the most common amount of time spent per week using the Internet to communicate was 2 to 4 hours (37%, $n = 542$).[1] Table 1 shows the number of participants per condition.

Design. Participants were randomly assigned to one of four levels of quantity of ostracism: overinclusion, inclusion, partial ostracism, and complete ostracism in a single-factor between-subjects design. Self-esteem served as a predictor variable.

Procedure. The study was conducted on an Internet web site, http:// psyber.psy.unsw.edu.au (no longer active). Data were collected over 15 months. The web site was written in Hypertext Markup Language (HTML). Software was written in PERL—a programming language specifically designed for use with web sites—to collect and store data as well as randomly assign participants to groups and colors to the computer-generated players. Graphics and animations were created in Graphics Interface Format (GIF).

On entering the web site, each participant was met by a welcome page. This page introduced the study, announced that the study had been approved by the School of Psychology, University of New South Wales, and emphasized that data collected were confidential. Furthermore, participants were informed that participation was voluntary and that they could discontinue at any time.

The experiment was conducted under the guise of research into "the utility of the computer as a tool in mental visualization." Participants were informed that recent studies found mental visualization of an action or task to be beneficial to real-world performance and that this study evaluated the use of the computer as a tool in aiding mental visualization.

Participants were initially asked to complete a preexperimental questionnaire, which asked for their age group, their gender, their level of education, their current field of employment, whether English was their first language, their amount of experience using the Internet (in years), their average number of hours per week spent communicating via the Internet, and the country from which they were accessing the study. Participants were also asked to indicate their e-mail address. We used the address as an identifier so that data from the preexperimental and postexperimental questionnaires could be combined and to discourage participants from accessing the study more than once. Following the questionnaire, participants completed Rosenberg's (1965) Self-Esteem Scale.

Participants were then given an overview of the experiment. They were told that there would be two other players and that they should all visualize themselves (and the other players) throwing and catching a flying-disc

according to the messages that were shown on their screen. In fact, the other "players" were computer generated. Further, participants were informed that they could choose to "quit" at any time and move on to the last part of the study. This quit option was presented after the sixth throw to ensure that the ostracism manipulation was perceived. Thereafter, participants picked one of seven colors to represent themselves in the game. Their color choice was confirmed, and they were informed which colors the other players had chosen (in fact, the computer randomly assigned the other players' colors). This was the only information provided about the other players.

For each turn a message and animation were presented on the screen, detailing what had happened. The message and animation varied according to who threw and who caught the flying-disc as well as whether the throw and the catch were good. The message had the following structure: "[Thrower] threw the flying-disc to [receiver]. It was a good (bad) throw. [Receiver] caught (did not catch) it." [Thrower] and [receiver] were replaced with the respective player's chosen color in the appropriately colored word. In cases in which the participant was either the thrower or receiver, then "You" (in the participant's chosen color) was placed appropriately in the message. To maintain enough variability to make the interaction interesting, the probability of a good throw or a good catch was set at .9. This was held constant for all players (both the participant and the computer-generated players) in all conditions.

When participants received the flying-disc, they had the choice of whom to throw to next by selecting that player's color. On each of the turns that participants were not in possession of the flying-disc, they were simply notified of what had happened the previous turn and given the option to continue. An algorithm controlled the computer-generated players' throws. The probability that they would throw it to the participant was programmed according to the quantity of ostracism condition to which participants were assigned. The time taken by each of the computer-generated players to make their decision and throw the flying-disc was varied each turn to increase the believability that they were also "real" participants.

Independent variable. After participants were given a chance to throw once and catch the flying-disc once, they were randomly assigned to one of four conditions that varied in the quantity of ostracism (overinclusion, inclusion, partial ostracism, and complete ostracism). In the overinclusion

condition, the probability that participants would be thrown the disc was 67%; in the inclusion condition, 33%; in the partial ostracism condition, 20%; and in the complete ostracism condition, 0%. The game continued indefinitely until participants chose to quit, at which point they proceeded to the postexperimental questionnaire and thought listing option.

Dependent variables. The postexperimental questionnaire assessed all dependent variables. It was presented on web pages in the form of a standard questionnaire, with 9-point scales ranging from 1 (*not at all*) to 9 (*very much*), and with radio buttons for them to click to indicate their responses. At the end of each page, they submitted their data, and if all items were not checked, it reminded them to do so before resubmitting. The thought-listing option (described below) was an open-ended box that allowed them to write and submit any thoughts they had about the experiment. We checked the success of quantity of ostracism manipulation by asking participants to gauge the percentage of throws they received. Persistence was measured by counting the number of total turns participants allowed the game to continue before quitting. Persistence in playing was assumed to reflect enjoyment of the game.

The extent to which needs were threatened was assessed with four 9-point questions, ranging from 1 (*not at all*) to 9 (*very much*). Belongingness was measured by the question, "How much do you feel you belonged to the group?" meaningful existence by the question, "How true is the statement: 'Life is meaningless'?" control by the question, "How true is the statement: 'I am in control of my life'?" and socially-oriented self-esteem by the question, "To what extent do you think the other participants value you as a person?" The self-esteem question was intentionally different from those items used in the self-esteem scale at the beginning of the experiment and was designed to be conceptually consistent with Leary's (Leary, Haupt, Strausser, & Chokel, 1998; Leary, Tambor, Terdal, & Downs, 1995) notion of self-esteem as a sociometer. Items measuring belongingness, control, and self-esteem were reverse scored such that higher scores for each measure indicated a greater need threat (lowered perception of currently possessing that need).

The following measures were used to assess the aversive impact of ostracism. Mood was assessed with four questions that asked participants to indicate how they felt at that moment. The anchors for the four items, ranging from 1 to 9, were *bad–good, sad–happy, tense–relaxed,* and *rejected–accepted.* Intensity of ostracism was measured by two 9-point questions, ranging from 1 (*not at all*) to 9 (*very much so*). The first item asked the participant, "To what extent did you feel that you were being ignored or excluded by the other participants?" The second item, which was reverse scored, asked, "To what extent did you feel that you were being noticed or included by the other participants?" Perception of group cohesiveness was assessed with two items, ranging from 1 (*not at all*) to 9 (*very much so*), "How much did you like the other players," and "How much did the other players like you?" which were both reverse scored.

Debriefing. After completing all measures, participants were provided an extensive debriefing that outlined the aims of the study and reassured them that the other players were in fact computer generated and were programmed to include or ostracize. They were also provided a link to the experimenter's e-mail address if they had any further questions.

Results

Because of the large sample size, we will report as significant only those effects for which $p < .01$.

Manipulation check. Participants accurately perceived the percentage of throws they received. All participants received one throw of the ball at the onset, so that the percentage of throws received would always be above 0%. A multiple regression analysis (with quantity of ostracism dummy coded) revealed a significant main effect for quantity of ostracism, $\Delta R^2 = .474$, $F(3, 1478) = 449.1, p < .01$. Those who were overincluded perceived higher percentages of throws ($M = 50\%, SD = 19\%$) than those in

the inclusion condition ($M = 34\%, SD = 13\%$), $F(1, 1484) = 121.7, p < .01$. Partially ostracized participants perceived receiving even fewer throws ($M = 26\%, SD = 14\%$) than those in the inclusion condition, $F(1, 1484) = 42.1, p < .01$; and completely ostracized participants reported receiving even fewer throws ($M = 12\%, SD = 9\%$) than partially ostracized participants, $F(1, 1484) = 66.7, p < .01$. Effects of self-esteem on percentage of throws was negligible ($\Delta R^2 = .001$), and there was no interaction between quantity of ostracism and self-esteem.

We performed a trend analysis to evaluate whether the effects of ostracism on the perceived percentage of received throws were linear, quadratic, or cubic in nature. Because levels of inclusion and ostracism were not equal intervals, we used the frequency of ostracism (0%, 20%, 33%, and 67%) as the predictor instead of ostracism group. The curve estimation procedure involves sequentially testing regression models involving the linear, quadratic, and cubic forms of the multilevel independent variable.

There was a significant linear effect of ostracism on the reported percentage of throws received, ($\beta = .76$, $SE = .05$), $t(1483) = 14.45, p < .01$, as well as a smaller quadratic effect ($\beta = -.003$, $SE = .00007$), $t(1483) = -3.93, p < .01$. There was no significant cubic effect. The R^2 improvement in fit between the linear model ($R^2 = .472$) and linear and quadratic model ($R^2 = .477$) was small, suggesting that the linear model alone could reasonably explain the data.

The success of the ostracism manipulation was also revealed through several participants' comments on their experience in thought boxes provided at the end of the questionnaire. One participant wrote, "I visualized us playing on a big open-spaced park, with a small fence surrounding it. I visualized each disc thrower throwing their disc. Mr. Brown appears short; Mr. Green seems lanky. They formed a conspiracy against me. I began to get disinterested when I was not included." Another wrote, "Felt like I was having fun. Then I didn't get the disc back and felt left out, ignored." Still another wrote, "Surely green is trying to appear nice with purple. . . I assume he 'wants' to please 'her' and disregard my feeling about her!. . . As I leave I'm somewhat happy their behavior will surely make them guilty when they will notice I went away. As I leave I remember it is quite the same in my real life. . .and this is the most painful!"

Self-esteem scores. Rosenberg's (1965) Self-Esteem Scale was used as a measure of trait self-esteem. The scale comprised 10 items to which participants were asked to agree strongly, agree, disagree, or disagree strongly ($M = 1.8$, $SD = 1.76$, with higher scores indicating higher self-esteem). Scores were centered for analyses. Further, an internal consistency estimate of reliability was calculated resulting in a coefficient alpha of .90.

Persistence. The average number of turns played before quitting for the entire sample was 13.17 ($SD = 13.16$). Multiple regression revealed a significant main effect for quantity of ostracism, $\Delta R^2 = .012$, $F(3, 1478) = 6.2, p < .01$, but no effect for self-esteem, $\Delta R^2 = .001$, $F(1, 1478) = 1.2$, *ns*, or the two-way interaction, $\Delta R^2 = .002$, $F(3, 1478) = 1.1$, *ns*. Post hoc contrasts comparing the mean number of turns played indicated that those in the complete ostracism condition ($M = 11.0$ turns, $SD = 8.6$) quit the game earlier than did those in the no ostracism condition ($M = 13.7$ turns, $SD = 13.9$), $t(1478) = 2.92, p < .05$, and the partial ostracism condition ($M = 15.0$ turns, $SD = 16.2$), $t(1482) = 4.12, p < .01$. There was no difference, however,

between persistence in the complete ostracism and the overinclusion condition ($M = 12.7$ turns, $SD = 12.0$), $t(1478) = 1.70$, ns.

There was a small, but significant, linear ($\beta = .18$, $SE = .049$), $t(1483) = 3.65$, $p < .01$, and quadratic ($\beta = -.0023$, $SE = .00066$), $t(1483) = -3.57$, $p < .01$, effect of quantity of ostracism on persistance ($R^2 = .009$). There was no significant cubic effect. This pattern of findings suggests that the relationship between quantity of ostracism and persistence was predominantly quadratic in nature. Increasing quantities of ostracism led to greater persistence up through partial ostracism; then persistence dropped for complete ostracism.

Aversive impact. Because analyses revealed similar patterns of results for measures of mood, intensity of ostracism, and perception of group cohesiveness (the intercorrelations between the three sets of measures were sufficiently high, rs ranging from .49 to .53, all ps $< .01$), we simplified the reporting of these results by creating an aversive impact index. Higher index scores meant participants were more negatively affected (scores ranged from 8 to 72, $Mdn = 40$). Means and standard deviations for each component, as well as means and standard deviations for all dependent measures, are shown in Table 1.

A multiple regression revealed main effects for quantity of ostracism, $\Delta R^2 = .293$, $F(3, 1478) = 219.3$, $p < .01$. As shown in Table 1, planned contrasts confirmed that there were significant differences between each level of quantity of ostracism, such that higher aversive impact was observed for higher quantities of ostracism, ts$(1478) = 3.32$ to 23.45, all ps $< .01$. There was also a significant main effect for self-esteem, such that lower self-esteem scores were related to higher levels of aversive impact, $\Delta R^2 = .046$, $F(1, 1478) = 102.3$, $p < .01$. The Quantity of Ostracism $\times$ Self-Esteem interaction was not significant, $\Delta R^2 = .00$, $F(3, 1478) = .99$, ns.

For aversive impact, there was a significant linear ($\beta = -.69$, $SE = .04$), $t(1483) = -15.77$, $p < .01$, and quadratic ($\beta = .006$, $SE = .0006$), $t(1483) = 9.51$, $p < .01$, effect ($\Delta R^2 = .29$). There was no significant cubic effect. As can be seen in Table 1, increasing quantities of ostracism led to greater aversive impact.

Mediational analysis involving ostracism, needs threatened, and aversive impact. According to Baron and Kenny (1986), mediation occurs if the independent variable predicts the dependent variable, the independent variable predicts the mediator, and the mediator predicts the dependent variable controlling for the independent variable in the model. The model proposes that ostracism (the independent variable) can threaten each of four needs (the mediators), which in turn, lead to psychological discomfort in individuals (the dependent variable). The first requirement was met, such that a regression of the aversive impact index on quantity of ostracism was significant, $\Delta R^2 = .30$, $F(3, 1482) = 206.6$, $p < .01$.

With respect to the second step, only two needs met the required test. Higher levels of quantity of ostracism resulted in lower levels of reported belonging, $R^2 = .332$, $F(3, 1482) = 234.2$, $p < .01$, and self-esteem, $R^2 = .097$, $F(3, 1482) = 53.2$, $p < .01$. However, quantity of ostracism did not affect the levels reported for perceived control, $R^2 = .001$, $F(3, 1482) = .493$, $p > .1$, or meaningful existence, $R^2 = .001$, $F(3, 1482) = .283$, $p > .1$.

For belonging and self-esteem, we then proceeded to the third step. When perceptions of belonging was added to the model, the effect of quantity of ostracism on aversive impact was reduced,

$\Delta R^2 = .01$, $F(3, 1481) = 19.8$, $p < .01$. Likewise, when self-esteem was added to the model, it reduced the influence of quantity of ostracism on aversive impact, $\Delta R^2 = .14$, $F(3, 1481) = 139.76$, $p < .01$. Therefore, according to Baron and Kenny's (1986) criteria, perceptions of belonging and self-esteem mediated the impact of ostracism on aversive feelings. Because belongingness and self-esteem were moderately correlated, ($r = .59$, $p < .01$), we investigated the extent that belongingness and self-esteem were unique mediators in the relationship between ostracism and aversive impact. We used ostracism and the two mediators in the same regression equation to predict aversive impact. This procedure allowed us to examine the impact of self-esteem while controlling for belongingness and vice versa. The regression analysis revealed that belongingness ($\beta = 3.3$, $SE = .12$) and self-esteem ($\beta = 1.24$, $SE = .12$) significantly predicted aversive impact (both ps $< .001$). Thus, they both appear to uniquely contribute to the relationship between ostracism and aversive impact.

Although perceived control and meaningful existence were not influenced by the quantity of ostracism, they independently influenced aversive impact. Regression analyses revealed that perceptions of control threat were positively correlated with aversive impact, $R^2 = .049$, $F(1, 1484) = 77.0$, $p < .01$, as was threatened meaningful existence, $R^2 = .032$, $F(1, 1484) = 49.6$, $p < .01$.

Discussion

The Internet ostracism paradigm was successful in several ways. We drew a large and diverse sample of participants.[2] The ostracism manipulation was perceived accurately and produced the hypothesized negative impact as measured by participants' self-reports. Aversive impact, as measured by negative mood, intensity of ostracism, and low group cohesiveness, increased as ostracism became more complete. These negative consequences were obtained despite the fact that, because participants were accessing the Internet in their own private environments, they were insulated from public embarrassment and ridicule. In fact, they had no idea who the ostracizing sources were and certainly would not be expecting any future contact with them. The sources were as psychologically distant as we could make them. Even the flying-disc was hypothetical. Nevertheless, targets of ostracism felt excluded; their moods dampened. This result points to the strength and potency of ostracism; it can be felt even in the artificial and minimal social environment that we created over the Internet.

Furthermore, we were able to obtain partial support for our theory of ostracism (Williams, 1997). As predicted, the mediation analyses were consistent with the proposed mediation between ostracism, decreased feelings of belonging and socially based self-esteem, and aversive impact. This finding suggests that the need for belonging is particularly sensitive to even remote social cues, adding further support to Baumeister and Leary's (1995) claim that the need to belong is fundamental to human motivation. The self-esteem measure, as mentioned, was worded to be consistent with Leary's sociometer hypothesis that self-esteem is an

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[2] In fact, we found that our experiment was endorsed on a "teaching of psychology" listserv. Although we could not check, we believe this endorsement was responsible for our unexpectedly large sample size; apparently, many teachers encouraged their students to participate in our experiment.

indicator of attractiveness to others. As such, both measures speak more directly to belonging than to any other particular motive.

We failed to find support for our prediction that ostracism would threaten control and meaningful existence. Other studies using social ostracism (i.e., ostracism by others who are in the presence of the target) have found that both control and meaningful existence are negatively affected (Lawson Williams & Williams, 1998; Williams, Shore, & Grahe, 1998; Williams & Zadro, 1999). The lack of effects for these two needs in this study may be because they are not as relevant during cyberostracism, or at least during a brief period of cyberostracism. Perhaps the issue of control is less salient when we sit and watch the other players continue their exclusive interaction on the screen as compared with watching them in one's own presence. It is also possible that participants experienced some control even in the ostracism conditions because they had to click the word *next* to continue the game. Perhaps this technological feature undermined the control threat of ostracism in our study. And, meaningful existence may only be implicated by the feeling of invisibility (the death metaphor) that targets get when others present do not appear to see or hear them. Of the four needs, threats to meaningful existence may be the slowest to engage. It is also possible that because our measures for control and meaningful existence were worded more abstractly (almost as traits), they were less sensitive to momentary changes. Further research is needed to determine which types of ostracism affect which of the four needs.

We also found, as predicted, that perception of ostracism and the aversive impact experienced from it followed a linear trend, increasing with greater levels of ostracism. The more we are ignored and excluded, the more we notice it, and the worse it becomes. Persistence, however, followed a curvilinear path. Participants were more likely to play the game as they went from being overincluded to included to partially ostracized, but when completely ostracized, they quit sooner. Perhaps this can best be understood in behavioral terms: Partial ostracism, like partial reinforcement, may increase persistence; but when all reinforcement is removed, extinction follows.

Two additional findings emerged in this experiment. First, although both overinclusion and ostracism may make targets feel conspicuous, our results indicated that overinclusion was not aversive, whereas ostracism was. Being overincluded, however, was not a more positive experience than being equally included. Second, we explored the effect of trait self-esteem on perceptions of and reactions to ostracism. We predicted individuals with lower levels of self-esteem would be particularly sensitive to ostracism. Consistent with this prediction, we found that self-esteem was positively correlated with estimates of number of throws received, and negatively correlated with aversive impact.

We did not, however, find the interaction between self-esteem and quantity of ostracism that might have been expected on the basis of research by Nezlek et al. (1997). They found that individuals who were either low in self-esteem or high in depression were more sensitive to signals of rejection. Of course, there may be other important psychological differences between being rejected but not ignored (as was done by Nezlek et al.) and being ignored and excluded throughout the interaction (as we did). Consistent with our finding, Leary, Haupt, Strausser, and Chokel (1998) reported that trait self-esteem did not moderate participants' reactions to interpersonal rejection.

Overall, the results of Experiment 1 were quite encouraging: The Internet ostracism paradigm was successful in producing feelings of ostracism, and we found partial support for the model's theoretical predictions. Still, does the impact of cyberostracism as manipulated through a virtual toss game affect more than self-reports? In Experiment 2, we went beyond self-report measures and examined specific behavioral effects predicted by the model.

Experiment 2

In 1951, Schachter (1951) found that after attempts to change the view of a nonconformist in the group failed, the group chose to reject and exclude the nonconformist. Later, in his influential book *The Psychology of Affiliation*, Schachter (1959) signaled his intention to conduct experiments examining the effects of social deprivation on conformity. He never completed this research because he faced numerous logistical and ethical difficulties when he attempted to physically isolate participants. Research on social, and now cyber, ostracism indicates, however, that it is not necessary to physically isolate individuals to make them feel excluded and rejected. If nonconformity can result in ostracism, might not ostracism encourage individuals to conform as a means to refortify their sense of belonging?

In Experiment 1, we showed that ostracism deprived targets of a sense of belonging, which, in turn, led to reports of worsened mood, feelings of exclusion, and perceptions of low group cohesion. Baumeister and Leary (1995) argued that the need to belong, defined as frequent, affectively pleasant, and stable interactions with a few others, is a powerful and extremely pervasive human motivation. They reviewed many studies that showed a linkage between the absence of affiliation and a variety of physical and psychological illnesses, including depression, anxiety, loneliness, stress, and relationship problems. Baumeister and Tice (1990) postulated that human beings function to minimize social exclusion by engaging in achievement-oriented behaviors (demonstrating their ability and willingness to contribute to the group) as well as by accommodating to group standards. One way to accommodate to group standards is to conform to group judgments.

According to Williams's (1997) model of ostracism, targets' reactions to short-term ostracism involve the desire to fortify needs that were threatened or deprived. Because cyberostracism reduced participants' sense of belonging in Experiment 1, they should desire to reestablish bonds with other individuals. Therefore, by arranging the experimental task such that participants have the opportunity to make perceptual judgments following the unanimously incorrect judgments of five other individuals, we hypothesize that, compared with individuals who were previously included, targets of ostracism will be more likely to conform to the group norm.

We also examined whether the behavioral consequences of ostracism are greater if psychological ties between the targets and the sources are stronger. In this study, we manipulate the target's strength of ties with the sources by placing participants in triads consisting of two other in-group members or two other out-group members. We hypothesized that targets of ostracism by in-group members will conform more than targets of ostracism by out-group members. We base this hypothesis on research from social identity theory and from an attributional analysis.

First, feelings of belonging should be most threatened by desirable others. According to social identity theory and self-categorization theory (Hogg & Abrams, 1988; Tajfel & Turner, 1986; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), social influence results from a process of self-categorization, whereby individuals perceive themselves as group members and thus desire to possess the same characteristics and attitudes as other in-group members. In support of this, Reicher (1984) found that individuals endorsed attitudes that showed greater conformity to their own group norm than to an out-group norm during a discussion on the topic of vivisection. This effect emerged despite the fact that the only distinction between the two groups was the color of their overalls and masks. More recently, Mackie, Gastardo-Conaco and Skelly (1992) found that whereas prior knowledge of the in-group position produced acceptance of the in-group position regardless of the message quality (i.e., even for nonmembership-relevant messages), messages from an out-group source produced almost no attitude change.

From an attributional standpoint, self-blaming attributions should be greatest when individuals are ostracized by in-group members. When ostracized by out-group members, targets may easily diffuse the negative impact of ostracism through the use of external, group-level attributions (e.g., "They are not throwing me the ball because of something about them, or because I am not in their group"). Ostracism by in-group members should be less easily attributable to differences in group membership, resulting in more internal self-blaming attributions (e.g., "They are not throwing me the ball because of something about me personally"), which should have greater aversive impact on targets.

For exploratory purposes, we also added a mixed-group condition, comprised of 1 in-group and 1 out-group member. We believe that ostracism by a mixed-group will be threatening, although to our knowledge there are no studies examining mixed-group influence. When ostracized by a mixed-group, targets may be less likely to attribute the ostracism to group membership, because even the in-group member is excluding them. Perceptions of betrayal by the in-group member may also be particularly keen, and the reason for being ostracized becomes very ambiguous. Therefore, targets may be led to make more internal, self-blaming attributions for the ostracism (e.g., "I am such a loser that my in-group member is choosing to conspire with the out-group member.") Our prediction then, is simply that ostracism by a mixed-group will be as threatening and unpleasant as ostracism by in-group members.

In Experiment 2, we modified the flying-disc paradigm with the creation of a "cyberball" game for the induction of ostracism. Aside from changing the name and shape of the tossed object, the game differed from the flying-disc game in several ways. First, we increased the level of animation of the tossing game to increase psychological engagement in the game. Second, we retained only two levels of the ostracism manipulation: inclusion and complete ostracism. Third, we chose not to allow participants to continue the game as long as they wished, because it did not appear to add any value to the analysis and it created different ostracism experiences for different participants. Thus, all cyberball participants played the game for 10 turns, the first 3 of which were standardized as per Experiment 1. Finally, on-line "bubble thoughts" were added so that participants could enter their thoughts about the experience while it was happening.

After engaging in the cyberball game, participants were asked to respond to several perceptual comparisons that had previously been shown to be sensitive to conformity measures (Nemeth, 1986) after viewing the responses of five other (ostensible) people with whom they were performing the perception task. We felt that regrouping participants with new members would provide a stronger test of the hypothesis: If ostracism increases the need to belong, it should increase conformity, even with a new group of individuals. Conformity was measured on the critical trials in which the others gave unanimously incorrect responses.

Two groups of computer users (PC and Macintosh) were chosen as grouping categories for the purpose of the in-group/out-group manipulation. Because the actual differences between PC and Macintosh (Mac) platforms are relatively negligible at this point in time, we believed this in-group/out-group distinction to be an excellent (but admittedly stronger) real-world analogy to typical laboratory studies on minimal group effects (Tajfel, 1970), in which arbitrary assignment to groups induces in-group favoritism.[3]

Method

Participants. There were 501 users who initially accessed the Internet site, but 270 did not complete the experiment. Almost all of these individuals logged off during the introductory phases of the experiment or within the first three throws in the cyberball game. This high rate of withdrawal is a concern, and may be one unavoidable drawback of on-line research. We feel that the large dropout rate may have been because of the lengthy time lags and technical incompatibilities that on-line users faced. The Java scripts imbedded in the program that allowed more sophisticated animations increased the time for the pages to appear and may not have been accommodated by older versions of Internet browsers. Therefore, the final sample completing the experiment consisted of 231 participants. Eighteen of them were correctly suspicious about the purpose of the study and were removed from analyses. The final sample consisted of 213 participants; 87% were PC users, and 13% were Mac users. Fourteen different countries were reported as the location of access to the study, with the majority of participants accessing the study from the United States (59%) and Australia (32%). The overall sample consisted of 33% males ($n = 70$) and 67% females ($n = 143$); the modal age range was between 19 and 25 years (62%). Table 2 shows the number of participants per condition.

Design. Participants were randomly assigned (through the use of a PERL script) to a 3 (group membership: in-group, out-group, or mixed-group) × 2 (ostracism manipulation: inclusion or ostracism) between-subjects factorial design. Forty-four of the participants were also randomly assigned to one of two control groups. The first control group ($N = 24$) allowed us to determine how likely it was that individuals would make the wrong judgments on the perceptual task without any peer influence. Participants randomly assigned to this condition were sent directly to the

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[3] Controversy exists and persists, both on-line and off-line, regarding whether PC or Mac is the more superior computer platform (Schlack, 1995). Despite the numerous articles documenting the increasing similarities between the two dominant types of computer in the present computer market, a simple on-line search using the AltaVista search engine yields 784 matches to anti-PC and 1,008 to anti-Mac web sites. Some of these sites are specifically designed to degrade or mock the computer of the rival make. The severity of the intergroup conflict between PC and Mac users reaches the extent to which generalizations are made of the personality traits of the two groups of computer users. For example, "unlike PC owners, Mac users are pioneers, a temperament suited to the vast frontier of on-line potential" (Mello, 1995) and "M.A.C. stands for Morons At Computers."

Table 2

Means and Standard Deviations for Each Dependent Variable as a Function of Type of Interaction (Inclusion or Ostracism) and Group Membership in Experiment 2

Group membership and type of interaction	Perceived percentage of throws[a]		Belonging		Percentage of trials conformed to		Percentage of participants who conformed at least once	
	M	SD	M	SD	M	SD	M	SD
In-group								
Inclusion (n = 26)	39.12	12.28	3.81	2.74	15.38	25.35	35	49
Ostracism (n = 21)	29.38	19.50	3.90	2.48	28.57	35.41	52	51
Out-group								
Inclusion (n = 32)	40.59	16.26	5.13	2.67	17.71	26.75	37	49
Ostracism (n = 32)	18.28	8.21	2.81	1.80	25.00	28.08	53	51
Mixed-group								
Inclusion (n = 39)	37.62	16.00	4.82	2.43	20.51	31.17	38	49
Ostracism (n = 19)	16.31	7.34	2.74	1.85	28.07	29.94	63	50
Conformity pressure only (n = 20)					16.65	29.65	30	47

[a] Actual percentage of throws was 40% in the inclusion condition and 20% in the ostracism condition (i.e., first two throws).

perceptual judgment pages. None of these participants made any errors. The second control group ($N = 20$) was a conformity-pressures-only condition in which participants were randomly assigned directly to the group perception task (described below) without first having been ostracized or included. If ostracism produced more conformity than inclusion, this condition was used to determine whether ostracism increased conformity or inclusion decreased it.

Procedure. The study was conducted on an Internet web site, http://psyber.psy.unsw.edu.au/cyberball (no longer active). Data were collected over 5 months. Programming was the same as in Experiment 1 except that graphics software CorelDRAW and Corel PHOTO-PAINT were used for graphics and animations were created using GIF Animator. Also, JAVA-Script Applets were used in the control of timing between computer-generated responses and the duration of display of the perceptual stimuli.

Participants were guided through the experiment as they were in Experiment 1. They read a description of the experiment and were given the experimenter's e-mail address to contact for further information. After participants provided consent, they answered some preliminary questions, then they moved on to the cyberball game, followed by the perception task and a few postexperimental questions. Finally, they were provided with a full debriefing and given another chance to contact the experimenter.

The purpose of the experiment was described as comparing perceptual abilities of PC versus Mac users. Participants were informed that they would be interacting with other users who were simultaneously logged onto the study. Emphasis was placed on having participants mentally visualize the tossing of a ball between players, as this would help them in the subsequent perception task, which they would be performing later in the experiment.

Participants were requested to fill out a preexperimental questionnaire similar to the one used in Experiment 1. Instead of filling out a self-esteem scale, they were asked to specify which type of computer they used and to write brief descriptions of average PC users and average Mac users. These descriptions also served as a manipulation check to determine whether participants made more positive comments about those who used the same type of computer as they did.

The cyberball game was similar to the flying-disc game, except that the throwers were depicted as animated characters throwing a ball with the Greek letter Psi (Ψ) on it. After group membership was manipulated, participants proceeded to play the game in a similar fashion to Experiment 1 except that, for everyone, the game lasted for 10 ball tosses with no option to quit.

After the cyberball game, participants moved onto the second part of the study, which involved a perception task. Participants were instructed to click on a rotating wheel on the screen to determine which respondent number they were assigned. The wheel always stopped at the No. 6 position and, thus, all participants were ostensibly randomly assigned to be the sixth person in a new six-person group that would be asked to make judgments on six perceptual comparisons. An overview of the task was then given together with an example. For each trial, a simple geometric figure (like a triangle) appeared on the screen for 5 s, after which it disappeared, followed by six complex figures that were displayed on the screen for 5 s. The geometric figure was embedded in one of the six complex figures, and participants were instructed to identify the correct figure from the six by clicking on the appropriate button. While waiting for their turn to respond, other users' responses appeared sequentially on participants' screen. When "Respondent Number 6" appeared on the screen, participants were prompted to enter their response. Trials 1 and 2 were designed to be easier than the ones that followed to familiarize participants with the demands of the task. Trials 3, 4, and 6 were the critical trials in which the computer was preprogrammed to display unanimously incorrect responses by the other five users. On the other trials, the other members were programmed to make unanimously correct responses.

Independent Variables

Strength of group ties manipulation. Through random assignment, participants were told prior to playing the cyberball game that the other two players were PC users, Mac users, or one of each. For PC users, this would create in-group, out-group, and mixed-group conditions, respectively; for Mac users, this would create out-group, in-group, and mixed-group conditions, respectively.

Ostracism manipulation. The first three throws were held constant for all conditions. The game always started off with participants in possession of the ball, and every player was given the chance to throw and catch the ball once. On the fourth throw, participants were once again in possession of the ball and had the chance to throw it to either of the two computer players. From the fifth throw onwards, participants were randomly assigned by a predetermined algorithm to either be included or ostracized. Those in the inclusion condition continued to receive the ball for a third of the throws, whereas those in the ostracism condition were not thrown the ball again.

Dependent Variables

Conformity. The primary dependent variable was conformity, which we operationally defined in two ways. First, because participants could conform between 0 and 3 times, we calculated the mean percentage of times participants conformed per condition (0%, 33%, 67%, and 100%). Second, to report conformity similarly to how Asch's (1956) results are usually discussed, we also operationally defined conformity as the percentage of participants who conformed to the unanimous incorrect judgments at least once.

Thought bubbles. A thought bubble appeared on every turn, allowing participants to enter any thoughts they had during that part of the game. We had hoped that we could use the content of these bubbles to code for attributions.

Postexperimental questions. Participants filled in a postexperimental questionnaire that measured manipulation checks and belonging. Manipulation checks included perceptions of throws received (participants indicated this by typing in their response), with participants indicating on a selection menu whether their copartners were using a Mac, or PC, or one of each. Belonging was assessed with a single item, with participants rating the extent to which they felt a sense of belonging with their copartners on a 9-point scale ranging from 1 *(not at all)* to 9 *(very much)*. To respond to this item, participants clicked the appropriate radio button.

Debriefing. After they completed the experiment, the next page provided an extensive debriefing about the ostracism manipulations, the computer-generated partners, and the conformity ruse. They were given references of articles to read about ostracism, social identity, and conformity, and were also given the experimenter's e-mail address to click if they had any further questions or concerns. Several participants contacted the experimenter to ask questions, which were answered immediately. Most comments involved an interest in either the topic or on-line research; no postexperimental distress was detected.

Results

Manipulation checks. The manipulations were generally successful. For the ostracism–inclusion manipulation, a 2×3 ANOVA revealed that participants in the inclusion condition reported receiving a higher percentage of throws $(M = 39\%, SD = 15.1)$ than those in the ostracism condition $(M = 21\%, SD = 13.4)$, $F(1, 163) = 63.2, p < .05$. There was also a main effect for group membership, $F(2, 163) = 3.35, p < .05$, and an interaction between the two variables, $F(2, 163) = 3.10, p < .05$. As shown in Table 2, the nature of these last two effects can best be described by the fact that, across all (but one) conditions, participants were fairly accurate in their percentage estimates of receiving the ball. Those who were ostracized by in-group members, however, deviated significantly from this pattern by overestimating how often they had possession of the ball. This observation was supported by a series of Bonferroni-protected post hoc tests on the three ostracism conditions and the three inclusion conditions. Within the included groups, there were no differences between any of the group membership conditions (all *p*s > .5). But, within the ostracism groups, in-group differed from the other two conditions (mean difference from out-group = 11.1, $SE = 3.96, p < .05$; mean difference from mixed-group = 13.07, $SE = 4.46, p < .05$), whereas the other two did not differ from each other $(p > .5)$. It might appear that we unsuccessfully manipulated ostracism for in-group participants. However, as we shall see, analysis of their conformity scores suggests otherwise. We will return to this paradox in the *Discussion.*

To assess whether participants attended correctly to the group membership manipulation, they were asked to indicate whether they played the cyberball game with two other PC users, two other Mac users, or one of each. This manipulation was successful in that most (82%) of the participants recalled correctly the types of computers used by the other two members of their cyberball triad. Participants who failed to correctly perceive the composition of their cyberball triad were distributed similarly across conditions.

To gauge the success of our choice of group categorization, we coded the descriptions that participants wrote regarding the typical PC and Mac users. Presumably, descriptions of prototypical in-group members (i.e., typical PC users for PC participants and typical Mac users for Mac participants) should be more favorable than descriptions for prototypical out-group members. The third author coded participants' descriptions (blindly to condition) according to their negativity, such that 0 represented a negative description, 1 represented a neutral description, and 2 represented a positive description. Eighty-nine percent of the participants typed in a description for the average PC user, whereas 87% typed in a description for the average Mac user (which explains the differences in the degrees of freedom). A 2 (PC or Mac) × 2 (PC-description or Mac-description) mixed ANOVA (with description as a within-subjects factor) revealed a significant interaction, such that PC participants described PC users more positively $(M = 1.23, SD = 0.57)$ than Mac users $(M = 0.95, SD = 0.74)$, whereas Mac participants described Mac users more positively $(M = 1.38, SD = 0.67)$ than PC users, $(M = 0.98, SD = 0.66)$, $F(1, 144) = 6.87, p < .05$.

Sample Mac descriptions include, "PC users are boring. Macintosh users are cool and different," "PC users are more concerned with detail, time constraints, and perfection. Macintosh users are friendlier," and (perhaps from a budding personologist) "PC users are stubborn, calculating, and retentive, conservative yet business-like and concerned with performance in the least amount of time. Macintosh users are more free-spirited, liberal, and fun, but perhaps not as intelligent." Sample PC descriptions include, "PC users are cool! Macs suck because of their inability to have more than one program open at a time," and "PC users are the smart ones ...Mac users are lazy."

Conformity. Conformity was measured in two ways: as a mean percentage of items to which participants conformed and as a percentage of participants who conformed at least once. Both analyses resulted in similar patterns, so for the sake of brevity we will report the results of the mean percentage of items to which participants conformed (both measures are presented in Table 2).

Overall, cyberball participants conformed to an average of 23% of the incorrect unanimous judgments. As predicted, a 2×3 ANOVA revealed that ostracized participants conformed more $(M = 27\%, SD = 30\%)$ than did included participants $(M = 18\%, SD = 28\%)$, $F(1, 163) = 4.01, p < .05$. There was no main effect for group membership, $F(2, 163) = .15, ns$; nor was there any interaction between ostracism–inclusion and group membership, $F(2, 163) = .16, ns$.

Belonging. In the postexperimental questionnaire, we asked participants, "Generally, how much of a sense of belongingness did you feel you had with the other people in your ball tossing group?" Participants gave responses on a 9-point scale ranging from 1 *(none at all)* to 9 *(very high)*. A 2 × 3 ANOVA revealed a significant main effect for the ostracism manipulation such that

ostracized participants reported lower feelings of belonging ($M = 3.11$, $SD = 2.07$) than did included participants ($M = 4.65$, $SD = 2.62$), $F(1, 163) = 14.4$, $p < .01$. The main effect for group membership was not significant, $F(2, 163) = .09$, ns. The Group Membership × Ostracism interaction was significant, $F(2, 163) = 3.94$, $p < .03$. As shown in Table 2, post hoc tests revealed that participants who were ostracized by either the out-group or the mixed-group reported lower belonging than their included counterparts (mean difference $= 2.3$, $SE = .60$; mean difference $= 2.1$, $SE = .67$, $ps < .01$, respectively), whereas participants who were ostracized by in-group members reported similar levels of belonging to those who were included by in-group members (mean difference $= -.09$, $SE = .70$, $p > .20$).[4]

Bubble-thoughts. Although 90% of the participants listed thoughts in at least one thought bubble during the cyberball game, very few dealt with attributions. Most thoughts were comments on the quality of the web site or were entirely unrelated to the experiment. Therefore, analyses could not be conducted. Some interesting comments were offered by the few who chose to write introspectively. These include, "If Mac throws it to me, maybe I can keep the ball between us PC users" (a future source of ostracism), "I am here, feeling rather dejected!. . .I am starting to feel left out. . .I would like to have another turn. . .getting a little angry that I'm not being included. . .maybe I will just leave and let the two of them play," "I wish these guys would throw me the ball for once. . .I wonder if they like me. . .I wonder if I did something wrong?" "Why are they only throwing to each other?. . .okay, this is getting irritating," "I feel bad, PC1 & Mac1 are leaving me out of the ball throwing. . .I want to play with the ball. . .No one likes me. . .I feel really rejected and sad," and "They are ignoring me. . .I don't want to play any more."

Discussion

Our first goal was to go beyond the self-report measures obtained in Experiment 1 by examining whether cyberostracism would also increase targets' likelihood to conform. Rather than giving targets the opportunity to conform to (or deviate from) the ostracizing group, we tested their likelihood of conforming to a new group that they would have no particular reason to impress or offend. The results supported the hypothesis. Not only did targets of ostracism report lower levels of belonging (as they did in Experiment 1), but they were also more likely to conform to the unanimous incorrect judgments of a new group. Thus, consistent with our theory, individuals reacted to a short-term episode of ostracism by refortifying the need that was threatened—belonging—by conforming to a new group. Participants who were included were not different in their levels of conformity compared with those who had not participated in the ball-toss game. It was conceivable that inclusion could have decreased conformity, because these individuals had already experienced sufficient inclusion to remove any attractiveness associated with conforming to another group. Perhaps inclusion was expected in a triadic ball toss, so being included in one was not especially noteworthy. In other circumstances, it might have been reasonable to expect included participants to have increased their levels of conformity, but we believe this would have only made sense if the subsequent perception task had been performed with the group that had included them.

These findings also lend support to the notion that ostracism serves to promote normative behaviors in the targets (Gruter & Masters, 1986). At an evolutionary level, Gruter and Masters (1986) argued that the use of ostracism is adaptive because it maintains the cohesiveness of the group, either by removing the deviant member(s) or by bringing deviant members back into the fold. The results are also consistent with Schachter's (1959) speculations that isolation will increase affiliative tendencies. Additionally, research by Latané and his colleagues (Latané, Nesbitt, Eckman, & Rodin, 1972; Latané & Steele, 1975) found that isolated rats were more attracted to and affiliative with other rats. The results of this study provide suggestive evidence that ostracism is a process that works similarly across species.

We also examined whether the relation between participants and their sources affected their perceptions of exclusion, sense of belonging, and subsequent conformity. We predicted that participants who were ostracized by out-group members would be less affected than those who were ostracized by in-group members. The results were mixed in this regard, with respect to self-report measures compared with our measures of conformity.

First, our measure of perceived exclusion was intended to be a manipulation check, and participants in five of the six cyberball conditions reported accurately on this question. The sole exception was the in-group–ostracism condition, in which participants reported receiving the ball about as often (29%) as would be expected if they were equally included (33%), when in fact they only received the ball 20% of the time. This same peculiar pattern emerged for reported belonging. Ostracized individuals felt less belonging than those who were included, except for the participants who were ostracized by in-group members. These individuals reported feeling just as much belonging as did included participants. These two similar patterns of data, on first inspection, would lead us to conclude that the in-group–ostracism condition was unsuccessfully manipulated. Yet, these same participants conformed to the group norms more than did those who were included. The inconsistency between the conformity results on the one hand, and the inclusion and belonging measures on the other hand, suggests that participants who were ostracized by in-group members were affected by the ostracism but did not want to admit it, to us or maybe even to themselves. It is also possible that by simply being categorized in an in-group, participants felt more included, which may have reduced perceptions of intragroup distinctions, as suggested by our belongingness data.

For conformity, we did not find a significant interaction between inclusion–ostracism and in-group/out-group. According to social identity theory, we would have expected that individuals ostracized by in-group members would have been more threatened, and hence would have conformed more, than individuals ostracized by out-group members. When the operational definition for confor-

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[4] The belonging measure was taken after the opportunity to conform. Therefore, belonging should not mediate conformity in the way that it mediated aversive impact in Experiment 1. Two of Baron and Kenny's (1986) three criteria were satisfied: The independent variable, ostracism, significantly affected the proposed mediator, belonging; and ostracism significantly affected the dependent variable, conformity. However, a regression analysis of the effects of belonging on conformity was not significant, $F(1, 167) = .34$, ns. Hence, belonging failed to be a mediator according to Baron and Kenny's definition.

mity was mean percentage of trials to which participants conformed, the pattern of results was in the predicted direction (see Table 2). When we operationally defined conformity as the percentage of participants who conformed at least once, the pattern was then such that participants ostracized by in-group or out-group members showed similar percentages of conformity. Thus, regardless of how conformity was operationally defined, being ostracized by out-group members was just as effective in producing conformity as being ostracized by in-group members. Perhaps ostracism by anyone is sufficiently aversive to trigger efforts to increase one's belongingness status, especially to a new group. Had we examined how likely participants would have been to conform to those who ostracized them instead of how likely they were to conform to a new, unfamiliar group, perhaps the social identity prediction would have been supported.

Finally, we examined the effects of being ostracized by a mixed-group dyad composed of one in-group and one out-group member. This was exploratory, as we had no theoretical foundation to make specific predictions. The mixed-group participants accurately reported the level of exclusion, reported lower levels of belonging when ostracized, and had high levels of conformity. Perhaps as long as there are out-group members in the ostracizing group, targets of that ostracism are less likely to distort or disguise what actually happened. These results warrant further research into reactions to mixed-groups.

General Discussion

Ostracism has been shown to be a powerful and effective strategy for those who use it. Until now, the deleterious effects on targets have been observed when the sources of ostracism are physically present with the target—what we call social ostracism. In the two experiments reported here, we have demonstrated that the impact of ostracism is so powerful that it can even be felt when two ostensible sources ignore and exclude individuals over the Internet. When participants were cyberostracized, their sense of belonging and inclusionary status was reduced. This, in turn, worsened their mood and increased their feelings of exclusion, and in Study 2, cyberostracism increased participants' likelihood to conform. It is rather astounding that despite the fact that our participants did not know, could not see, could not communicate with, and were not anticipating future interaction with "virtual others," they felt ostracized when these others neglected to throw them a virtual disc or ball.

On the one hand, we found in Experiment 1 that ostracism was just as debilitating to high as to low self-esteem individuals, and in Experiment 2 we found that ostracism increased conformity regardless of whether the ostracizers were in-group members or not. Apparently, ostracism was powerful enough to overwhelm these typically potent personality and situational variables. On the other hand, the pattern of results in Experiment 2 suggests that perhaps with stronger manipulations of group identification or greater experimental control to reduce variability, identification with the ostracizing group may result in stronger effects.

Our results provided further support for the theoretical predictions derived from Williams's (1997) model of ostracism. Ostracism was hypothesized to threaten targets' fundamental needs, including belonging, self-esteem, control, and meaningful existence. With our Internet paradigm, we found evidence that cy-

berostracism negatively affected feelings of belonging and self-esteem, but we found no impact on reports of control or meaningful existence. Furthermore, the model predicts that when fundamental needs are threatened by short-term ostracism, targets will try to repair, regain, or fortify these threatened needs. Hence, because belonging was threatened in Experiment 1, we predicted and found that targets of ostracism would attempt to regain a sense of belonging by conforming to a new group when the opportunity arose.

Internet Methodology

We were also encouraged in using the Internet to conduct social psychological research. Much of the procedure followed traditional laboratory methods: We used random assignment to allocate participants to the various conditions in our experiments, provided a brief description of the study, gave participants the opportunity to contact the researchers, and allowed them to give informed consent. They were then provided with a convincing cover story, and we were able to collect demographic and individual difference information. After the experimental trials, participants answered manipulation check questions and other dependent variables (both scales and open-ended questions). Finally, they were debriefed and given another opportunity to contact the researchers. Not only did we gain the kind of data that we would normally get in a laboratory study, we were able to access large samples, whose diversity in age, occupation, and country location far exceeded that which we normally get using our introductory psychology pools.

Collecting data over the Internet does present unique problems. We cannot be certain that the participants were who they claimed to be. They may also have given inaccurate personality information. However, Internet participants may be less concerned with social desirability than participants who we meet face-to-face, because they may be less concerned with evaluation. Another potential problem is that individual participants could have participated in our study more than once. If participants used their real e-mail addresses, we were able to check for multiple access (there were only a few instances of repeated access, and these were primarily participants whose computers disconnected before they could finish). But it was possible for participants to give false e-mail addresses. Although this is a potential problem, we wonder, with all the potentially interesting sites on the Internet, if participants are really likely to spend the time (and expense) to participate over and over again.

A more serious problem is that we had exceptionally high dropout rates, especially in Experiment 2. This suggests that the results may have been due to self-selection, such that only the types of people who would continue on with the experiment would give this pattern of results. It is just as plausible, however, that individuals who were most bothered by the ostracism would have dropped out, thus, making our findings of reactions to ostracism more conservative.

Finally, experimenters cannot control the conditions in which participants partake in Internet research. Whereas one participant may be alone in a quiet office during his or her lunch break, another may be at a public access terminal in a crowded and noisy Internet café. In this regard, Internet research is a bit more like field research, in which large numbers of potential participants might offset the noise in the data. Finally, regarding ethics, al-

though Internet research can provide written debriefing with handy links to the researchers' e-mail addresses, debriefing may be more effective if the researchers can see participants' faces and respond to their nonverbal behaviors (Cooper, 1998).

Summary

The Internet ostracism paradigm is similar in some ways to Asch's (1956) conformity, Tajfel's (1970) minimal group, and Milgram's (1974) obedience paradigms. In these classic studies, the researchers anticipated that they were developing baseline conditions that would likely not result in significant impact on their participants' behaviors. They were all surprised that, even in their baseline conditions, people conformed to clearly wrong answers, developed senses of "we and they," and obeyed authority figures to the point of hurting someone. We initially set out to develop a minimal ostracism paradigm, perhaps so minimal as to have no effects at all. From that baseline condition, we anticipated adding factors that were necessary for ostracism to produce the predicted effects. Indeed, our colleagues were quite skeptical that we would find anything to report at all. Instead, we found that people were so sensitive to being ignored and rejected that they showed negative reactions even in our baseline conditions. Perhaps, as with the impact of unanimous others, minimal groups, and legitimate authorities, ostracism may be an exceptionally potent form of social influence.

We have argued that short-term ostracism results in fortification of the threatened needs. In contrast, we predict that for long-term ostracism, targets will internalize the threatened needs, resulting in feelings of depression, alienation, helplessness, and worthlessness. In structured interviews with long-term sources and targets of the silent treatment (Williams & Zadro, 1999), one participant divulged to us that she was engaged in a "master-slave" relationship with a man over the Internet. Despite her willingness to comply with a variety of self-debasing requests, the worst thing that her master did to her was to give her the silent treatment over their private chatroom, with monosyllabic answers to the slave's inquiries soon leading to no responses whatsoever. She said her self-esteem plummeted as a result of his continuous use of this cyber silent treatment. As was shown by Kraut et al. (1998), feelings of loneliness and depression are a possible outcome of continued Internet usage. As our global society moves closer to worldwide use of the Internet, opportunities for exacerbating these feelings through real or perceived ostracism clearly exist and demand our attention.

References

Alexander, R. D. (1986). Ostracism and indirect reciprocity: The reproductive significance of humor. *Ethology and Sociobiology, 7,* 253–270.

Asch, S. E. (1956). Studies of independence and conformity: A minority of one against a unanimous majority. *Psychological Monographs, 70* (Whole No. 417).

Baldwin, M. W., & Sinclair, L. (1996). Self-esteem and "If...Then" contingencies of interpersonal acceptance. *Journal of Personality and Social Psychology, 71,* 1130–1141.

Barner-Barry, C. (1986). Rob: Children's tacit use of peer ostracism to control aggressive behavior. *Ethology and Sociobiology, 7,* 281–293.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and

statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173–1182.

Basso, K. H. (1972). "To give up on words": Silence in Western Apache culture. In P. P. Giglioli (Ed.), *Language and social context* (pp. 67–86). Baltimore, MD: Penguin Books.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497–529.

Baumeister, R. F., & Tice, D. M. (1990). Anxiety and social exclusion. *Journal of Social and Clinical Psychology, 9,* 165–195.

Boehm, C. (1986). Capital punishment in tribal Montenegro: Implications for law, biology, and theory of social control. *Ethology and Sociobiology, 7,* 305–320.

Burger, J. M. (1992). *Desire for control: Personality, social, and clinical perspectives.* New York: Plenum.

Cairns, R. B., Cairns, B. D., Neckerman, H. J., & Ferguson, L. L. (1989). Growth and aggression: I. Childhood to early adolescence. *Developmental Psychology, 25,* 320–330.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control theory approach to human behavior.* New York: Springer-Verlag.

Cooper, J. (1998, October). *Discussant on symposium "Social psychology on the Internet."* Paper presented at the Annual Meeting of the Society for Experimental Social Psychology, Lexington, KY.

Craighead, W. E., Kimball, W. H., & Rehak, P. J. (1979). Mood changes, physiological responses, and self-statements during social rejection imagery. *Journal of Consulting and Clinical Psychology, 47,* 385–396.

Davis, B. O., Jr. (1991). *Benjamin O. Davis, Jr., American: An autobiography.* Washington, DC: Smithsonian Institution Press.

Dittes, J. E., & Kelley, H. H. (1956). Effects of different conditions of acceptance upon conformity to group norms. *Journal of Abnormal and Social Psychology, 56,* 100–107.

Edwards, J. A. (1998). Effects of causal uncertainty on the dispositional attribution process. *Journal of Experimental Social Psychology, 34,* 109–135.

Faulkner, S. J., & Williams, K. D. (1999, April). *After the whistle is blown: The aversive impact of ostracism.* Paper presented at the 71st Annual Meeting of the Midwestern Psychological Association, Chicago.

Faulkner, S., Williams, K., Sherman, B., & Williams, E. (1997, May). *The "silent treatment": Its incidence and impact.* Paper presented at the 69th Annual Meeting of the Midwestern Psychological Association, Chicago.

Gardner, W., Pickett, C. L., & Brewer, M. B. (2000). Social exclusion and selective memory: How the need to belong influences memory for social events. *Personality and Social Psychology Bulletin, 26,* 486–496.

Geller, D. M., Goodstein, L., Silver, M., & Sternberg, W. C. (1974). On being ignored: The effects of violation of implicit rules of social interaction. *Sociometry, 37,* 541–556.

Goodall, J. (1986). Social rejection, exclusion, and shunning among the Gombe chimpanzees. *Ethology and Sociobiology, 7,* 227–236.

Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of the need for self-esteem: A terror management theory. In R. F. Baumeister (Ed.), *Public self and private self* (pp. 189–212). New York: Springer-Verlag.

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management theory: II. The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology, 58,* 308–318.

Greenberg, J., Solomon, S., Pyszczynski, T., Rosenblatt, A., Burling, J., Lyon, D., Simon, L., & Pinel, E. (1992). Why do people need self-esteem? Converging evidence that self-esteem serves an anxiety-buffering function. *Journal of Personality and Social Psychology, 63,* 913–922.

Grieve, P., & Hogg, M. A. (in press). Subjective uncertainty and intergroup

discrimination in the minimal group situation. *Personality & Social Psychology Bulletin.*

Gruter, M. (1986). Ostracism on trial: The limits of individual rights. *Ethology and Sociobiology, 7,* 271–279.

Gruter, M., & Masters, R. D. (1986). Ostracism as a social and biological phenomenon: An introduction. *Ethology and Sociobiology, 7,* 149–158.

Heron, T. E. (1987). Timeout from positive reinforcement. In I. O. Cooper, T. E. Heron, & H. Merrill (Eds.), *Applied behavior analysis.* Columbus, OH: Charles E. Merrill.

Hogg, M. A., & Abrams, D. (1988). *Social identifications: A social psychology of intergroup relations and group processes.* London: Routledge.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopahdyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53,* 1017–1031.

Lancaster, J. B. (1986). Primate social behavior and ostracism. *Ethology and Sociobiology, 7,* 215–225.

Latané, B., Nesbitt, P., Eckman, J., & Rodin, J. (1972). Long- and short-term social deprivation and sociability in rats. *Journal of Comparative and Physiological Psychology. 81,* 69–75.

Latané, B., & Steele, C. (1975). The persistence of social attraction in socially deprived and satiated rats. *Animal Learning and Behavior, 3,* 131–134.

Lawson Williams, H., & Williams, K. D. (1998, April). *Effects of social ostracism on controlling behaviour and desire for control.* Paper presented at the Annual Meeting of the Society of Australasian Social Psychologists, Christchurch, New Zealand.

Leary, M. R. (1990). Responses to social exclusion: Social anxiety, jealousy, oneliness, depression, and low self-esteem. *Journal of Social and Clinical Psychology, 9,* 221–229.

Leary, M. R., Haupt, A. L., Strausser, K. S., & Chokel, J. T. (1998). Calibrating the sociometer: The relationship between interpersonal appraisals and state self-esteem. *Journal of Personality and Social Psychology, 74,* 1290–1299.

Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology, 68,* 518–530.

Lieberman, D. A., Cathro, J. S., Nichol, K., & Watson, E. (1997). The role of S- in human observing behavior: Bad news is sometimes better than no news. *Learning and Motivation, 28,* 20–42.

Mackie, D. M., Gastardo-Conaco, M. C., & Skelly, J. J. (1992). Knowledge of the advocated position and the processing of the in-group and out-group persuasive messages. *Personality & Social Psychology Bulletin, 18,* 145–151.

Madey, S. F., & Williams, K. D. (1999, March). *Ostracism and the elderly: Older adults' feelings of exclusion in relationships.* Paper presented at the Annual Meeting of the Eastern Psychological Association, Boston.

Mahdi, N. Q. (1986). Pukhtunwali: Ostracism and honor among the Pathan Hill tribes. *Ethology and Sociobiology, 7,* 295–304.

McInnis, S., & Williams, K. D. (1999, April). *Social ostracism and the invisible worker.* Paper presented at the Society for Australasian Social Psychology, Coolum, Queensland, Australia.

Mello, A. (1995, December). Manifest destiny: The Mac's special relationship with the Web. *Macworld, 12,* 19–20.

Milgram, S. (1974). *Obedience to authority: An experimental view.* New York: Harper & Row.

Nemeth, C. J. (1986). Differential contributions of majority and minority influence. *Psychological Review, 93,* 23–32.

Nezlek, J., Kowalski, R., Leary, M., Blevins, T., & Holgate, S. (1997). Personality moderators of reactions to interpersonal rejection: Depression and trait self-esteem. *Personality & Social Psychology Bulletin, 23,* 1235–1244.

Pepitone, A., & Wilpizeski, C. (1960). Some consequences of experimental rejection. *Journal of Abnormal and Social Psychology, 60,* 359–364.

Peterson, C., & Seligman, M. E. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review, 91,* 347–374.

Reicher, S. D. (1984). Social influence in the crowd: Attitudinal and behavioral effects of deindividuation in conditions of high and low group salience. *British Journal of Social Psychology, 23,* 341–350.

Rintel, E. S., & Pittam, J. (1997a, May). *Communicative and non-communicative silence on Internet Relay Chat: Management and function.* Paper presented at the 47th Annual Conference of the International Communication Association, Montreal, Quebec, Canada.

Rintel, E. S., & Pittam, J. (1997b). Strangers in a strange land: Interaction management on Internet Relay Chat. *Human Communication Research, 23,* 507–534.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.

Samolis, M. M. (1994). *The effects of ostracism and communication level on self and task-referents, feelings, and action.* Unpublished manuscript, University of Toledo, Ohio.

Schachter, S. (1951). Deviation, rejection, and communication. *Journal of Abnormal and Social Psychology, 46,* 190–207.

Schachter, S. (1959). *The psychology of affiliation.* Stanford, CA: Stanford University Press.

Schlack, M. (1995, September 1). Facing the future with Windows95. *Datamation, 41,* 43–44.

Schneider, D. J., & Turkat, D. (1975). Self-presentation following success or failure: Defensive self-esteem models. *Journal of Personality, 43,* 127–135.

Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death.* San Francisco: Freeman.

Snoek, J. D. (1962). Some effects of rejection upon attraction. *Journal of Abnormal and Social Psychology, 64,* 175–182.

Sommer, K. L., Williams, K. D., Ciarocco, N. J., & Baumeister, R. F. (in press). Explorations into the intrapsychic and interpersonal consequences of social ostracism. *Basic and Applied Social Psychology.*

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology.* New York: Academic Press.

Sudnow, D. (1967). *Passing on: The social organization of dying.* Englewood Cliffs, NJ: Prentice Hall.

Sweeting, N., & Gilhooly, M. L. M (1992). Doctor, am I dead? A review of social death in modern societies. *Omega, 24,* 254–269.

Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American, 223,* 96–102.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 7–24). Chicago: Nelson-Hall.

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 181–227). San Diego, CA: Academic Press.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory.* Oxford, England: Basil Blackwell.

Williams, K. D. (1997). Social ostracism. In R. Kowalski (Ed.), *Aversive interpersonal behaviors* (pp. 133–170). New York: Plenum.

Williams, K. D., Bernieri, F. J., Faulkner, S. J., Gada-Jain, N., & Grahe, J. E. (2000). The Scarlet Letter Study: Five days of social ostracism. *Journal of Personal and Interpersonal Loss, 5,* 19–63.

Williams, K. D., Shore, W. J., & Grahe, J. E. (1998). The silent treatment: Perceptions of its behaviors and associated feelings. *Group Processes and Intergroup Relations, 1,* 117–141.

Williams, K. D., & Sommer, K. L. (1997). Social ostracism by coworkers:

Does rejection lead to social loafing or compensation? *Personality & Social Psychology Bulletin, 23,* 693–706.

Williams, K. D., & Zadro, L. (in press). Ostracism: On being ignored, excluded, and rejected. In M. Leary (Ed.), *Interpersonal rejection.* New York: Oxford Press.

Williams, K. D., & Zadro, L. (1999, April). *Forty years of solitude: Effects of long-term use of the silent treatment.* Paper presented at the Annual Meeting of the Midwestern Psychological Association, Chicago.

Woods, D. (1978). *Biko.* New York: Paddington Press.

Zadro, L., & Williams, K. D. (1998, April). *Take the 'O' train: Oblivious versus punitive ostracism.* Paper presented at the Annual Meeting of the Society of Australasian Social Psychologists, Christchurch, New Zealand.