

Groups Being Ostracized by Groups: Is the Pain Shared, Is Recovery Quicker, and Are Groups More Likely to Be Aggressive?

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Considerable research has documented that brief and seemingly innocuous episodes of ostracism cause individuals to feel initial pain, distress, and threatened fundamental needs. How do ostracized groups respond? Does sharing ostracism with a cotarget reduce the distress? Are groups more aggressive than individuals, particularly if they are ostracized? Following a brief inclusion or ostracism experience in Cyberball, either as a solo or as a dyad, participants provided self-reports of need threats and mood during the game, and after a delay that allowed for reflection and coping. In addition, after this delay participants also had an opportunity to aggress. We found that ostracism's initial distress is not mitigated by being in a group. Instead, sharing the ostracism experience did moderate delayed responses. Sharing the ostracism experience did mitigate reflective self-reports of belonging, self-esteem, meaning, control and mood. Moreover, ostracism increased aggression and groups were more aggressive than individuals.

Keywords: ostracism, social impact theory, discontinuity effect, distress, aggression

Findings by a variety of researchers on ostracism, rejection, and social exclusion show considerable convergence despite the use of different paradigms and being influenced by different theoretical perspectives. As reviewed by Williams (2009), this body of research indicates that ostra-

cism is a widespread behavior across all social animals, and that it is powerful and painful to individuals who experience it. Anthropologists and ethologists have argued that ostracism of burdensome members provided evolutionary advantage to those who employed it and thus improved chances for survival (Fry, 2007; Goodall, 1986; Lancaster, 1986). Similarly, it has been argued that immediate detection of even the subtlest forms of ostracism would provide an advantage to individuals, allowing them to correct their undesired behaviors before full expulsion from the group (Kerr & Levine, 2008; Spoor & Williams, 2007). In fact, Williams's model of ostracism (e.g., 2009) has argued that to fully understand responses to ostracism one should distinguish between immediate responses (reflexive impact) that directly assess how individuals experience ostracism and more delayed responses (reflective impact) that assess how individuals subsequently cope.

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Extending this literature, we draw attention to the fact that prior ostracism research has exclusively focused on settings in which individuals

are ostracized or included by other individuals. We therefore assessed how individuals would respond when they are ostracized as a small group by other small groups. Would such individuals respond similarly or differently than individuals who are included or ostracized by other individuals? How would this affect the immediate distress that is caused by ostracism? How would this affect more delayed self-reported distress? And how would sharing the ostracism experience affect aggressive behavior toward those that are responsible?

The Reflexive Impact of Ostracism

Supporting the evolutionary contention underlying ostracism theory, research indicates that brief and seemingly innocuous ostracism episodes are sufficient to cause considerable distress. For example, ostracism activates regions of the brain associated with detecting the affective distress of pain ([Eisenberger, Lieberman, & Williams, 2003](#)) and literally leaves the individual feeling cold ([Zhong & Leonardelli, 2008](#)). Furthermore, the immediate distress of ostracism is accompanied by threats to at least four fundamental needs: belonging, self-esteem, control, and meaningful existence. Ostracized individuals feel a loss of belonging ([Gardner, Pickett, & Knowles, 2005](#); [Pickett & Gardner, 2005](#); [Williams, Cheung, & Choi, 2000](#); [Zadro, Williams, & Richardson, 2004](#); [Zadro, Boland, & Richardson, 2006](#)), a decline in self-esteem ([van Beest & Williams, 2006](#); [Zadro et al., 2004](#); [Zhou, Vohs, & Baumeister, 2009](#)), a loss of perceived control ([Zadro et al., 2004](#)), plus calls into question one's feeling of and worthiness for existing ([Stillman et al., 2009](#); [Zadro et al., 2004](#)). Finally, this immediate distress is relatively impervious to cross-cutting factors that logically ought to mitigate the severity to the experience. For example, the distress of ostracism is not reduced by knowing that the ostracizers are merely computer programmed ([Zadro et al., 2004](#)), outgroup members ([Williams et al., 2000](#); [Wirth & Williams, 2009](#); [Goodwin, Williams, & Carter-Sowell, 2010](#)), or even despised outgroup members ([Gonsalkorale & Williams, 2007](#)). Being financially rewarded for being ostracized does not lessen its sting ([van Beest & Williams, 2006](#)). Merely observing another individual's ostracism is enough to cause distress to the observer ([Wesselmann,](#)

[Bagg, & Williams, 2009](#)). All told, ostracism is a particularly unpleasant experience for individuals, despite researchers' attempts to lessen ostracism's blow.

The Reflective Impact of Ostracism

Once individuals have an opportunity to reflect, appraise, and interpret, a variety of different coping behaviors have been observed. One finding is that coping behavior often has an interpersonal component. Coping does thus not only affect the target of ostracism but often also those that are responsible or even unrelated others. Moreover, ostracism theory argues that coping behavior can usually be interpreted as serving the goal of fortifying either belonging and self-esteem, or control and meaningful existence ([Williams, 2009](#)). Indeed, underscoring the goal of belonging and self-esteem, many studies indicate that ostracized individuals will behave in ways that will improve their inclusionary status. For example, ostracized individuals will conform more ([Williams et al., 2000](#)), comply more ([Carter-Sowell, Chen, & Williams, 2008](#)), remember more social information ([Gardner, Pickett, & Brewer, 2000](#); [Pickett, Gardner, & Knowles, 2004](#)), be more accurate in detecting social information ([Bernstein, Young, Brown, Sacco, & Claypool, 2008](#)), and be more likely to reach out to other groups for acceptance ([Maner, DeWall, & Baumeister, 2007](#); [Mead, Baumeister, Stillman, Rawn, & Vohs, 2011](#)). Moreover, underscoring the goal of control and meaningful existence, considerable research has found antisocial response tendencies by individuals who have been ostracized, excluded, or rejected. Such individuals have been observed to retaliate against the excluders as well as to those similar to the excluders ([Chow, Tiedens, & Govan, 2008](#); [Gaertner, Iuzzini, & O'Mara, 2008](#); [van Beest & Williams, 2006](#)), and innocent others ([DeWall, Twenge, Bushman, Im, & Williams, 2010](#); [DeWall, Twenge, Gitter & Baumeister, 2009](#); [Twenge, Baumeister, Tice, & Stucke, 2001](#); [Twenge & Campbell, 2003](#)). They have also been found to be less helpful and cooperative ([de Waal-Andrews & van Beest, 2012](#); [Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007](#); [van Beest & Williams, 2011](#)). Additionally, [Wesselmann, Butler, Williams, and Pickett \(2010\)](#) found that unpredictable rejection under-

mined participants' belief that they could predict other's behavior and led to higher levels of aggression.

Finally, and especially relevant for the current investigation, ostracism theory argues that cross-cutting variables that do not affect immediate responses may affect delayed responses (Williams, 2009), provided that such cross-cutting variables do not also speak directly to the reflexive system (Lelieveld, Gunther Moor, Crone, Karremans, & van Beest, 2012; van Beest, Williams, & Van Dijk, 2011; Zhou et al., 2009). For example, Zadro and colleagues (2006) assessed how socially anxious individuals respond to ostracism. Results showed that social anxiety did not mitigate how individuals experience ostracism; both high and low socially anxious individuals were equally distressed by ostracism. It did, however, mitigate how individuals cope with ostracism. Low anxious individuals were less distressed from ostracism after some time had passed than high anxious individuals. Moreover, to give another example, results of van Beest and Williams (2006) showed that money did not mitigate the immediate distress but instead did mitigate delayed interpersonal behaviors. Individuals who were ostracized from a game that was financially costly were less willing to hurt those who are responsible than individuals who were ostracized from a game that was financially beneficial.

The Present Research

We set out to test how sharing the ostracism experience would affect intrapersonal distress as measured by threat to basic fundamental needs and mood, and how sharing the ostracism experience would affect interpersonal behavior as measured by interpersonal aggression. For this purpose, we compared the standard ostracism situation in which individuals are ostracized by other individuals with a situation in which dyads are ostracized by other dyads. More specifically, we used a three-agent version of Cyberball, in which the Cyberball players were either controlled by a single individual who was seated alone behind the computer, or by two individuals who were seated together behind the computer.

In Study 1, we focused only on the immediate distress as measured by threat to basic needs

and mood. According to Williams' temporal model of ostracism, one could argue that sharing the experience might not mitigate the immediate distress of ostracism. However, based on social impact theory (Latané, 1981), one might actually predict that moving from an interindividual setting to an intergroup setting ought to moderate the immediate experience of ostracism. Social impact theory argues that social interactions take place in a social force field that is governed by the same laws as a physical force field. One of the main postulates of this theory is that social impact is defined by the number of targets affected by the impact. Increasing the number of targets will decrease social impact. Hence, provided that being ostracized as a group is perceived as being ostracized together with other targets, one could predict that negative reactions to ostracism are decreased when one moves from an interindividual to an intergroup setting. On the other hand, social impact theory also acknowledges that social impact is defined by the number of sources exerting the impact. Hence, provided that being ostracized by a group is perceived as being ostracized by more sources than when one is ostracized by an individual, one could also predict that negative reactions to ostracism are increased when one moves from an interindividual to an intergroup setting.

In Study 2, we went a step further by also considering more delayed measures that were assessed after participants were instructed to sit back and think about the situation. On this more reflective level, we argue that the presence of a cotarget offers a way to cope with the negative experience of social exclusion that is not available to individuals who do not have a cotarget. The sharing of negative experiences and emotions has been found to promote coping behavior, and even bring people closer together (e.g., Collins & Miller, 1994; Reis & Patrick, 1996). In a similar vein, research on socially devaluated groups has shown that the shared experience of being discriminated can provide a sense of inclusion that enhances psychological well-being (e.g., Branscombe, Schmitt, & Harvey, 1999; Spears, Jetten, & Scheepers, 2002). In the current setting, sharing the ostracism experience may thus promote the restoration of the lowered feelings of belonging, self-esteem, perceived control, worthiness, and mood. Put differently, when people have been able to reflect on the

situation, we predict that ostracized individuals in an intergroup context will report less social pain than ostracized individuals in an interindividual context.

It is interesting that this restored social pain does not imply that ostracized groups should be less motivated to take revenge and exhibit fewer retaliatory behaviors than ostracized individuals. Indeed, a body of research on the discontinuity effect has repeatedly shown that intergroup interactions are more competitive and often more hostile than interindividual interactions (Insko et al., 1998, 2001; Wildschut, Insko, & Pinter, 2007). Although empirical support of this discontinuity effect is typically based on increased competition in prisoners' dilemmas, there is now also increasing evidence that it may also result in more aggression (Jaffe & Yinon, 1979; Meier & Hinsz, 2004). Meier and Hinsz (2004), for example, who measured aggressive behavior by means of hot-sauce allocation to hot-sauce-hating recipients, found clear support for the fact that more aggression was exhibited in intergroup interactions compared to interindividual interactions. These insights are highly relevant to this current research as it implies that we should not only observe a main effect for Cyberball experience such that ostracized participants exhibit more aggression than included participants, but also a main effect of player status such that dyads should exhibit more aggression than solos. Moreover, given that an aggressive response is most likely to occur after a provocation, it may even be anticipated that—compared to solos—dyads are more likely to retaliate when ostracized than when included.

In sum, the irony of having a cotarget is that sharing a painful experience may lessen the pain for those who are hurt, but increase the harm that is done to those who are responsible (especially when some time has passed, because this increases the likelihood that people have formed a thorough appraisal of the situation).

Study 1

In Study 1, we tested the first temporal stage of the model of ostracism (Williams, 2009) by considering immediate and reflexive reactions of cotarget groups compared to solo targets. To facilitate comparisons with prior research on ostracism, we collected self-reports of belong-

ing, self-esteem, meaning, control, and mood that are typically measured to assess immediate distress. We explored whether moving from an interindividual to an intergroup setting would (a) mitigate the immediate distress because it increases the number of targets that are affected, (b) exacerbate the immediate distress because it increases the number of sources that are responsible for ostracism, or (c) yield only a main effect of Cyberball experience such that ostracism is more stressful than inclusion.

Method

Participants and design. Participants were 189 students (60 dyads, 69 solos, 46% female and 54% male) from Purdue University. The average age was 19.6 ($SD = 1.9$). The participants were randomly assigned to a 2 (Cyberball experience: ostracism, inclusion) \times 2 (Cyberball agent: dyads, solos) design. Participants were given course credit in exchange for their contributions to this research.

Procedure. The procedure we used to ostracize participants was the Cyberball game, in which three animated figures are playing a ball-tossing game on a computer (Williams & Jarvis, 2006). Participants are led to believe they are playing an incidental game of virtual ball toss as a means to exercise their mental visualization abilities. Upon arrival to the lab, the participants were asked to stand in front of a screen to have their digital photo taken. Meanwhile, the experimenter went into an adjacent lab, loaded the head shots of the participants into the Medialab@ program, and assigned same-sex Cyberball players to be displayed during the experiment. The participants were told that they should all visualize themselves and the other players, for example, where they are playing, what the temperature is like, and so forth. Here, the manipulation of the Cyberball agent was introduced. The participants played the game as a dyad or solo. In the solo conditions the participant played Cyberball with two other individuals (see Figure 1). In the dyad conditions the participants were seated together behind a computer and played as a dyad with two other dyads (see Figure 2). Dyads could be mixed gender or equal gender. The computer dyads mimicked the gender distribution of the participant dyad. The Cyberball experience consisted of a 30-throw manipulation of ostracism or in-

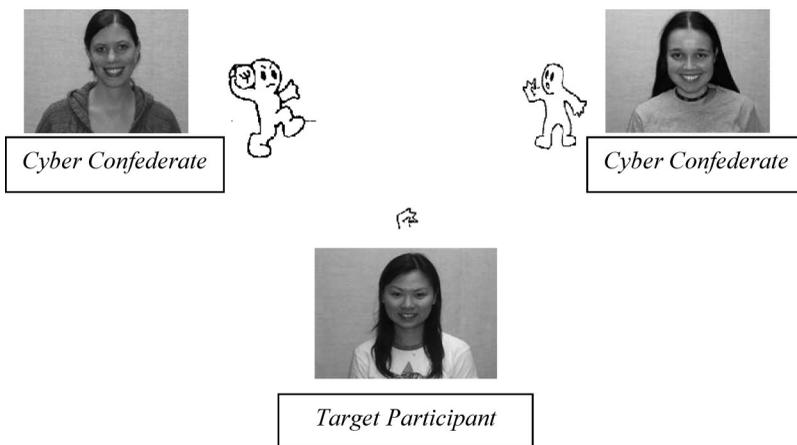


Figure 1. Cyberball paradigm for the individual by individuals conditions.

clusion by confederate players. Participants in the ostracism conditions received only two tosses at the beginning and were then excluded from the remaining tosses. Participants in the inclusion conditions received as many tosses as the other Cyberball players.

Immediately after playing the game, participants were asked to fill out a 32-item measure assessing general distress from the impact of Cyberball on the four fundamental needs (1 = agree, 9 = disagree): belonging, (seven items, $\alpha = .96$, e.g., “I felt like an outsider during the game”), control (nine items, $\alpha = .90$, e.g., “I had the feeling that I could influence the direc-

tion of the game”), meaningful existence (eight items, $\alpha = .94$, e.g., “I felt nonexistent”), and self-esteem (eight items, $\alpha = .88$, e.g., “I felt that the other players thought that I was a worthy person”). These questions were presented in random order and aggregated in a total needs satisfaction index ($\alpha = .97$). Next, participants completed a 9-item questionnaire indexed to assess overall mood experienced during the Cyberball game (items presented in random order: angry, hurt, happy, irritated, sad, tense, cheerful, nervous, content, $\alpha = .87$). The need and mood questions used were similar to those used in prior research on ostracism (e.g., Zadro et al.,

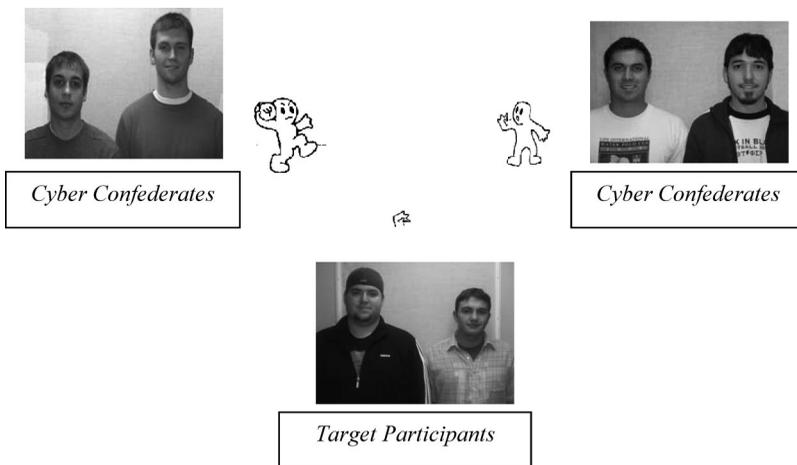


Figure 2. Cyberball paradigm for group by groups conditions.

2004; van Beest & Williams, 2006). Similar to previous research we recoded the items such that higher ratings indicated more need satisfaction and more positive mood, whereas lower ratings reflect more need threat and more negative mood.

Finally, participants were asked three questions to check whether the manipulation of Cyberball experience worked. To assess feelings of rejection, participants responded on a scale of 1 (*totally rejected*) to 9 (*totally accepted*). To assess feelings of exclusion participants responded on a scale of 1 (*not at all*) to 9 (*very much so*). Also there was an open-ended question asking for the percentage of overall tosses the participant received during the Cyberball game.¹

Results

Participants in the dyad condition filled in an individual questionnaire. The analyses reported below are based on data that is aggregated across the two individuals of the dyad. This is done because data of dyads are not independent. However, we also ran analyses in which we did not aggregate the data within the dyad and that yielded identical results.²

Manipulation checks. The 2×2 ANOVAs on the ostracism manipulation check questions yielded a significant main effect of inclusionary status for all questions. Ostracized participants felt more rejected ($M = 2.11$, $SD = 1.17$) than included participants ($M = 7.24$, $SD = 1.59$), $F(1, 125) = 417.96$, $p < .001$, $\eta^2 = .77$. Also, ostracized participants felt more excluded ($M = 1.94$, $SD = .85$) than included participants ($M = 7.35$, $SD = 1.55$), $F(1, 125) = 583.18$, $p < .001$, $\eta^2 = .82$. Lastly, ostracized participants reported receiving fewer total throws ($M = 3.93\%$, $SD = 2.69$) than included participants ($M = 35.00\%$, $SD = 7.80$) during the Cyberball game, $F(1, 125) = 902.54$, $p < .001$, $\eta^2 = .88$.

Immediate distress. Separate 2×2 ANOVAs were conducted on the total needs and overall mood scales (see Figure 3). A significant main effect for Cyberball experience was found on both dependent variables (see Table 1 for ANOVA means and standard deviations). Ostracized participants ($M = 3.33$, $SD = 1.11$) reported lower levels of total need satisfaction than included participants ($M =$

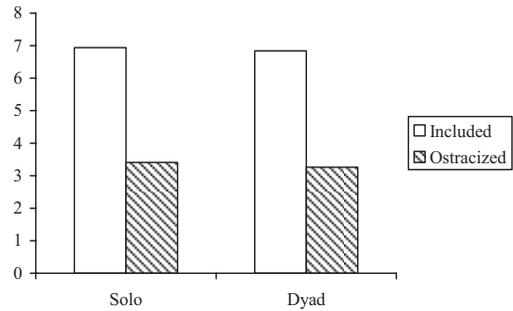


Figure 3. Index of total needs during game by individuals and groups in Study 1.

6.89 , $SD = 1.04$) $F(1, 125) = 346.03$, $p < .001$, $\eta^2 = .73$ and more overall negative mood ($M = 4.66$, $SD = 1.52$) than included participants ($M = 2.86$, $SD = 1.10$) $F(1, 125) = 57.21$, $p < .001$, $\eta^2 = .31$. All other main and interaction effects were not significant ($F_s < 1$). In fact, a simple main effect analysis comparing dyads and solos in the ostracism condition, also failed to yield a difference in need and mood ($F_s < 1$).

Next, we assessed each basic need separately. These separate analyses on the basic needs yielded a similar picture. Also, simple main effect analyses comparing dyads and solos in the ostracism condition failed to yield any significant effects ($F_s < 1.80$). So, in the reflexive stage having a cotarget was not a moderating variable in experiencing ostracism.

Study 2

Study 1 suggests that having a cotarget may not diminish the immediate distress of being ostracized. This is consistent with prior research

¹ In Study 1, participants also completed multiple individual difference inventories before playing Cyberball, including demographic information, as well as scales for mental visualization, sociopolitical attitudes (Paulhus & Christie, 1981), loneliness (Hughes, Waite, Hawkey, & Cacioppo, 2004), and the Big Five Inventory (John & Srivastava, 1999). No effects were found. This replicated prior findings on ostracism that immediate reactions are relatively impervious to cross-cutting variables.

² In both experiments we also checked for gender effects. There was only a gender effect for the hot-sauce allocation measure, $F(1, 75) = 4.56$, $p < .05$, $\eta^2 = .11$. Males allocated on average 20.88 grams hot sauce ($SD = 29.59$). Females allocated on average 8.47 grams hot sauce ($SD = 17.68$). Mixed dyads allocated on average 21.22 grams of hot sauce ($SD = 34.51$).

Table 1
Means and Standard Deviations for Need and Mood Index as a Function of Cyberball Experience and Target for Study 1

	Ostracized participants				Included participants			
	Dyad		Solo		Dyad		Solo	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Total needs (during game)	3.26	0.73	3.41	1.36	6.85	0.79	6.93	1.23
Total mood (during game)	5.59	1.24	5.17	1.71	7.21	0.79	7.09	1.32

on ostracism and the leading assumption of Williams' temporal model of ostracism that the immediate distress caused by ostracism is relatively impervious to cross-cutting factors that ought to mitigate the severity of the experience.

In Study 2 we continued our analyses by also considering more delayed responses by explicitly instructing participants to carefully think about what happened in the Cyberball game. On this reflective level, we again measured distress but also hostile intentions and behavior. As argued in the general introduction, we predict that having a cotarget may become more relevant when one has time to form a more thorough appraisal of the situation. We predicted that having a cotarget would increase the extent to which people are willing to hurt those that are responsible, but decrease distress.

Method

Participants and design. The participants in this Study were 127 students (42 dyads and 43 solos, 60% female and 40% male) from Leiden University ($M_{\text{age}} = 20.7$, $SD = 2.25$). They were randomly assigned to a 2 (Cyberball experience: ostracism, inclusion) \times 2 (Cyberball agent: dyads, solos) between subjects design. Participants were paid 6 euro as compensation for their contributions to this research.

Procedure. The procedures for Experiments 1 and 2 were quite similar. Participants were again seated individually or as dyads behind a computer in separate cubicles. Immediately after the Cyberball game, we assessed satisfaction levels of reflexive needs ($\alpha = .95$) and moods ($\alpha = .91$), which specifically asked participants for self-reports regarding "During the Cyberball game" (1 = *agree*, 7 = *disagree*). Note that the measure was a bit different than that of Study 1. First, the questions were anchored differently (7-point instead of 9-point

scales). Second, we now used a 22-item measure of need satisfaction and a 7-item measure of mood (angry, hurt, fortunate, sad, happy, cheerful, and disappointed). Also the questions were now presented in fixed order and not random.

More importantly, we also added reflective measures. These reflective measures followed the reflexive measures and were introduced by a verbal instruction of the experimenter to sit back and think about the situation [see for similar methods to distinguish between reflexive and reflective responses [van Beest and Williams \(2006\)](#); [van Beest et al. \(2011\)](#), or [de Waal-Andrews & van Beest \(2012\)](#)]. Participants in the dyad condition could thus form a joint appraisal because they could interact and talk to each other, whereas participants in the solo condition could only form an individual appraisal.

This was followed by two different interpersonal measures that assessed harm to fellow Cyberball players. The first measure was a self-reported measure of revenge (i.e., I want to take revenge, 1 = *not all*, 5 = *very much*). The second measure was a behavioral measurement of hot-sauce allocation ([Lieberman, Solomon, Greenberg, & McGregor, 1999](#)). Participants were asked to participate in an independent study of food tasting and the relationship with personality. First, the participants had to rate six tastes on a 21-point scale with higher numbers indicating stronger preferences and fill in a bogus questionnaire about personality traits. They had to put the taste-questionnaire in the envelope(s) and hand it in with their personality questionnaires. A few minutes after handing in the envelope(s) to the experimenter they received the envelope(s) with the taste preferences of one or two (depending on whether they were solo or a dyad targets) of the other Cyberball players. The participants saw on the simu-

lated taste preference questionnaire that this/these player(s) did not like “Hot and Spicy” foods at all (selecting 3 on the 21-point scale). At this point, participants were informed who was assigned to allocate versus accept the taste sample. In reality all the participants were assigned to allocate the “Hot and Spicy” food portion of hot sauce. Participants were asked to measure out an amount of the hot sauce in a cup. They were told the other Cyberball player(s), as assigned, had to eat the entire amount given in the cup. Lastly, participants were informed that allocation of the taste samples would occur in anonymity (Lieberman et al., 1999; Warburton, Williams, & Cairns, 2006). Note that participants in the dyad condition thus filled two cups, which were averaged (divided by two) to allow comparison with the solo condition in which only one cup was filled.

At the end of the experiment, the participants got a final questionnaire that served as a post-measurement of need satisfaction ($\alpha = .81$) and mood ($\alpha = .87$). The questions were similar to the immediate need satisfaction and mood with the exception that participants had to rate how they felt right now. Finally, after the manipulation checks of Cyberball, the participants were debriefed and received 6 euro for participating in the experiment.

Results

The analyses reported below are again based on data that are aggregated across the two individuals of the dyad. We also ran analyses in which we did not aggregate the data within the dyad and that yielded identical results.

Manipulation checks. Separate 2×2 ANOVAs on the Cyberball experience manipulation check questions yielded main effects of the Cyberball experience on all three checks. Ostracized participants reported receiving fewer throws ($M = 5.36\%$, $SD = 4.10$) than included participants ($M = 37.25\%$, $SD = 12.10$), $F(1, 81) = 243.24$, $p < .001$, $\eta^2 = .75$; feeling more excluded ($M = 3.85$, $SD = 0.92$) than included participants ($M = 1.39$, $SD = 0.66$), $F(1, 81) = 181.65$, $p < .001$, $\eta^2 = .69$; and receiving the ball less often ($M = 1.08$, $SD = 0.26$) than included participants ($M = 3.37$, $SD = 1.08$), $F(1, 81) = 178.80$, $p < .001$, $\eta^2 = .69$. There were no significant main effects of having a cotarget or interactions (all F s < 1). This shows that our manipulation of the Cyberball experience was successful.

Reflexive stage. Reflexive measures assess the participants’ immediate reaction to the Cyberball experience (being ostracized or being included). Overall means and standard deviations are reported in Table 2. At this reflexive level we assumed that having a cotarget would not mitigate the experience of being ostracized. Similar to Study 1, we did not observe differences between the separate basic needs; therefore, we only report the index of overall total needs and moods.

A 2×2 ANOVA on the total need scale yielded only a main effect of Cyberball experience $F(1, 81) = 234.50$, $p < .001$, $\eta^2 = .74$. Ostracized participants reported lower levels of overall needs satisfaction ($M = 2.56$, $SD = 0.66$) compared to included participants ($M = 4.91$, $SD = 0.74$). A 2×2 ANOVA on mood

Table 2
Means and Standard Deviations for Need Index, Mood Index, Revenge Intentions and Aggressive Behavior as a Function of Cyberball Experience and Target for Study 2

	Ostracized participants				Included participants			
	Dyad		Solo		Dyad		Solo	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Total needs (during game)	2.54	.54	2.58	.79	4.79	.72	5.03	.76
Total needs (feeling now)	5.35	.56	4.94	.63	5.23	.53	5.35	.59
Total mood (during game)	2.98	.80	2.70	.86	3.91	.57	3.99	.68
Total mood (feeling now)	4.26	.45	4.18	.64	4.27	.39	4.15	.62
Hot sauce (grams)	21.78	31.92	13.36	24.19	20.69	33.22	4.19	4.35
Hot sauce (log)	.95	.55	.85	.43	.78	.57	.48	.38
Revenge intentions	2.86	1.12	1.95	1.09	1.74	.87	1.48	1.08

yielded also only a main effect of Cyberball experience, $F(1, 81) = 48.29, p < .001, \eta^2 = .37$. Ostracized participants ($M = 2.84, SD = 0.83$) reported lower levels of overall mood compared to included participants ($M = 3.95, SD = 0.62$). Additional analysis revealed no other significant effects. We also directly tested the most relevant contrast comparing dyads and solos in the ostracism condition. This contrast was again not significant ($F_s < 1$). This replicates the findings of Study 1.

Reflective stage. We first analyzed revenge intentions. A 2×2 ANOVA on revenge intentions revealed that ostracized participants ($M = 2.39, SD = 1.18$) wanted to retaliate more than included participants ($M = 1.61, SD = 0.97$), $F(1, 81) = 12.39, p < .001, \eta^2 = .13$. Consistent with discontinuity theory, dyads ($M = 2.29, SD = 1.14$) wanted to retaliate more than solos ($M = 1.72, SD = 1.09$), $F(1, 81) = 6.58, p < .01, \eta^2 = .07$. The interaction was not significant, $F(1, 81) = 1.99, p = .16, \eta^2 = .02$. However, simple means did show that the Cyberball experience affected dyads, $F(1, 81) = 12.02, p = .001, \eta^2 = .12$, more than solos, $F(1, 81) = 2.12, p = .15, \eta^2 = .03$. Moreover, the Cyberball agent manipulation did significantly affect revenge intentions in the ostracism condition, $F(1, 81) = 7.68, p = .007, \eta^2 = .08$, but not in the inclusion condition, $F(1, 81) = 0.66, p = .66, \eta^2 = .008$. Indeed, as can be seen in Table 2, and consistent with our prediction, ostracized dyads had the most revenge intentions.

Next, we analyzed actual aggressive behavior. The hot-sauce allocation was assessed in grams, but we conducted a log transformation because the data were positively skewed. A 2×2 ANOVA yielded a main effect of Cyberball experience, $F(1, 81) = 6.49, p < .05, \eta^2 = .07$. Ostracized participants allocated more hot sauce ($M = 0.89, SD = 0.49$) than included participants ($M = 0.63, SD = 0.50$). The ANOVA further yielded a main effect of Cyberball agent, $F(1, 81) = 3.70, p = .058, \eta^2 = .04$. Consistent with discontinuity theory, groups allocated more hot sauce ($M = 0.86, SD = 0.56$) than did solos ($M = 0.66, SD = 0.44$). However, this time the interaction was far from significant, $F(1, 81) = 0.87, p = .35, \eta^2 = .01$, and, therefore, we did not further explore specific contrasts. Hence, different than on our measurement of intentions, we now did not ob-

serve an increase in the discontinuity effect when people are ostracized. However, as can be seen in Table 2, we still observed that ostracized dyads allocated the most hot sauce.

Finally, we analyzed the extent to which participants recovered as measured by final need satisfaction and final mood. As in Study 1, we also looked at the separate needs. This yielded identical results as the overall analysis. We therefore only report the overall analysis.³

The 2×2 ANOVA on overall need satisfaction yielded only an interaction effect of Cyberball experience and Target (dyads, solos) $F(1, 81) = 4.46, p < .05, \eta^2 = .05$. Indeed, for solos ($M = 4.93, SD = 0.63$), ostracism was still more painful than inclusion ($M = 5.35, SD = 0.59$), $F(1, 81) = 5.53, p < .05, \eta^2 = .06$. This difference in assessed needs between the ostracism ($M = 5.34, SD = 0.56$) and inclusion conditions ($M = 5.23, SD = 0.53$) was not observed in dyads, $F(1, 81) = 0.43, p = .51, \eta^2 = .00$. Or, alternatively, dyads reported more need satisfaction than solos in the ostracism condition, $F(1, 81) = 5.57, p = .021, \eta^2 = .064$, but not in the inclusion condition, $F(1, 81) = .43, p = .52, \eta^2 = .005$.

The 2×2 ANOVA on overall mood at the end of the Study did not yield any significant effects ($F_s < 1$). The overall mean was 4.31 ($SD = 0.53$). Apparently, in terms of mood we observe a major upturn for both solos and dyads.

To provide a conservative test of our reasoning we also included both revenge measures as a covariate in the analysis of final need satisfaction (revenge intention, $F(1, 79) = 0.30, p = .86, \eta^2 = .00$; hot-sauce allocation, $F(1, 79) = 0.09, p = .92, \eta^2 = .00$). Again we only observe

³ We also performed an analysis in which the reflexive and reflective measures of need satisfaction were first standardized and then used as a within variable. This 2 (Cyberball experience) \times 2 (target) \times 2 (time of measurement) analysis yielded a main effect of the Cyberball experience manipulation, $F(1, 81) = 54.00, p < .001, \eta^2 = .40$; an interaction of the Cyberball experience and Target manipulation, $F(1, 81) = 3.85, p = .05, \eta^2 = .05$; an interaction of time of measurement and the Cyberball experience manipulation, $F(1, 81) = 47.57, p < .001, \eta^2 = .37$; and a marginally significant three-way interaction, $F(1, 81) = 3.17, p = .07, \eta^2 = .04$. This provides an alternative analysis to support our argument that participants react differently to the reflexive need satisfaction than reflective need satisfaction.

an interaction, $F(1, 79) = 4.32, p = .04, \eta^2 = .05$, such that the effect of the Cyberball experience manipulation remained statistically significant for solos, $F(1, 79) = 5.00, p = .028, \eta^2 = .06$, and remained not significant for dyads, $F(1, 79) = 0.43, p = .51, \eta^2 = .005$. Hence, the effects remain even when controlled for differences in revenge intentions and aggressive behavior.

General Discussion

These two experiments advance theorizing on ostracism (Williams, 2009) because they are the first to test the reflexive and reflective stages of the Model of Ostracism with this situational variable—the physical presence of a cotarget. We show that having a cotarget did not affect the reflexive stage. Regardless of the presence of a cotarget, participants were hurt by ostracism. Instead, it did impact the reflective stage. When participants had more time to form an appraisal of the situation, we observed that groups were less hurt by ostracism than individuals and—consistent with prior research on the discontinuity effect (Insko et al., 1998; Wildschut et al., 2007)—more willing to lash out than individuals.

Intrapersonal Effects

Our findings suggest that, for the immediate impact of ostracism, there is no “safety in numbers.” In this respect, it may be worthwhile to compare our approach with prior research on partial ostracism (e.g., Chernyak & Zayas, 2010; DeWall et al., 2010; Jones, Carter-Sowell, Kelly, & Williams, 2009; Williams et al., 2000). Partial ostracism is defined by the number of people that ostracize the individual. This type of research has shown that partial ostracism is sometimes experienced as complete ostracism but sometimes as complete inclusion. For example, Chernyak and Zayas (2010) used a three-player Cyberball game to study the effect of partial ostracism. They compared a condition in which the participant was completely ostracized by both other players with a condition in which the participant was ostracized by one, but included by the other player, and a condition in which participants were included by both. Results showed that people who were ostracized by both felt as

negative as people who were only ostracized by one. DeWall and colleagues (2010) used a four-player Cyberball game and also a five-player selection task. Similar to Chernyak and Zayas (2010), they manipulated the number of people that ostracized the participant. However, their results suggested that the reactions to partial ostracism were more similar to full inclusion than to the full ostracism condition. We took a different approach. We did not manipulate the number of individuals who included or ostracized another individual. Instead we manipulated whether individuals were included or ostracized as individuals by other individuals or as groups by other groups. Moreover, we explicitly focused on the difference between reflexive and reflective responses. Future research may thus integrate these research lines by addressing how groups would experience and cope with partial ostracism. Based on our findings, it is likely that individuals and groups will respond as negative to partial ostracism as to complete ostracism when one considers the immediate experience. Moderation is more likely to occur on coping. Based on our findings, it is likely that groups would recover from partial ostracism faster than would solos.

In addition, it may be fruitful to consider the implications for social impact theory. We used social impact theory to argue that impact could be diffused if one considers that our manipulation increases the number of targets that is affected by ostracism, but could also be exacerbated if one considers that our manipulation increases the number of sources that is responsible for the ostracism. In fact, if one would simply count the number of people that are involved in the situation, one may even conclude that social impact would thus predict no differences. However, one could also take a more nuanced interpretation of social impact theory, acknowledging that one should also consider how the number of targets and sources is increased. Is the number of targets or sources increased simply by adding other agents that experience a similar social event or—as we did—by increasing the number of people that control an agent? Using the analogy of a flashlight, it is not unreasonable to assume that it matters less whether the flashlight is operated by one or two others, and more that one is alone or with another while standing in the light. Taking this view, it could thus be argued that

social impact theory may indeed also be a valid tool to interpret our results. However, to be sure, one should then also include other conditions in which individuals are ostracized by groups or groups ostracized by individuals. This more nuanced interpretation of social impact would then predict that increasing the number of targets is most effective when one increases the number of targets that control the behavior of a specific agent in Cyberball, whereas increasing the number of sources is most effective when one increases the number of agents in Cyberball.

Another potential avenue for further research is to explicitly manipulate specific aspects of the group that is ostracized. We tested a setting in which dyads did not know each other prior to the experiment. Further research, for example, may manipulate whether or not the dyads already have a shared history, and/or even the relation between the dyads. These types of questions are beyond the scope of the current article, as we only wanted to test the most minimal conditions under which sharing an experience would buffer against the negative impact. Indeed, manipulating the nature of the groups would introduce a confound because solos cannot have a prior history manipulation. Finally, we acknowledge that we used dyads to assess groups. This is consistent with prior research on the discontinuity effect that also compares solos and dyads as a way to compare individuals and groups (e.g., van Beest, Andeweg, Koning, & Van Lange, 2008). This literature has shown that discontinuity is not greatly enhanced when one uses triplets or more instead of dyads (Wildschut et al., 2007; Williams, 2010).

Interpersonal Effects

We realize that the results of the aggression measurement cannot be instantly generalized to aggression in the real world. The kind of aggression examined in this experiment is, of course, not comparable with the acts of violence on the scale of school and workplace shootings, prison uprisings, or government-authorized genocide. It is highly likely that aggressive responses are a function not only of the situation but also of the constellation of individual differences that comprise the group. As mentioned by Leary, Kowalski, Smith, & Phillips (2003),

rejected students who turn into school shooters are also characterized by one or more of the three other risk factors that they investigated—psychological problems, an interest in guns and explosives, and a fascination with death. Nevertheless, on a small scale, we are beginning to understand the connections between being ostracized, individually or in groups, and our propensity to respond with aggression or aggressive intentions.

Moreover, we acknowledge that the outcome of our analyses of aggression intentions were somewhat different than the outcome of actual aggressive behavior. Our analysis of aggressive intentions showed that the classic discontinuity effect (Schopler & Insko, 1999; Wildschut et al., 2007) is observed more when people are ostracized than when included. This moderation of the discontinuity effect, however, was not observed on actual aggressive behavior. Here we only observed that being ostracized increased aggressive behavior compared to inclusion, and that dyads are more aggressive than solos. This difference between intentions and actual behavior may first of all reflect that intentions are but one of the factors instigating actual behavior (Sheeran, 2002). In addition, the literature on aggression (e.g., Dodge & Coie, 1987) suggests that it may be worthwhile to differentiate between unprovoked (proactive) aggression and provoked (reactive) aggression. Given this conceptualization of aggression, one could argue that our measure of retaliation intention is more directly related to provoked aggression than the hot-sauce allocation. After all, whereas the retaliation intention measure directly asked participants for their willingness to retaliate, we did not ask participants to retaliate with hot sauce. We merely asked participants to allocate hot sauce, leaving more room for it to be used for unprovoked aggression. The fact that groups were more likely to allocate hot sauce even when they were included fits with this explanation.

Conclusion

This research is a first step in examining responses by groups to ostracism. The reaction of groups to ostracism by other groups has theoretical significance. As shown in this article, the impact of ostracism on the group can potentially affect intrapersonal and intergroup

behavior. This directs attention to other group phenomena. For instance, will ostracized groups be less likely to engage in social loafing because they are more cohesive? Are ostracized groups more likely to engage in groupthink because they are sensitized to exclusion? Will ostracized groups be more inclined to voice unshared information to their group members? Will ostracized groups become less tolerant of ingroup diversity? Or, at an intergroup level, are ostracized groups more likely to stereotype outgroup members, allocate less to outgroups, and behave less cooperatively with them? These theoretical questions map onto important real-world issues. Future research should attempt to specify the conditions under which groups can exploit the shared experience for more functional and constructive coping, as well as identify those conditions that exploit group members' proclivity to impulsive or premeditated aggression. We showed that there is no safety in numbers from the pain of ostracism and its hostile impact on others.

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