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Are all ostracism experiences equal? A comparison of the autobiographical recall, Cyberball, and O-Cam paradigms

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Abstract In the present study, we aimed to compare the primary-need depletion elicited by three common ostracism paradigms: autobiographical recall (e.g., Zhong & Leonardelli in Psychological Science 19:838–842, 2008), Cyberball (Williams, Cheung, & Choi in Journal of Personality and Social Psychology 79:748–762, 2000), and O-Cam (Goodacre & Zadro in Behavior Research Methods 42:768–774, 2010). A total of 152 participants (52 males) were randomly allocated to one of the three paradigms, and their subsequent primary needs were measured (belonging, control, self-esteem, and meaningful existence). O-Cam was found to induce greater total primary-need depletion than did Cyberball and recall, which did not differ significantly from each other. Moreover, when examining the pattern of individual need depletion elicited by each paradigm, O-Cam was found to induce significantly greater depletion of belonging, control, and meaningful existence than did the recall paradigm, and significantly greater depletion of control and self-esteem than did Cyberball. No other comparisons were found to be significant, including the comparisons between the recall and Cyberball paradigms for each individual primary need. Collectively, the findings will assist ostracism researchers in making informed choices regarding (a) which paradigm is appropriate to implement with respect to their research aims, and (b) whether the interchangeable use of paradigms within a program of research is appropriate practice.

Keywords Autobiographical recall · Cyberball · O-Cam · Ostracism · Primary needs

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It has been well-established that ostracism (being excluded and ignored; Williams, 2001) is a universal phenomenon that can take place within any relationship—whether with loved ones, colleagues, or even strangers—irrespective of age and culture (Williams, 2001). Furthermore, over a decade's worth of literature has demonstrated that being excluded and ignored has a host of adverse psychological outcomes—perhaps most distinctly, a threat to four primary human needs; belongingness, control, self-esteem, and meaningful existence (Williams, 2007).

Given the pervasiveness of this phenomenon, it is unsurprising that researchers have sought to better understand the nature and consequences of ostracism. In order to conduct empirical examinations, researchers have attempted to devise paradigms that induce ostracism episodes that are controlled and confined to the laboratory setting, yet that remain comparable to ostracism instances experienced in the real world (i.e., are powerful and believable). To date, several such ostracism paradigms have been devised (for a review, see Williams, 2007). However, closer examination of these paradigms indicates that they actually induce different types of ostracism episodes; that is, the paradigms' inductions vary in terms of the methods by which ostracism is elicited (e.g., being ostracized during a conversation or during a game), the extent to which the participant is ostracized in the presence of the sources (i.e., the ostracizers), and even whether ostracism is merely recalled or is actively experienced during the experimental session.

Despite such fundamental differences, these paradigms are often used interchangeably within the ostracism literature, without acknowledging that they may induce different ostracism experiences, and hence different psychological consequences. Moreover, to date, no research has attempted to verify whether the ostracism inductions of these different paradigms result in the same psychological ramifications—specifically, does each paradigm produce the same pattern of primary-need depletion in ostracized targets?

Thus, in the present study we aimed to systematically compare three common ostracism paradigms[1]—the autobiographical recall paradigm (e.g., Bargh & Shalev, 2012; Bernstein, Young, Brown, Sacco, & Claypool, 2008; Zhong & Leonardelli, 2008), Cyberball (Williams, Cheung, & Choi, 2000), and O-Cam (Goodacre & Zadro, 2010)—in order to determine the extent to which these paradigms, and the ostracism episodes they induce, differentially affect the four primary human needs.

Inducing ostracism in the laboratory

Within the ostracism literature, the recall paradigm, Cyberball, and O-Cam have emerged as successful methods to create powerful, laboratory-based ostracism episodes that consistently elicit primary-need depletion as a result of their induction procedures. However, these paradigms utilize distinctive methods to induce ostracism and consequently each has their own specific strengths and weaknesses, as outlined below.

Autobiographical recall paradigm The recall paradigm induces ostracism by instructing participants to recall, and thus reexperience, a past incident in which they felt "excluded or ignored" (e.g., Bargh & Shalev, 2012; Bernstein et al., 2008).

Implementing the recall paradigm in ostracism research has several benefits. For instance, given that participants recollect a personalized, real-life experience of ostracism, one could argue that the induced exclusionary episode of the recall paradigm is of high external validity, as it is presumably self-relevant and meaningful to each individual participant. However, a limitation of this paradigm is that participants are merely ruminating about a past ostracism episode rather than experiencing one within the lab. Thus, any observed psychological effects may merely be a product of rumination rather than ostracism itself.

Cyberball Within the field, the most widely used ostracism paradigm is "Cyberball" (Williams et al., 2000). In this elegant paradigm, participants play a virtual ball-tossing game with two confederates who are, in fact, computer generated. The confederate players are presented on screen as simplistic avatars. During the interaction, participants are either thrown the ball for a third of the game (inclusion) or are initially thrown the ball once or twice and then never again (ostracism). Despite its simple premise, Cyberball has been shown to consistently elicit primary-need depletion (e.g., Carter-Sowell, Chen, & Williams, 2008; Oaten, Williams, Jones, & Zadro, 2008) whilst remaining a simple and efficient experimental procedure to implement.

A major strength of the Cyberball induction over previous face-to-face ostracism paradigms (e.g., the ball-tossing paradigm; Williams & Sommer, 1997) is that the interaction is standardized across experimental trials. However, a shortcoming of Cyberball's virtual nature is that it lacks the mundane realism of typical real-world social interactions. Given that both the sources and the ostracism episode itself are visually represented as avatars throwing and catching a ball, participants are unable to "see" the sources themselves actively initiating the ostracism episode (i.e., they cannot view the facial expressions or body language of those who are excluding and ignoring them). Thus, although the ostracism episode induced by Cyberball mimics what is experienced in an online context (in which sources are "faceless"), the inability to view the verbal and nonverbal behavior of the sources, coupled with the game-like nature of the paradigm, suggests that Cyberball's ostracism induction may be a conceptually different experience from the ostracism induction of other paradigms, in which targets are ignored in a nonanonymous context during a face-to-face interaction (e.g., a conversation).

O-Cam The O-Cam paradigm (Goodacre & Zadro, 2010) is a simulated webcam conference that takes place between a participant and two confederates. However, unbeknownst to the participant, the entire webcam interaction is actually a pre-recorded film. In the inclusion condition, participants make a 2-min speech, during which the prerecorded confederates appear to listen politely. Conversely, in the ostracism condition, the prerecorded confederates listen to the participant's speech for 15 s before turning to each other and beginning their own conversation—thus ignoring and excluding the participant (for a demonstration of the paradigm, see www.psych.usyd.edu.au/research/ostracism/, username, guest; password, Bach).

[1] The paradigms examined in this study were specifically ostracism paradigms; that is, they induced feelings of being excluded and ignored. We acknowledge that other paradigms in the field induce related phenomena—such as the "life-alone" paradigm (Twenge, Baumeister, Tice, & Stuck, 2001), which assesses long-term isolation and rejection, or the "get acquainted" paradigm (Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997), which assesses immediate rejection. These two paradigms explicitly inform participants that they are unwanted by the group and, as such, do not operationalize exclusion in the same manner as the three ostracism paradigms that we examined in this study. For the purposes of this article, we are only interested in examining paradigms that are all investigating the same operationalization of ostracism in order to minimize confounding factors. Future research should compare the consequences of ostracism and rejection/exclusion paradigms.

Like Cyberball, O-Cam is a cyber-ostracism paradigm, whereby the ostracism induction uses prerecorded confederate interactions, thereby ensuring high experimental control and standardization of the interaction across trials. However, unlike a Cyberball interaction, in which targets and sources are masked by an avatar, O-Cam participants and their ostracizers can be both seen and heard during the entire simulated interaction, thus enabling participants to experience ostracism via other, more subtle modalities, such as the sources' facial expressions, vocal tone, and body language (see Nezlek, Wesselmann, Wheeler, & Williams, 2012).

Despite its realistic ostracism induction, a potential shortcoming of O-Cam is that, unlike the efficiency and practicality of the Cyberball procedure, the O-Cam paradigm is relatively time and resource intensive (e.g., experimenters are required to act and rehearse with the prerecorded videos to ensure that the interactions seem authentic; the paradigm only allows for one-on-one testing, and each experimental session typically lasts 1 h).

Overall, although these three paradigms aim to elicit the psychological experience of being excluded and ignored, they are distinguished by clear variations between their respective induction procedures. In light of these differences, we explored whether the ostracism episodes that each of these paradigms elicit are comparable in terms of the psychological ramifications that participants experience.

The present study

In the present study, we aimed to compare how each ostracism paradigm (recall, Cyberball, and O-Cam) affected depletion of the four primary needs: belonging, control, self-esteem, and meaningful existence.

The decision to focus solely on primary-need depletion was made for a number of reasons. First, it is widely accepted within the field that ostracism is distinct from other forms of interpersonal conflict (e.g., argument) as it uniquely depletes the four primary needs (Williams, 2007; Zadro, Williams, & Richardson, 2005). Thus, as primary-need depletion is at the theoretical core of psychological responses to ostracism, it is therefore imperative that any laboratory-based ostracism paradigm should elicit primary-need depletion.

Indeed, almost all ostracism research to date uses need depletion as one of the fundamental indicators of ostracism induction effectiveness. Typically, ostracism researchers combine each of the four primary-need scores together to create a "total needs score" (also known as an "aversiveness index"). Research has demonstrated that the recall paradigm, Cyberball, and O-Cam all induce total primary-need depletion (Bastian & Haslam, 2010; Goodacre & Zadro, 2010; Williams et al., 2000). However, to date there has been no direct comparison of these ostracism paradigms regarding their ability to deplete primary needs; that is, do they all result in similar levels of total need depletion?

Furthermore, within the field, the effects of ostracism on each *individual* primary need are rarely examined (for some exceptions, see Williams et al., 2000; Zadro, Williams, & Richardson, 2004). Thus, even if the three paradigms of interest are depleting *total* primary needs in a similar fashion, one may question whether they are adversely affecting each of the four *individual* primary needs in a similar manner. Given the distinct methodological differences between the three paradigms (as outlined above), it is possible that each ostracism induction may elicit differential effects on the pattern of individual primary-need depletion.

The purpose of this study is not only to compare paradigms on an individualistic need-to-need basis but, more importantly, to compare each paradigm's *holistic pattern* of need depletion. That is, although two paradigms may show the same level of *total* primary-need depletion, they may differ with respect to the *pattern* in which this depletion is spread across the four primary needs. Thus, the term "pattern of need depletion" will be used throughout this article to refer to the relation of depletion between the four primary needs specific to a single paradigm.

When examining the three paradigms of interest, the most glaring methodological difference is that the recall paradigm requires participants to ruminate over a specific past ostracism episode (a *retrospective* ostracism paradigm), whereas both Cyberball and O-Cam allow participants to experience an unanticipated instance of ostracism in the laboratory (*experiential* ostracism paradigms). Experiencing ostracism from a retrospective versus experiential standpoint could potentially have a significant impact on the manner in which primary needs are depleted. For instance, the mobilization–minimization hypothesis (Taylor, 1991) suggests that emotions experienced by an individual when merely recalling an ostracism episode would not be as severe as those experienced at the time of the event. Hence, the process of ruminating on a previous ostracism experience within the recall paradigm may elicit less total primary-need depletion than does that experienced under the Cyberball and O-Cam paradigms, during which participants actively experience an ostracism episode.

Method

Participants

A group of 152 first-year psychology students from the University of Sydney (52 males, 100 females; mean age = 21.37 years, $SD = 7.16$) took part in the study. This sample size was selected to yield ns per cell that would be comparable

to, or exceed, those of published ostracism studies (e.g., Bargh & Shalev, 2012; Bastian & Haslam, 2010; Bernstein et al., 2008; Gonsalkorale & Williams, 2006; Goodacre & Zadro, 2010; Van Beest, Williams, & Van Dijk, 2011; Zadro et al., 2004). Participants were randomly allocated to a 3 (paradigm: recall, Cyberball, O-Cam) × 2 (inclusionary status: ostracism, inclusion) design. Given that the purpose of the study was to examine the effectiveness of the ostracism manipulations, the inclusion condition was used merely to verify that the ostracism manipulation was successful. All participants were required to speak and write English fluently and were granted course credit for their participation.

Materials and procedure

After giving consent, participants underwent the induction procedure respective to their designated paradigm condition: recall, Cyberball, or O-Cam.

The recall paradigm Participants in the ostracism condition were asked to write about an episode in their lives when they had been excluded and ignored, whereas participants in the inclusion condition were instructed to recall and write about a time when they were included (see Zhong & Leonardelli, 2008). Participants were asked to "focus on their thoughts, feelings, and emotions" during the episode. Participants wrote about their respective episodes for 5 min.

Cyberball Cyberball (Williams et al., 2000) is a triadic virtual ball-tossing game in which participants ostensibly play online with two other players who, unbeknownst to the participant, are actually computer-generated. On screen, participants view two identical animated figures representing the other players and a virtual ball is thrown between the participant and the two figures. Participants in the ostracism condition received the ball twice at the beginning of the game and then never again for the remaining one minute and 30 s, whereas those in the inclusion condition received the ball for one third of the game.

O-Cam The O-Cam paradigm (Goodacre & Zadro, 2010) is a simulated Web conference that, unbeknownst to participants, is actually a prerecorded film. Participants were informed that they would be participating in a Web conference with two other students (identified as Student 1 and Student 2), during which each student would give a brief speech about their university experiences. Prior to the conference, participants were asked to prepare a speech based on a list of questions provided (e.g., "what subjects are you taking?").

The ostensible conference then begins, and the experimenter explains that participants are not to interrupt or ask questions during each other's speeches. It is important to ensure that this instruction is understood by participants, since otherwise they may interrupt the students' speeches and potentially jeopardize the paradigm's believability. The experimenter then instructs Student 1 (on camera) to begin their speech, and leaves the room (the film is timed so that Student 1 begins to speak as the experimenter leaves). The filmed students then each present their speeches, uninterrupted, for approximately 2 min. When Student 2 is finished, they indicate that it is the participant's turn to speak. In the ostracism condition, the two filmed students attend to the participant for the first 15 s, after which they begin conversing with each other and completely ignore the participant for the rest of the conference (approximately 1 min 30 s).[2] In the inclusion condition, the prerecorded sources listen politely to the participant for the entirety of the speech.

The films were made using a JVC GZ-MG505AA Hard Disk Camcorder and a Rode Directional Video Condenser Microphone. The duration of the film was approximately 10 min.

Following the induction, participants completed the primary-needs questionnaire.

Primary-needs questionnaire The immediate impact of each ostracism manipulation was assessed using the standard 12-item primary-needs questionnaire (Williams & Zadro, 2001). Three items were used to assess each of the four primary needs: belonging (e.g., *I felt disconnected*), self-esteem (e.g., *I felt good about myself*), control (e.g., *I felt powerful*), and meaningful existence (e.g., *I felt invisible*). Each item is scored on a 5-point Likert scale (1=*not at all* to 5=*very much so*).

Upon completion of the session, participants were fully debriefed. In any ostracism experiment, care must be taken to ensure the well-being of the participant. A generous allotment of time was provided in the experimental session for the debriefing, to ensure that the experimenter had time not only to fully explain the aims of the experiment and the necessity for any deception, but also to address—at length—any concerns and/or questions that participants may have had about the experiment. Care was also taken to ensure that all participants, particularly those in the ostracism conditions, were aware that they had been randomly allocated to their condition. Finally, the experimenter provided participants with a small token (the choice between a piece of candy or a box of sultanas) to ensure that the participants left the laboratory in a positive mood.

[2] For a copy of the O-Cam script, please email the third author (lisa.zadro@sydney.edu.au).

Results

Manipulation check

The primary-needs items were reverse scored where necessary, and then summed to create a total primary-needs score (Cronbach alpha= .94; scores ranged from 12 to 60 for the total sample). Lower scores signified greater need depletion.

To verify that all of the paradigms successfully induced ostracism, independent-samples *t* tests were conducted on the total primary needs for each paradigm, with inclusionary status entered as the independent variable. All paradigms were found to successfully induce ostracism, such that ostracized participants in all three paradigm conditions reported significantly greater need depletion ($M_{\text{O-Cam}}$= 21.28, SD= 7.35; M_{Cyber}= 27.52, SD= 8.40; M_{Recall}= 28.36, SD= 8.50) than did the included participants [$M_{\text{O-Cam}}$= 39.29, SD= 7.33, $t(47)$= 8.59, $p < .0001$; M_{Cyber}= 44.74, SD= 6.25, $t(50)$= 8.33, $p < .0001$; M_{Recall}= 50.88, SD= 5.20, $t(49)$= 11.36, $p < .0001$]. Given the success of the ostracism manipulations, the remaining analyses focused solely on the ostracized participants.

Analyzing primary needs

For the ostracized participants, primary-need items were then summed to create a total score for each individual primary need (Cronbach's alphas: belonging= .73, control= .73, self-esteem= .77, meaningful existence= .76; scores ranged from 3 to 15 for meaningful existence and belonging, 3 to 12 for control, and 3 to 11 for self-esteem), and these individual scores were analyzed in addition to the total primary-needs score (Cronbach's alpha= .88 for the ostracized sample).

Total primary needs A one-way between-subjects analysis of variance (ANOVA) with paradigm entered as the independent variable was conducted on the total primary-needs score. Post-hoc comparisons using the Tukey HSD test were then conducted (see Table 1 for the complete results of the post-hoc Tukey comparisons).

A significant effect of paradigm was found for total primary-need depletion, $F(2, 72)$= 5.70, p= .005, η^2= .137, such that O-Cam (M= 21.28, SD= 7.35) resulted in significantly greater primary-need depletion than did Cyberball (M= 27.52, SD= 8.40) and recall (M= 28.36, SD= 8.50). However, we observed no significant difference in the need depletion induced by Cyberball and recall.

Pattern of individual need depletion To visually depict the pattern of need depletion for each paradigm, the means and standard errors of the individual need scores are displayed graphically in Fig. 1.

It is apparent from the pattern of means displayed in Fig. 1 that each paradigm induces a different holistic pattern of need depletion (in which a lower score represents greater need depletion). Recall appears to have a more aversive impact on control and self-esteem than on belonging and meaningful existence. In contrast, Cyberball appears to have a more aversive impact on control than on the remaining needs. O-Cam appears to have the most adverse impact on control, although the remaining needs appear to be (similarly) adversely affected.

A one-way ANOVA was then conducted on each individual need score. Here we found a significant effect of paradigm for each of the individual needs: belonging, $F(2, 72)$= 6.29, p= .003, η^2= .149; control, $F(2, 72)$= 5.52, p= .006, η^2= .133; self-esteem, $F(2, 72)$= 3.79, p= .027, η^2= .095; meaningful existence, $F(2, 72)$= 3.51, p= .035, η^2= .089.

Although from Fig. 1 it appears that O-Cam induced greater need depletion than did the other paradigms for all four primary needs, post-hoc comparisons using the Tukey HSD test revealed that O-Cam led to significantly greater depletion of belonging, control, and meaningful existence than did the recall paradigm, and significantly greater depletion of control and self-esteem than did Cyberball (see Table 1). No other comparisons were found to be significant, including the comparisons between the recall and Cyberball paradigms for each individual primary need.

Discussion

The aim of the present study was to compare the effects of ostracism induced by three different paradigms on primary-need depletion. Although each paradigm was found to adversely affect primary needs—and hence, successfully induce ostracism—significant differences emerged in the total need depletion elicited by the different paradigms. Moreover, the paradigms were found to elicit different patterns of individual need depletion.

It was expected that the induction procedures of experiential ostracism paradigms (O-Cam and Cyberball) would elicit greater primary-need depletion than would the act of merely ruminating on an ostracism episode in a retrospective paradigm (the recall paradigm); however, the present findings indicate that this was not necessarily the case. Specifically, although the experiential paradigm O-Cam resulted in significantly greater total primary-need depletion than did the retrospective recall paradigm, no significant difference in total need depletion was found between the experiential Cyberball paradigm and the recall paradigm. Moreover, O-Cam was found to result in significantly greater total need depletion than did Cyberball, indicating that the psychological impacts of the two experiential paradigms are not equivalent. It appears that being ostracized during an O-Cam Web conference induces a more powerful

Table 1 Post-hoc Tukey results from the one-way between-subjects ANOVA for total primary needs and for each individual need, as a function of paradigm

Dependent Variable	Paradigm (I)	Paradigm (J)	Mean Difference (I–J)	Std. Error	Sig.
Total primary needs	Recall	Cyberball	0.84	2.29	.929
		O-Cam	7.08**	2.29	.008
	Cyberball	O-Cam	6.24*	2.29	.022
Belonging	Recall	Cyberball	1.08	0.78	.358
		O-Cam	2.76**	0.78	.002
	Cyberball	O-Cam	1.68	0.78	.089
Control	Recall	Cyberball	0.36	0.53	.778
		O-Cam	1.68**	0.53	.007
	Cyberball	O-Cam	1.32*	0.53	.041
Self-esteem	Recall	Cyberball	–1.32	0.63	.099
		O-Cam	0.32	0.63	.868
	Cyberball	O-Cam	1.64*	0.63	.030
Meaningful existence	Recall	Cyberball	0.72	0.90	.702
		O-Cam	2.32*	0.90	.031
	Cyberball	O-Cam	1.60	0.90	.182

The error term is mean squared error: for total primary needs= 65.63; belonging= 7.69; for control= 3.54; for self-esteem= 4.98; and for meaningful existence= 10.04. * Significant at the .05 level. ** Significant at the .01 level.

exclusionary experience—as assessed by total primary-need depletion—than either being ostracized from an internet ball-tossing game or being asked to recall and write about a past incident of personal ostracism.

Differences also emerged between the paradigms with respect to individual primary-need depletion, such that O-Cam was found to induce greater depletion of belonging, control, and meaningful existence than did the recall paradigm, and greater depletion of control and self-esteem than did Cyberball. The recall and Cyberball paradigms did not differ significantly from each other with respect to both total and individual primary-need depletion.

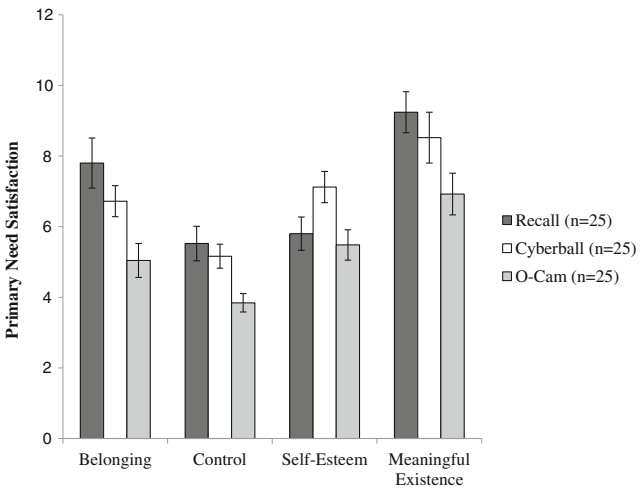

Fig. 1 Means and standard errors of primary needs a function of each paradigm, where each need is on a scale of 3–15 (lower score= greater need depletion)

Several unique features of the O-Cam paradigm may have facilitated its comparatively more powerful impact on primary-need depletion, relative to the other paradigms. First, unlike Cyberball and the recall paradigm, the nature of O-Cam's induction—in which the target is face to face with his or her ostracizers—allows for both verbal and nonverbal cues of ostracism. Such subtle cues of nonverbal ostracism have been shown to have a detrimental impact on an individual's primary needs (Nezlek et al., 2012; Wirth, Sacco, Hugenberg, & Williams, 2010). Thus O-Cam's multimodal ostracism induction (i.e., ostracism that occurs via both verbal and nonverbal means) may lead the paradigm to have a more aversive effect on primary-need depletion.

Additionally, O-Cam's ostensible Web-conference cover story creates the (perceived) ability for targets to communicate their immediate emotional reactions to the sources during the ostracism episode, either verbally (e.g., "Are you guys listening to me?") or nonverbally (e.g., through physical displays of negative emotion such as looking down/away and sad/distressed facial expressions). Given that the prerecorded sources in O-Cam are apparently not bothered by any emotional response that the target chooses to display, participants may subsequently experience increased frustration and a lack of control during the induction procedure (which may be reflected in O-Cam's significantly greater threat to control, relative to the other paradigms).

Implications of findings, limitations, and future research

Within the current literature, it is common for ostracism researchers to generalize findings yielded through one specific type of ostracism induction to the entire ostracism phenomenon as a whole (for review, see Williams, 2007). However, to date, no research has established whether the numerous ostracism paradigms implemented in the field produce equivalent ostracism experiences and therefore warrant interchangeable use. As such, the present findings have important implications for researchers with regard to the validity of this practice.

Unexpectedly, no significant differences in need depletion—whether total or individual needs—were found between the recall paradigm and Cyberball paradigms. Consequently, this suggests that the interchangeable use of these two paradigms may be valid, as the psychological responses that the paradigms elicit are equivalent in terms of primary-need depletion. However, the fact that O-Cam has a significantly more aversive impact on primary needs relative to the Cyberball and recall paradigms suggests that the findings established when implementing O-Cam may not necessarily translate to ostracism studies that utilize Cyberball or recall (and vice versa).

One limitation of the present study is that it only compared the three paradigms in terms of primary-need depletion. The induction procedures of the three paradigms may produce substantial differences with respect to other types of ostracism consequences—such as behavioral responses. Future research should thus examine the three ostracism paradigms with respect to other dependent variables—such as behavioral reactions (e.g., pro- or antisocial behavior)—to further verify whether the three ostracism inductions are equivalent and therefore appropriate for interchangeable use.

Overall, regardless of the paradigm used, empirical findings should be replicated using alternative ostracism paradigms to verify that the findings are not paradigm specific. This is not common practice in the current literature (for exceptions, see Bastian & Haslam, 2010; Zhong & Leonardelli, 2008). Until evidence suggests that the generalization of ostracism findings is appropriate, ostracism researchers should be mindful of this limitation and therefore only apply their findings to the specific form of ostracism that their paradigm respectively induces, rather than generalize to all instances of ostracism. This will also have the effect of ensuring that researchers will take the nature of the paradigm into consideration should they fail to replicate prior psychological or behavioral findings in the ostracism literature.

Conclusion

In the ostracism field, researchers have tended to use total need depletion rather than individual need depletion as an indicator of the effectiveness of an ostracism induction. However, this practice may lead researchers to erroneously assume that all ostracism paradigms are "equal," and hence to (a)use the paradigms interchangeably and (b)view the findings as being indicative of all types of ostracism phenomena. The findings of the present study, however, suggest that this would be problematic, given that the paradigms appear to systematically vary in both total and the pattern of individual primary-need depletion.

Therefore, ostracism researchers should be cognizant of the limitations of the paradigm(s) that they implement when extrapolating their findings in order to provide explanations for ostracism phenomena. The differential consequences of each paradigm should also be taken into account when researchers attempt to replicate studies in the field; our findings suggest that using a different paradigm from that utilized in the original study may result in different patterns of need depletion and, possibly, alternative behavioral outcomes.

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