

RESEARCH ARTICLE

Ostracism negatively impacts working self-perceptions of personality

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Abstract

We examined if being ostracized (excluded and ignored) changes working self-perception of personality — a core aspect of the self — which may contribute to understanding post-ostracism behaviour. Across three studies ($N = 943$), using a virtual ball-toss game (i.e., Cyberball), participants were either ostracized, included or mentally visualized playing the game. Subsequently, participants reported working self-perceptions of their personality (using two measures of Big Five personality), ostracism's immediate effects (e.g., basic needs) and post-ostracism behavioural intentions: aggressive temptations and solitude seeking. Across the studies, ostracism in Cyberball negatively impacted working self-perception of personality: ostracized participants were less conscientious, agreeable, open and extraverted, and more neurotic (negative emotionality), compared to controls. Illustrating that altered working self-perceptions are important to consider, ostracism's increase of aggressive temptations was mediated by agreeableness, even when accounting for ostracism's immediate (reflexive) effects. Additionally, ostracism's increase in solitude seeking was mediated by extraversion. Ultimately, these aversive self-perceptions may create difficulties in socially connecting with others.

KEYWORDS

aggression, ostracism, personality, self-perception, social exclusion, solitude seeking

1 | INTRODUCTION

Ostracism is a universally unpleasant experience, but the extent of ostracism's aversive consequences is still being determined. Ostracized individuals, those who are excluded and ignored, experience thwarted fundamental needs (i.e., belonging, control, self-esteem, meaningful existence) which are necessary for everyday functioning. Ostracism also increases negative affect (see Hartgerink et al., 2015, for a meta-analysis), even as quickly as 30 s after ostracism begins (Wesselmann et al., 2012). Further, ostracism induces social pain — the pain resulting from a threat or actual loss of a social connection (MacDonald

& Leary, 2005). Due to the harmful effects of losing social connections, researchers (Kerr & Levine, 2008; M. R. Leary, 1999; M. Leary & Baumeister, 2000; Pickett & Gardner, 2005; Spoor & Williams, 2007) argue we developed a social monitoring system (with social pain as the alarm) set to detect any indication of the nearly daily experience of ostracism (Nezlek et al., 2012). In fact, when ostracism occurs, regions of the brain sensitive to physical pain, the dorsal anterior cingulate cortex and right ventral prefrontal cortex, are activated (Eisenberger, 2012; Eisenberger et al., 2003). These immediate (reflexive) responses begin to capture ostracism's overall negative sequelae. This immediate painful response, captured in sociometer theory (M. R. Leary, 1999;

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M. Leary & Baumeister, 2000), could characterize the strong impact exclusion could have on multiple dimensions of the self. Specifically, it is currently unknown whether ostracism affects one's immediate sense of a core attribute: their personality.

Given ostracism's immediate harm, it is plausible ostracism's consequences are sufficiently strong to affect core aspects of the self. If ostracism can negatively affect involuntary physiological responses, such as increased autonomic responses (Paolini et al., 2016), colder finger temperatures (a stress response; Ijzerman et al., 2012) and decreased pupillary reactivity (consistent with post-ostracism numbing; Sleegers et al., 2017), ostracism may also influence aspects of the self. For instance, ostracism leads to decrements in both explicit and implicit self-esteem (Wirth et al., 2010), decreases belief that life is meaningful (Stillman et al., 2009), interferes with self-concept clarity (Ayduk et al., 2009), increases uncertainty about one's self (e.g., Hales et al., 2021) and prompts feelings of dehumanization (Bastian & Haslam, 2010). Central to our current examination of self-perception of personality following ostracism, ostracized individuals report being more disagreeable in particular (Hales et al., 2016).

As suggested by increased disagreeableness following ostracism (Hales et al., 2016), a working self-concept — one's self-perception of personality — may vary depending on the social situation. That is, we are interested in self-perception of personality based on the response to a specific moment, rather than traits overall. On a broad level, the possibility of all Big Five personality factors being affected by ostracism is supported by theory indicating one's sense of self can and does change (e.g., Roberts et al., 2006), even varying throughout the day (e.g., Fleeson & Law, 2015). Researchers proposed theories to support why personality expresses itself differently across situations. For instance, the cognitive-affective system theory of personality argues individuals differ between situations in their cognitive-affective mediating units (e.g., encodings, expectancies and beliefs, affects and goals) and the relationship with these units interact with each other and the psychological features of the social scenario (Mischel, 2004; Mischel & Shoda, 1995). Additionally, whole trait theory (Fleeson & Jayawickreme, 2021) characterizes personality dimensions as density distributions which vary within people and across situations in ways that adaptively promote behaviours relevant to goals. Thus, an individual varies on levels of personality dimensions (rather than remaining at a fixed level) and this variance is itself meaningful (e.g., Fleeson, 2001).

The possibility of ostracism changing personality traits temporarily, showing variance in personality, may be captured more specifically by the idea of *situated identities* — adjusting aspects of the self during a social encounter (Alexander & Knight, 1971). From this initial idea, Markus and Kunda (1986) contend an individual's identity is comprised of a diversity of knowledge structures. From these knowledge structures, an individual can combine different substructures in response to the social situation. Thus, the working self-concept is a temporary identity structure drawing elements from an individual's wide-ranging collection of self-conceptions which, based on what is dictated by the social situation, are temporarily organized into a configuration (Markus & Kunda, 1986). For example, if an individual makes an ill-advised comment, the individual may activate knowledge structures associated

with feeling foolish or awkward, which are only a part of the individual's overall knowledge structures (Markus & Kunda, 1986). As this example shows, the working self-concept captures changes in an individual's self-concept based on a momentary social context (Markus & Kunda, 1986; McConnell, 2011; E. R. Smith, 2002). This results in malleability and fluidity of how one perceives themselves based on social contextual cues.

The social contextual cues of ostracism appear to alter the working self-perception of personality. Supporting this possibility, ostracized individuals experience more of a disconnect between their past, current and future selves (i.e., self-continuity), potentially altering self-perceptions to meet the changing social situation of ostracism (Jiang et al., 2021). Relating to the possibility of ostracism affecting working self-perception of personality, following social exclusion, individuals show increased self-concept malleability by adjusting their self-concepts to match the identity of a potential friend (Richman et al., 2015). Specifically, excluded participants incorporated traits of a potential friend into their own self-concept. These studies provide additional evidence suggesting the malleability of working self-perceptions. Further, given that low levels of belonging can lead to a decrease in global evaluation of oneself (i.e., their self-esteem; M. Leary & Baumeister, 2000), it is plausible to expect that ostracism could also shift self-perceptions of one's overall personality traits.

1.1 | Linking ostracism to changes in working self-perception of personality

Evidence for ostracism influencing working self-concept and initial results finding ostracized individuals report being disagreeable (i.e., Hales et al., 2016) suggest ostracism may negatively impact self-perception of *all* big five personality dimensions (i.e., conscientiousness, agreeableness, neuroticism, openness, extraversion).

The current research will test the proposition that ostracism changes self-perceptions of these characteristics. Specifically, we will examine if ostracism impacts self-perception of personality negatively and if this impact may provide an enhanced understanding of the behavioural response to ostracism (i.e., aggression and solitude seeking) beyond what is currently shown by ostracism's immediate (i.e., reflexive) effects.

Ostracism may negatively impact self-perception of personality in the sense of making the ostracized individual feel their personality traits inhibit their ability to form social connections. For instance, if an ostracized individual perceives they possess lower levels of agreeableness, this may make it harder to socially connect as individuals exclude those low on agreeableness (Hales et al., 2016). In fact, the stereotype of an 'ostracizable' person includes the person being low in agreeableness or conscientiousness (Rudert et al., 2020). Even if ostracized individuals can make contact with others, prior research (e.g., Asendorpf & Wilpers, 1998) suggests ostracized individuals' perceived personality dimensions are the sorts of characteristics that are associated with social connections that are of worse quality and quantity. Ostracism may negatively impact self-perception of

personality in the sense of an ostracized individual perceiving having traits that make them less likely to make a new and sustainable social connection.

Further, being ostracized may cause individuals to see themselves as inhabiting the types of characteristics which elicit ostracism from others due to feeling burdensome. Indeed, potential sources of ostracism are more likely to ostracize targets who are low in conscientiousness, agreeableness and openness and high in neuroticism (Rudert et al., 2020). Ostracized individuals may perceive themselves as having these traits because they feel *burdensome* to others, even when there was no means to burden the group (Buelow & Wirth, 2017). To the extent that certain personality characteristics are sensed to be burdensome to others (i.e., being unconscientious, disagreeable and emotionally negative), we might expect ostracism to momentarily shift one's working self-perceptions accordingly.

There are also trait-specific reasons to expect ostracism to have specific and measurable effects on working self-perceptions. This is most visible with the trait of *neuroticism*, which primarily involves the tendency to experience negative emotions (John et al., 2008) and responds unfavourably to stressful events, including a lack of social support (Denissen & Penke, 2008). Given that ostracism reliably induces strong negative affect (Hartgerink et al., 2015; Williams, 2009), it is plausible ostracism increases self-perceptions of neuroticism. Likewise, ostracism is theorized (and has been previously found) to induce *disagreeableness* (Hales et al., 2016). A core aspect of agreeableness is the desire to maintain positive relations with others (Graziano & Eisenberg, 1997). When relations have just been severed, as when ostracized, one is likely to respond with coldness, anger and less empathy, that is, with less agreeableness. *Conscientiousness* entails being careful, dutiful and exercising self-control in completing tasks (John & Srivastava, 1999). Ostracism and related experiences have been shown to induce the sort of state that would obstruct conscientiousness (Stillman & Baumeister, 2013): It reduces self-control (Oaten et al., 2008), cognitive functioning (Baumeister et al., 2002) and increases risk-taking (Buelow & Wirth, 2017) — an outcome negatively associated with conscientiousness (Bogg & Roberts, 2004). Thus, ostracism plausibly decreases both one's motivation and ability, to behave in a dutiful way, leading potentially to perceptions of lowered conscientiousness. Ostracism's effect on self-perceptions of *openness* is less straightforward. On the one hand, it has been shown to cause increased openness to non-conventional ideas (e.g., conspiracy and superstitious beliefs; Poon et al., 2020; 2023) and general susceptibility to social influence (e.g., Riva et al., 2014). On the other hand, ostracism is associated with depression and related symptoms (Rudert et al., 2021), which themselves are associated with a tendency to withdraw and lose interest in new experiences (e.g., De Fruyt et al., 2020) and to assume new experiences are negative (e.g., Pietri et al., 2015). Finally, *extraversion* is characterized by lively social interaction, assertiveness and activity (McCrae & John, 1992). When one is ostracized, they are not only typically isolated, but also lack an ability to act upon their social environment (Warburton et al., 2006); again producing possible decreases in self-perceived extraversion.

1.2 | Ostracism affecting behaviour

Ostracism leads to pro-social, anti-social and asocial behaviours. Responding pro-socially, ostracized individuals can behave in ways that help reestablish social connections: focus more on social information that could lead to inclusion (Bernstein et al., 2008; Böckler et al., 2014; Pickett et al., 2004), respond with greater mimicry of an interaction partner (Lakin et al., 2008), work harder on groups tasks (at least for female participants; Williams & Sommer, 1997), focus more on re-inclusion (Maner et al., 2007; Molden et al., 2009) and be more susceptible to social influence (Carter-Sowell et al., 2008; Riva et al., 2014; Williams et al., 2000). Reacting anti-socially, ostracism increases aggression towards both the source of the ostracism and innocent others based on several assessments of aggression, including negative evaluations, punishing someone with an aversive noise blast and ostensibly forcing someone to eat hot sauce (e.g., Chow et al., 2008; Gaertner et al., 2008; Twenge et al., 2001; Warburton et al., 2006; Wesselmann et al., 2010). Likewise, ostracized individuals are more tempted to act aggressively (Buckley et al., 2004), even when failing to receive eye contact during a brief virtual interaction (Wirth et al., 2010). However, when these responses are measured within the same scale, pro-social behaviour was reverse-scored to create an overall index of aggression (e.g., Buckley et al., 2004; Wirth et al., 2010) based on the idea that pro-social and aggressive behaviour are on opposite ends of the same dimension (e.g., Krueger et al., 2001). Ostracized individuals may also be asocial by opting to seek solitude. Being ostracized positively correlates with a general desire for solitude and across a multitude of paradigms and samples, ostracized participants reported an increased desire for solitude (Ren et al., 2016, 2021). Solitude, following being ostracized, may prevent further ostracism or rejection and allow contemplation (Wesselmann et al., 2021). In the current research, we examined how ostracism's aversive impact on reflexive responses and working self-perception of personality would subsequently predict these latter two responses: aggressive behaviour temptations and solitude seeking.

If personality *traits* predict aggression and solitude seeking, then it follows that temporary ostracism-induced influences on working self-perception of personality may contribute to understanding post-ostracism behaviours. Indeed, at the trait level, the extent to which individuals are aggressive or seek solitude does appear to depend on their personality. Specifically, for aggressive behaviour, agreeableness and neuroticism are associated strongly with aggression (Caprara et al., 1996). Based on the Aggression Questionnaire, a widely used self-report measure (Buss & Perry, 1992), agreeableness and neuroticism were the most highly correlated, but extraversion and conscientiousness were also significantly correlated with aggression (Sharpe & Desai, 2001; Tremblay & Ewart, 2005). For solitude seeking, openness, conscientiousness and traits associated with high emotional stability are associated with an increase in preference for solitude, whereas agreeableness is linked to a decrease in preference for solitude (McCrae & Costa, 2003; Teppers et al., 2013). In previous work examining solitude

seeking, using the same measures we used, researchers (Ren et al., 2016) found introversion-extraversion moderated participants' desire to play an upcoming game alone (i.e., solitude seeking) following being ostracized versus included (although the effect was weaker in a subsequent replication study; Ren et al., 2021; Study 3). Collectively, given individual differences are associated with aggression and solitude seeking, it seems plausible that ostracism's negative impact on working self-perception of personality traits could contribute to understanding aggressive behaviour temptations and solitude seeking.

1.3 | Overview

We examined, based on personality traits influencing aggression and solitude seeking, if working self-perception of personality could contribute to understanding behavioural intentions beyond ostracism's immediate negative influence: thwarted basic needs, increased social pain and greater negative affect. Research (e.g., Warburton et al., 2006) indicates ostracism's reflexive effects (e.g., control) can predict aggressive behaviour. Using mediation analyses, we aimed to provide evidence that changes in working self-perception of personality could contribute to understanding post-ostracism behaviour following Cyberball, even when accounting for ostracism's immediate reflexive effects (i.e., basic needs, negative mood, social pain).

Hypotheses and initial evidence. We hypothesized that ostracized participants in Cyberball would indicate less conscientiousness, agreeableness, openness and extraversion, but increased neuroticism (negative emotionality) compared to control participants (e.g., inclusion and mental visualization). We subsequently tested, using parallel multiple mediation, if changes in personality contribute to understanding post-ostracism behaviours. Specifically, we aimed to illustrate the importance of changes in working self-perception by examining if they can predict post-ostracism behavioural intentions (i.e., aggression temptations, solitude seeking), even when accounting for ostracism's immediate effects (e.g., thwarted basic needs).

A pilot study produced initial evidence for ostracism's harming working self-perception of personality. Participants ($n = 311$) recalled their worst experience being rejected or excluded, a time they were accepted or included, or a time (i.e., event) where they worked in a group (see <https://osf.io/g7mnn/> for full methods and results of the pilot). Ostracized participants reported less conscientiousness, agreeableness, openness, and extraversion, and greater neuroticism than participants recalling inclusion or working in a group ($ps \leq .012$, $ds \geq 0.38$). This is promising initial evidence for our hypotheses; however, there are limitations of re-living experiments (e.g., potential demand effects or self-report biases) and other aspects of the re-lived experience may be confounded with the conditions (e.g., thinking of disliked others). In the subsequent studies, we examined the hypotheses using an established and less ambiguous experimental manipulation of ostracism in which participants have an actual brief experience of ostracism (i.e., Cyberball; Williams et al., 2000).

1.4 | Data collection plan and exclusions for all studies

We used G*Power 3.1 (Faul et al., 2007) to calculate the required sample size for our three studies. Based on a Type I error (α) = .05, two-tailed, a power of $1 - \beta = .90$ and an average effect size in social psychology of $r = .21$ (Richard et al., 2003), we required 291 participants; we aimed to have at least 300 participants complete each study. In our initial approach to conducting a power analysis, we used the average effect size in social psychology (i.e., $r = .21$; Richard et al., 2003) given we examined five personality dimensions and their associations with two different behaviours, so we did not feel we had a clear single effect size to use as the basis for our power analysis. The average effect size ended up equalling the smallest effect Hales et al. (2016) found when examining ostracism's effect on agreeableness. Hypothesis tests are non-directional across all studies and analyses.

To account for potential participant exclusions while still trying to attain our desired sample size, we increased the samples by approximately 20% to address participant dropouts and potentially invalid data due to conducting the study online (vs. laboratory; e.g., Dandurand et al., 2008; Hoerger, 2010). For each of the studies, we did not analyse data until we completed data collection and participant exclusions. We report all measures, manipulations and exclusions. Studies 3, 4a and 4b were preregistered. Materials for all the studies, datasets, and pre-registrations can be found at <https://osf.io/g7mnn/>.

We conducted one-way ANOVAs for all analyses and used Tukey or Games-Howell (when homogeneity of variance was violated) post-hoc comparisons.

2 | STUDY 1

2.1 | Method

2.1.1 | Participants

Our initial sample included 355 U.S. MTurk workers who received \$1.25. We removed participants who played Cyberball before ($n = 23$), were suspicious of the other players ($n = 7$), took more than 3 SDs to complete the study ($n = 6$), were distracted ($n = 10$), were interrupted ($n = 3$) or a combination of the above exclusion criteria ($n = 12$). Our final sample included 294 participants (64.6% female; $M_{\text{age}} = 34.41$, $SD_{\text{age}} = 10.76$, $\text{Range}_{\text{age}} = 18\text{--}73$) who were predominantly White (78.6%).

2.1.2 | Procedure

To manipulate participants' exclusionary status, we utilized Cyberball (Williams et al., 2000), a virtual ball-toss game. We instructed participants to mentally visualize tossing a ball with two other

players online (ostensibly), who were computer-controlled avatars. Ostracized participants received the ball once from each player at the beginning and then never again, whereas included participants received the ball throughout the game (approximately 33% of the time). To determine the directionality of effects (i.e., whether outcomes are attributed to the benefits of inclusion rather than the costs of ostracism), we included a control condition where participants only visualized playing Cyberball (they viewed a static image of the game) — they did not actually play the game.

2.1.3 | Measures

Following playing Cyberball, participants completed measures in the same order as listed below.

Self-perceptions of personality dimensions. Using the Five-Factor Model Rating Form (FFMRF; Mullins-Sweatt et al., 2006), participants indicated the extent the Big Five dimensions best described them *during the Cyberball task*. Participants responded on a scale of 1 (*Extremely low*) to 5 (*Extremely high*) on 30 items capturing the facets of the five-factor model of personality (Costa & McCrae, 1992). We used the 30 'facet' scores of the FFMRF to generate the five broad domains of the five-factor model (α s: openness = .59, remaining = .67–.83).

Basic need satisfaction, negative affect, social pain and manipulation checks. Participants completed several measures in a randomized order. Participants responded to 20 items, with five items each assessing the basic needs of belonging, control, self-esteem and meaningful existence (e.g., 'I felt like an outsider', 'I felt insecure'; e.g., Wirth et al., 2010). We averaged the needs together to create an overall basic needs score (α = .96), similar to previous research (e.g., McConnell et al., 2011; Rudert et al., 2017; Sacco et al., 2014). Participants also completed an 8-item scale of negative affect (e.g., 'I felt angry', 'I felt sad'; α = .91; e.g., Wirth et al., 2010) and a social pain item ('I was in pain'). All items were on a 1 (*Not at all*) to 5 (*Extremely*) scale.

As part of the randomized questions, participants answered manipulation check items asking how ostracized they felt (i.e., ignored and excluded; $r_{\text{spearman-brown}} = .95$). Separately, participants indicated what percent of time they were included.

Aggressive behaviour temptations. Participants indicated how tempted they were to behave aggressively towards the other group members if given the chance to meet with the group members face-to-face (Buckley et al., 2004; Wirth et al., 2010). Specifically, participants reported their temptation to perform eight aggressive behaviours (e.g., 'humiliate the group members', 'push or shove the group members') and eight pro-social behaviours (e.g., 'smile at the group members', 'compliment the group members') on a scale of 1 (*Not at all tempted*) to 7 (*Very tempted*). We averaged the 16 items into an aggressive behaviour temptations measure (α = .93). Following this measure, participants completed a set of attention and familiarity checks, provided demographic information and reviewed debriefing information.

2.2 | Results

2.2.1 | Manipulation checks

We successfully manipulated feelings of ostracism, as participants self-reported receiving the ball less and feeling more ostracized than included participants or participants who mentally visualized (p s < .001, d s ≥ 1.62 ; Analysis of variances [ANOVAs]: F s(2, 289) ≥ 58.63 , p s < .001, η_p^2 s $\geq .29$; see Table 1 for M s, SD s and 95% CIs). There were no significant differences between included participants versus participants who mentally visualized (p s $\geq .394$, d s ≤ 0.19).

2.2.2 | Personality dimensions

Ostracized participants reported less extraversion and greater neuroticism compared to included participants (p s $\leq .008$, d s ≥ 0.43). Ostracized participants also reported less conscientiousness, openness and extraversion, and greater neuroticism, compared to participants who mentally visualized (p s $\leq .033$, d s ≥ 0.35 ; ANOVAs: F s(2, 291) ≥ 3.23 , p s $\leq .041$, η_p^2 s $\geq .02$). The ANOVA for agreeableness did not reach significance at the standard $p = .05$ level (F (2, 291) = 2.87, $p = .058$, $\eta_p^2 = .02$), but the pattern of results is consistent with the other personality traits.

2.2.3 | Basic needs, negative affect and social pain

Ostracized participants reported less basic needs satisfaction and more negative affect compared to both control conditions (p s < .001, d s ≥ 0.85 ; ANOVAs: F s(2, 291) ≥ 27.68 , p s < .001, η_p^2 s $\geq .16$). There was no significant effect for social pain (F (2, 291) = 1.67, $p = .191$, $\eta_p^2 = .01$).

2.2.4 | Aggressive behaviour temptations

Ostracized participants had a greater temptation to be aggressive compared to the control conditions ($p_{\text{Games-Howells}} < .001$, d s ≥ 0.77 ; ANOVA: F (2, 291) = 25.99, $p < .001$, $\eta_p^2 = .15$).

2.2.5 | Do changes in self-perception of personality contribute to understanding aggressive behaviour temptations?

To assess if ostracized participants' self-perception of their personality predicts behaviour temptations following ostracism, we conducted a parallel multiple mediation analysis (Hayes, 2018, model 4) with the Big Five dimensions, basic needs, negative affect and social pain entered as mediators of the relationship between exclusionary status and aggressive behaviour temptations. If Big

TABLE 1 Means, standard deviation and 95% confidence intervals for the dependent variables for Study 1.

Variable	Means and standard deviations						95% Confidence intervals		
	Ostracism (n = 98)		Inclusion (n = 102)		Mental visualization (n = 94)		Ostracism vs. inclusion	Ostracism vs. mental visualization	Inclusion vs. mental visualization
	M	SD	M	SD	M	SD			
Manipulation checks									
Feeling ostracized $F(2, 291) = 94.38, p < .001, \eta_p^2 = .39$ 95% CI [0.31, 0.46]	4.10 ^a	1.00	2.18 ^b	1.34	1.94 ^b	1.24	1.522, 2.309	1.771, 2.540	−0.194, 0.674
Percent of throws received $F(2, 289) = 58.63, p < .001, \eta_p^2 = .29$ 95% CI [0.20, 0.36]	19.39 ^a	15.28	53.61 ^b	23.51	53.98 ^b	34.97	−40.812, −27.608	−43.974, −25.187	−10.606, 9.865
Personality traits									
Conscientious $F(2, 291) = 3.23, p = .041, \eta_p^2 = .02$ 95% CI [0.00, 0.06]	3.29 ^a	0.76	3.45 ^{a,b}	0.66	3.55 ^b	0.73	−0.398, 0.080	−0.504, −0.017	−0.343, 0.140
Agreeableness $F(2, 291) = 2.87, p = .058, \eta_p^2 = .02$ 95% CI [0.00, 0.06]	3.16 ^a	0.61	3.37 ^a	0.63	3.32 ^a	0.63	−0.413, 0.004	−0.367, 0.059	−0.160, 0.261
Neuroticism $F(2, 291) = 6.16, p = .002, \eta_p^2 = .04$ 95% CI [0.01, 0.09]	2.79 ^a	0.82	2.47 ^b	0.66	2.45 ^b	0.78	0.069, 0.572	0.079, 0.592	−0.239, 0.269
Openness $F(2, 291) = 6.47, p = .002, \eta_p^2 = .04$ 95% CI [0.01, 0.09]	2.96 ^a	0.57	3.06 ^a	0.63	3.27 ^b	0.59	−0.291, 0.108	−0.507, −0.100	−0.414, −0.011
Extraversion $F(2, 291) = 21.77, p < .001, \eta_p^2 = .13$ 95% CI [0.06, 0.20]	2.64 ^a	0.77	3.10 ^b	0.75	3.35 ^c	0.73	−0.702, −0.201	−0.960, −0.449	−0.506, < 0.001
Basic needs $F(2, 291) = 63.50, p < .001, \eta_p^2 = .30$ 95% CI [0.22, 0.38]	2.15 ^a	0.69	3.14 ^b	0.87	3.43 ^c	0.92	−1.251, −0.730	−1.557, −1.002	−0.591, 0.013
Negative affect $F(2, 291) = 27.68, p < .001, \eta_p^2 = .16$ 95% CI [0.09, 0.23]	2.97 ^a	0.84	2.28 ^b	0.80	2.18 ^b	0.80	0.425, 0.966	0.518, 1.070	−0.175, 0.372
Social pain $F(2, 291) = 1.67, p = .191, \eta_p^2 = .01$ 95% CI [0.00, 0.04]	1.49 ^a	0.90	1.35 ^a	0.85	1.28 ^a	0.69	−0.156, 0.430	−0.060, 0.487	−0.185, 0.338
Aggressive behaviour temptations $F(2, 291) = 25.99, p < .001, \eta_p^2 = .15$ 95% CI [0.08, 0.22]	3.08 ^a	1.12	2.26 ^b	1.01	2.09 ^b	0.93	0.461, 1.175	0.641, 1.343	−0.153, 0.501

Note: Different superscripts denote significant differences between conditions, $p < .05$. Confidence intervals are calculated based on the mean differences. Abbreviation: CI, confidence interval.

Five dimensions predict aggressive behaviour temptations, when included as mediators with ostracism's reflexive effects, then this outcome suggests changes in self-perception of personality are important to investigate to better understand post-ostracism behaviours.

Due to the exclusionary status variable consisting of three conditions (ostracism, inclusion and mental visualization), when mediation requires categorical predictor variables to have two levels, we used Helmert coding (Hayes, 2018, Chapter 6) to represent this variable with two orthogonal contrasts. The first contrast is the primary predictor of interest and compares the ostracism condi-

tion to the collapsed values of the inclusion and control conditions (numerically represented as $-2/3, 1/3, 1/3$). The second contrast directly compares only the inclusion condition to only the control condition (numerically represented as $0, -1/2, 1/2$). This contrast was included in the model to fully represent the effect of condition but is not reported here as it is not relevant to the hypothesis.

Corroborating earlier analyses, the mediation model, depicted in Figure 1, indicated that ostracism — compared to the other two conditions — significantly induced negative affect, reduced basic needs, increased social pain and altered negatively self-ratings on all Big Five

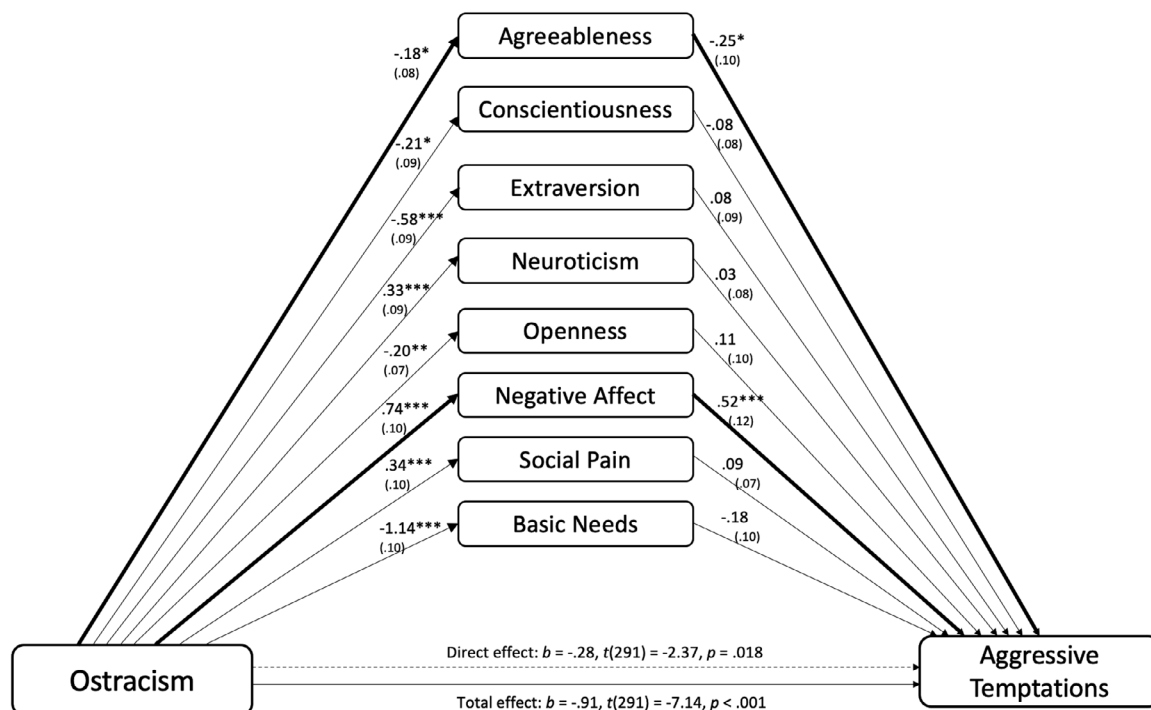


FIGURE 1 Mediation model testing the indirect effect of ostracism on aggressive behaviour temptations through the Big Five Personality dimensions, negative affect, social pain and basic needs in Study 1. Study 1 ($N = 294$). Values are unstandardized regression coefficients, and standard errors are in parentheses. * = significant at the .05 level, ** = significant at the .01 level and *** = significant at the .001 level. The three levels of inclusionary status are represented with Helmert codes ($-2/3, 1/3, 1/3$) comparing ostracism to the collapsed values of the inclusion and mental visualization conditions. For ease of presentation, the second Helmert code (comparing the inclusion and mental visualization conditions to each other) is not depicted here but was included in the model to fully represent the effect of the condition. Significant indirect pathways are bolded for emphasis.

dimensions (weakest $b = -.18, t(291) = -2.32, p = .021$). Of the tested mediators, aggression was significantly predicted by both agreeableness ($b = -.25, t(283) = -2.59, p = .010$) and negative affect ($b = -.52, t(283) = -4.28, p < .001$). We tested the indirect effects of each variable with bootstrapped 95% confidence intervals based on 5000 iterations (Hayes, 2018). The effect of ostracism was mediated by both agreeableness (*indirect effect* = $-.045 [-.105, -.004]$) and negative affect (*indirect effect* = $.386 [.179, .662]$), as neither confidence interval included 0.

2.2.6 | Exploratory analyses

To be thorough with our analyses, we conducted mediation analyses examining pro-social and aggressive behaviour temptation separately (i.e., treating the previously reversed-coded items as a separate pro-social scale and calculating aggressive behaviour temptation from only the non-reverse coded items). We found agreeableness was a significant mediator for pro-social behaviour temptations (*indirect effect* = $-.08 [-.17, -.01]$), but not aggressive behaviour temptations exclusively (*indirect effect* = $.01 [-.02, .06]$). The mediation for aggressive behaviour temptations was in the predicted direction, but not at a significant level. Negative affect was also a significant mediator for pro-social behaviour temptations (*indirect effect* = $.56 [.27, .97]$)

and aggressive behaviour temptations exclusively (*indirect effect* = $-.21 [-.43, -.02]$). (See Supplemental Figures 1 and 2 for more information.)

2.3 | Discussion

Study 1 indicates ostracized participants in Cyberball reported more negatively impacted working self-perceptions of personality compared to one or both control groups. Additionally, participants reported aversive outcomes associated with being ostracized (e.g., thwarted basic needs), with the exception of social pain. Ostracized participants, compared to control participants, also indicated greater temptations to aggress, which was accounted for by ostracism's effect on negative affect and level of agreeableness. Suggesting that changes in working self-perception are meaningful, an ostracized individual's working self-perception of being less agreeable was a significant mediator when examining temptations to be aggressive, even after accounting for reflexive effects (e.g., basic needs).

Study 2 was designed to enhance the reliability of our results through replication. We also intended for this study to generalize the effects of ostracism in Cyberball on working self-perception of personality. To do so, we used a new personality measurement instrument which also helped account for the lower reliability for some of the Big

Five traits calculated using the FFMRF. Specifically, we included a new measurement of the Big Five – the Big Five Inventory-2 (BFI-2; Soto & John, 2017).

3 | STUDY 2

3.1 | Method

3.1.1 | Participants

We started with a sample of 366 U.S. MTurk users who received \$1.25. We removed participants due to playing Cyberball previously ($n = 23$), being suspicious of the other players ($n = 6$), taking longer than 3 SDs to complete the study ($n = 5$), being distracted ($n = 7$), being interrupted ($n = 5$), not completing all of the scales ($n = 10$), having a duplicate IP address ($n = 4$) or a combination of the listed exclusions ($n = 18$). These exclusions resulted in a final sample of 288 participants (58.0% female; $M_{\text{age}} = 34.37$, $SD_{\text{age}} = 11.20$, $\text{Range}_{\text{age}} = 18\text{--}78$) who were mainly White (71.5%) or African American (10.8%).

3.1.2 | Procedure

We used the same Cyberball conditions as Study 1 to manipulate exclusionary status.

3.1.3 | Measures

Participants completed the same assessments of basic need satisfaction ($\alpha = .96$), negative affect ($\alpha = .91$), social pain, manipulation checks ($r_{\text{sb}} = .94$) and aggressive behaviour temptations ($\alpha = .93$) as we used previously. Here, these tasks were completed prior to the personality measure. Participants reported self-perceptions of their personality dimensions using the BFI-2 (Soto & John, 2017). As in Study 1, participants were instructed to respond based on how they felt during Cyberball. Participants indicated their agreement (1 = *Disagree strongly*; 5 = *Agree strongly*) on 60 items that comprised the following factors: extraversion, agreeableness, conscientiousness, negative emotionality and open-mindedness ($\alpha\text{s} = .80\text{--}.90$).

Following the personality measure, participants concluded the study similarly to Study 1.

3.2 | Results

3.2.1 | Manipulation checks

Ostracized participants self-reported receiving the ball less and feeling more ostracized than both included participants and the participants who mentally visualized ($p_{\text{Games-Howells}} < .001$, $d\text{s} \geq 1.64$; ANOVAs: $F\text{s}(2,285) \geq 52.81$, $p\text{s} < .001$, $\eta_p^2\text{s} \geq .27$; see Table 2). There were

no significant differences between the latter groups ($p_{\text{Games-Howells}} \geq .591$, $d\text{s} \leq .0.14$).

3.2.2 | Personality dimensions

Ostracized participants indicated less conscientiousness, agreeableness, openness and greater negative emotionality compared to included participants ($p\text{s} \leq .039$, $d\text{s} \geq 0.34$). Ostracized participants also reported less agreeableness and more negative emotionality compared to participants who mentally visualized ($p\text{s} \leq .005$, $d\text{s} \geq 0.46$; ANOVAs: $F\text{s}(2,285) \geq 3.40$, $p\text{s} \leq .035$, $\eta_p^2\text{s} \geq .02$). For extraversion, the ANOVA did not reach a standard significance level (i.e., $p = .05$; $F(2,285) = 2.94$, $p = .055$, $\eta_p^2 = .02$), but the overall results are consistent with our previous extraversion and other personality findings.

3.2.3 | Basic needs, negative affect and social pain

Ostracized participants experienced less basic need satisfaction and more negative affect compared to included participants or those who mentally visualized ($p\text{s} < .001$, $d\text{s} \geq 1.07$; ANOVAs: $F\text{s}(2,285) \geq 42.07$, $p\text{s} < .001$, $\eta_p^2\text{s} \geq .23$). The overall ANOVA for social pain was again not significant ($F(2,285) = 2.35$, $p = .097$, $\eta_p^2 = .02$).

3.2.4 | Aggressive behaviour temptations

Ostracized participants indicated more temptation to aggress compared to the control conditions of inclusion and mental visualization ($p_{\text{Games-Howells}} < .001$, $d\text{s} \geq 0.87$; $F(2,285) = 35.12$, $p < .001$, $\eta_p^2 = .20$).¹

3.2.5 | Do changes in self-perception of personality contribute to understanding aggressive behaviour temptations?

We performed mediation analyses, using the same method as Study 1, to test if the Big Five dimensions continued to mediate the effects of ostracism on aggressive behaviours beyond ostracism's reflexive effects (e.g., basic needs) as mediators. As in Study 1, the three conditions were represented with two orthogonal contrast codes, the first of which compared the effect of the ostracism condition to the collapsed values of the inclusion and control conditions.

¹ We included a behavioural-based measure of aggression (Thürmer & McCrea, 2018) by asking participants to evaluate if each group member should be included in a pool of competent participants for future studies (+3 [Yes] to -3 [No] scale; $r_{\text{sb}} = .89$). Ostracized participants ($M = 0.03$, $SD = 1.97$) were less likely to recommend the group members for a future participant pool compared to the control conditions of inclusion ($M = 1.98$, $SD = 1.47$) and mental visualization ($M = 1.95$, $SD = 1.45$; $p_{\text{Games-Howells}} < .001$, $d\text{s} \geq 1.11$; $F(2,285) = 44.35$, $p < .001$, $\eta_p^2 = .24$). For the parallel multiple mediation, this measure of aggression was only significantly predicted by basic needs ($b = .47$, $t(277) = 2.64$, $p < .001$), which also was the lone significant mediator (indirect effect = $-.57 [-.96, -.18]$).

TABLE 2 Means, standard deviations and 95% confidence intervals for the dependent variables for Study 2.

	Means and standard deviations						95% Confidence intervals		
	Ostracism (n = 96)		Inclusion (n = 93)		Mental Visualization (n = 99)		Ostracism vs. Inclusion	Ostracism vs. Mental Visualization	Inclusion vs. Mental Visualization
Variable	M	SD	M	SD	M	SD			
Manipulation checks									
Feeling ostracized $F(2, 285) = 96.08, p < .001, \eta_p^2 = .40$ 95% CI [0.32, 0.47]	4.14 ^a	1.07	2.22 ^b	1.22	2.05 ^b	1.18	1.520, 2.311	1.704, 2.466	−0.240, 0.580
Percent of throws received $F(2, 285) = 52.81, p < .001, \eta_p^2 = .27$ 95% CI [0.19, 0.35]	19.67 ^a	20.96	53.48 ^b	22.56	50.01 ^b	30.32	−41.307, −26.327	−39.145, −21.542	−5.606, 12.553
Personality traits									
Conscientious $F(2, 285) = 4.53, p = .012, \eta_p^2 = .03$ 95% CI [0.00, 0.08]	3.55 ^a	0.79	3.84 ^b	0.62	3.71 ^{a,b}	0.59	−0.536, −0.049	−0.403, 0.069	−0.081, 0.333
Agreeableness $F(2, 285) = 15.51, p < .001, \eta_p^2 = .10$ 95% CI [0.04, 0.16]	3.35 ^a	0.79	3.84 ^b	0.63	3.80 ^b	0.58	−0.737, −0.246	−0.681, −0.208	−0.160, 0.254
Negative emotionality $F(2, 285) = 7.46, p = .001, \eta_p^2 = .05$ 95% CI [0.01, 0.10]	2.70 ^a	0.87	2.27 ^b	0.91	2.34 ^b	0.70	0.125, 0.738	0.094, 0.630	−0.347, 0.208
Openness $F(2, 285) = 3.40, p = .035, \eta_p^2 = .02$ 95% CI [0.00, 0.06]	3.06 ^a	0.67	3.28 ^b	0.64	3.24 ^{a,b}	0.57	−0.440, −.009	−0.392, 0.032	−0.170, 0.258
Extraversion $F(2, 285) = 2.94, p = .055, \eta_p^2 = .02$ 95% CI [0.00, 0.06]	2.95 ^a	0.78	3.18 ^a	0.70	3.14 ^a	0.67	−0.481, 0.009	−0.433, 0.049	−0.200, 0.287
Basic needs $F(2, 285) = 72.35, p < .001, \eta_p^2 = .34$ 95% CI [0.25, 0.41]	2.06 ^a	0.72	3.26 ^b	0.90	3.29 ^b	0.79	−1.476, −0.914	−1.480, −0.970	−0.319, 0.259
Negative affect $F(2, 285) = 42.07, p < .001, \eta_p^2 = .23$ 95% CI [0.15, 0.30]	3.18 ^a	0.85	2.28 ^b	0.83	2.21 ^b	0.76	0.620, 1.178	0.689, 1.239	−0.212, 0.342
Social pain $F(2, 285) = 2.35, p = .097, \eta_p^2 = .02$ 95% CI [0.00, 0.05]	1.64 ^a	1.12	1.34 ^a	0.73	1.47 ^a	0.89	−0.032, 0.615	−0.181, 0.502	−0.406, 0.145
Aggressive behaviour temptations $F(2, 285) = 35.12, p < .001, \eta_p^2 = .20$ 95% CI [0.12, 0.27]	3.29 ^a	1.24	2.07 ^b	0.94	2.31 ^b	1.00	0.847, 1.601	0.600, 1.364	−0.572, 0.089

Note: Different superscripts denote significant differences between conditions, $p < .05$. Confidence intervals are calculated based on the mean differences. Abbreviation: CI, confidence intervals.

The mediation models indicated ostracism — compared to the other two conditions — significantly induced negative affect, reduced basic needs, increased social pain and negatively impacted self-perception on all Big Five dimensions, (weakest $b = -.21, t(285) = 2.39, p = .017$; see Figure 2). Of the tested mediators, aggressive behaviour temptations were significantly predicted by agreeableness ($b = -.77, t(277) = -6.46, p < .001$), negative affect ($b = .26, t(277) = 2.34, p = .020$) and social pain ($b = .15, t(277) = 2.27, p = .024$). The effect of ostracism was significantly mediated both by agreeableness (*indirect effect* = .36 [.19, .56]) and negative affect (*indirect effect* = .24 [.02, .50]). The indirect effect for social pain did not reach the $p = .05$ level (*indi-*

rect effect = .04 [−.003, .10]) as the confidence interval nearly did not include 0.

3.2.6 | Exploratory analyses

To further investigate mediation effects, we examined pro-social and aggressive behaviour temptations separately. Agreeableness was a significant mediator for both pro-social (*indirect effect* = −.35 [−.59, −.16]) and aggressive behaviour temptations *exclusively* (*indirect effect* = .36 [.19, .59]). Negative affect was a significant mediator for pro-social

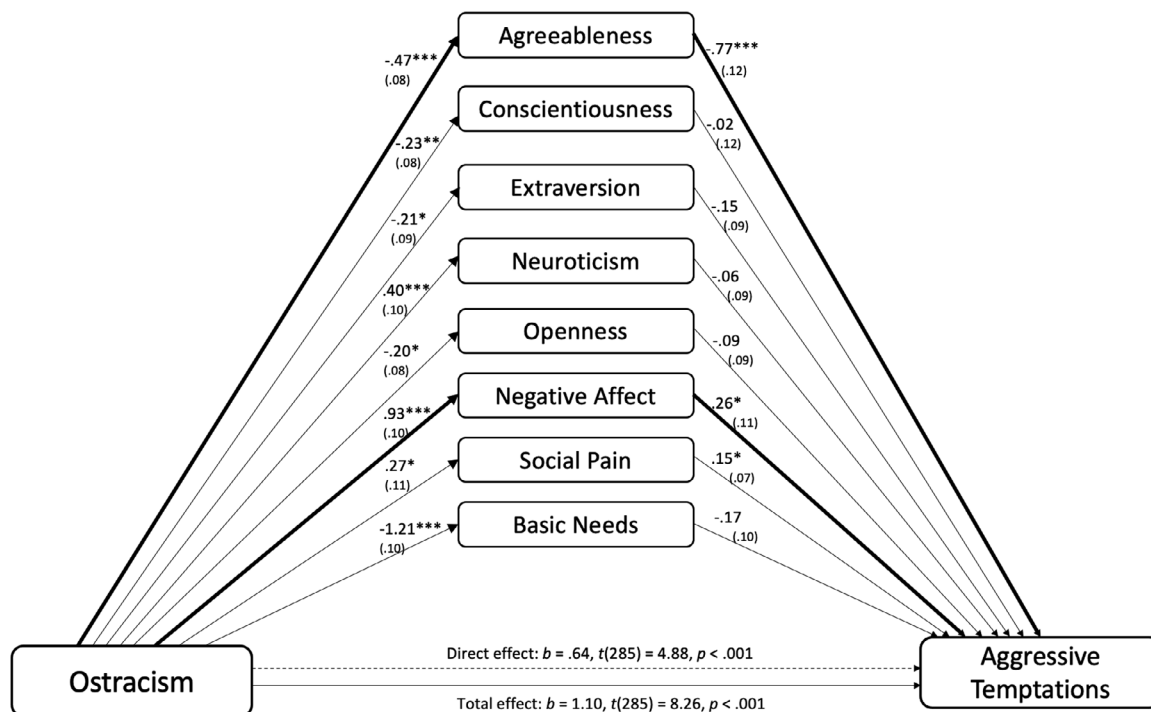


FIGURE 2 Mediation model testing the indirect effect of ostracism on aggressive behaviour temptations through the big five personality dimensions, negative affect, social pain and basic needs in Study 2. Study 2 ($N = 288$). Values are unstandardized regression coefficients, and standard errors are in parentheses. * = significant at the .05 level, ** = significant at the .01 level, and *** = significant at the .001 level. The three levels of the condition variable were represented with Helmert codes comparing ostracism to the collapsed values of the inclusion and mental visualization conditions. For ease of presentation, the second Helmert code (comparing the inclusion and mental visualization conditions to each other) is not depicted here but was included in the model to fully represent the effect of the condition. Significant indirect pathways are bolded for emphasis.

behaviour temptations (*indirect effect* = .46 [.12, .85]), but not for aggressive behaviour temptations (*indirect effect* = $-.02[-.26, .20]$). (See Supplemental Figures 3 S1 and 4 S1 for more information.)

3.3 | Discussion

Study 2 used a different measure of personality dimensions (i.e., the BFI-2) and replicated Study 1 results. Ostracized participants in Cyberball self-reported more aversive outcomes on all Big Five personality dimensions (primarily compared to the inclusion condition), basic needs satisfaction and negative affect, but no significant aversive consequences for social pain. Additionally, ostracized participants were more tempted to act aggressively. Again, indicating changes in working self-perception of personality are meaningful, agreeableness continued to mediate the relationship between ostracism (vs. controls) on aggressive behaviour temptations, even when including reflexive needs in the model.

We designed Study 3 to evaluate further how ostracism's impact (following Cyberball) on working self-perception of personality contributes to understanding behavioural intentions; we did this three ways. First, we investigated a different behaviour that occurs after ostracism – solitude seeking (Ren et al., 2016, 2021; Wesselmann et al., 2021). By selecting a different post-ostracism behaviour, we

can generalize the importance of examining working self-perception of personality to multiple post-ostracism behavioural outcomes. Second, we examined if different personality dimensions may be linked to different post-ostracism behavioural intentions. In our pre-registration, we hypothesized ostracized individuals' working self-perception of *extraversion* would mediate the relationships between ostracism in Cyberball and the desire to seek solitude, even beyond ostracism's immediate negative impact (e.g., thwarted basic needs). Third, Study 3 also strengthened our ability to draw conclusions by pre-registering the participant exclusion criteria, data collection stopping rule and analysis plan – which included the mediation analyses.

4 | STUDY 3

4.1 | Method

4.1.1 | Participants

The initial sample consisted of 473 U.S. MTurk workers who were paid \$1.50. Based on the pre-registered criteria, we removed participants who played Cyberball before ($n = 65$), were suspicious of the other players ($n = 9$), took more than 3 SD to complete the study ($n = 1$), were

distracted ($n = 10$), were interrupted ($n = 4$), did not complete all of the scales ($n = 11$), had a duplicate IP address ($n = 2$) or met multiple criteria ($n = 10$). Therefore, our final sample included 361 participants (58.0% female; $M_{\text{age}} = 38.33$, $SD_{\text{age}} = 13.18$, $\text{Range}_{\text{age}} = 18\text{--}74$) identifying primarily as White (72.7%), African American (10.8%) or Asian (9.1%).

4.1.2 | Procedure

To manipulate exclusionary status, we used Cyberball in the same fashion as the previous studies.

4.1.3 | Measures

Using the same measures as Study 2, and presented in the same order, participants responded on scales evaluating basic need satisfaction ($\alpha = .96$), negative affect ($\alpha = .91$), social pain, manipulation checks ($r_{\text{sb}} = .94$) and Big Five personality dimensions (measured using the BFI-2; Soto & John, 2017; $\alpha\text{s} = .82\text{--}.92$).

To examine if an ostracized individual's working self-perception of personality would predict a different post-ostracism behavioural intention, we assessed participants' desire for solitude. Our key measure of solitude seeking was the item, 'I'd like to work on the next task by myself', previously used by Ren and colleagues (Ren et al., 2016, 2021). Similarly, we asked participants, separately, how much they would like to (1) join their previous group and (2) join a new group on an upcoming task. We treated these two items as exploratory as they may assess behaviours outside of solitude seeking, such as not returning to the group to aggress against the group. Participants used a 1 (*Not at all*) to 5 (*Very much*) scale.

We also developed a 4-item scale to include as an exploratory analysis based on preference for solitude scales (Burger, 1995; Ren & Evans, 2021). We included the items, 'Right now, I need time alone', 'Right now, I would enjoy the pleasure of solitude', 'Right now, being with others for an extended amount of time would be unbearable' and 'Right now, I just want to get away and be by myself' ($\alpha = .92$; 1 = *Not at all*; 7 = *Very much*) to verify similar solitude seeking results are observed using a generally more reliable, multi-item scale.

To conclude the study, participants completed the same procedure as the previous studies.

4.2 | Results

4.2.1 | Manipulation checks

Ostracized participants indicated they received the ball less and felt more ostracized than included participants and those who mentally visualized ($p_{\text{Games-Howell}} < .001$, $ds \geq 0.88$; ANOVAs: $F_{\text{s}}(2,358) \geq 81.22$, $ps < .001$, $\eta_p^2\text{s} \geq .31$; see Table 3). Participants reported receiving more throws in the inclusion versus mental visualization condition ($p_{\text{Games-Howell}} < .001$, $d = 0.59$), but there was no significant difference

between these conditions for feeling ostracized ($p_{\text{Games-Howell}} = .244$, $d = 0.21$).

4.2.2 | Personality dimensions

Ostracized participants reported being less agreeable and extraverted and greater negative emotionality, compared to included participants ($ps < .001$, $ds \geq 0.49$). Likewise, ostracized participants reported being less agreeable, open, and extraverted, and more negative emotionality, versus participants who mentally visualized the Cyberball interaction ($ps \leq .015$, $ds \geq 0.37$; all ANOVAs: $F_{\text{s}}(2,358) \geq 3.10$, $ps \leq .046$, $\eta_p^2\text{s} \geq .02$).

4.2.3 | Basic needs, negative affect and social pain

Ostracized participants had less basic needs satisfaction, more negative affect and greater social pain compared to both included participants and participants who mentally visualized ($ps < .001$, $ds \geq 0.49$; all ANOVAs: $F_{\text{s}}(2,358) \geq 13.68$, $ps < .001$, $\eta_p^2\text{s} \geq .07$).

4.2.4 | Solitude seeking

For our key measure of solitude seeking, the extent to which individuals wanted to complete a new task alone, we found an overall significant difference between conditions, $F(2,358) \geq 3.66$, $p = .027$, $\eta_p^2 = .02$. Post hoc tests between conditions did not reach the standard statistical significance level ($ps = .051$, $d = 0.31$ for ostracism vs. mental visualization and $.054$, $d = 0.30$ for ostracism vs. inclusion), but the means were in the hypothesized direction.

We also examined several exploratory measures of solitude seeking. Participants were less likely to want to work with the group again when participants were ostracized versus included or mentally visualized the interaction ($p_{\text{Games-Howell}} < .001$, $ds \geq 0.70$; $F(2,358) = 26.69$, $p < .001$, $\eta_p^2 = .13$). We found no significant differences between conditions on the desire to work with a new group ($F(2,358) = 0.44$, $p = .646$, $\eta_p^2 < .01$), which replicates previous research (i.e., Ren et al., 2016, 2021). For our multi-item solitude-seeking measure, we found ostracized individuals desired greater solitude compared to those who mentally visualized ($p = .015$, $d = 0.37$; $F(2,358) = 4.09$, $p = .018$, $\eta_p^2 = .02$), but not included participants ($p = .150$, $d = 0.24$).

4.2.5 | Do changes in self-perception of personality contribute to understanding solitude seeking?

Consistent with the previous results (see Figure 3), all mediation models indicate ostracism – versus the two control conditions together – led to greater negative affect, reduced basic needs, increased social pain and more negative impact on working self-perception on each of

TABLE 3 Means, Standard Deviations and 95% Confidence Intervals for the Dependent Variables for Study 3.

	Means and Standard Deviations						95% Confidence Intervals		
	Ostracism (<i>n</i> = 123)		Inclusion (<i>n</i> = 125)		Mental Visualization (<i>n</i> = 113)		Ostracism vs. Inclusion	Ostracism vs. Mental Visualization	Inclusion vs. Mental Visualization
Variable	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Manipulation checks									
Feeling ostracized <i>F</i> (2, 358) = 155.19, <i>p</i> < .001, η_p^2 = .46 95% CI [0.39, 0.52]	4.33 ^a	0.93	1.95 ^b	1.19	2.21 ^b	1.33	2.061, 2.702	1.761, 2.473	−0.652, 0.123
Percent of throws received <i>F</i> (2, 358) = 81.22, <i>p</i> < .001, η_p^2 = .31 95% CI [0.24, 0.38]	18.66 ^a	17.74	60.59 ^b	23.27	43.04 ^c	34.92	−48.125, −35.742	−33.018, −15.736	8.372, 26.741
Personality traits									
Conscientious <i>F</i> (2, 358) = 3.10, <i>p</i> = .046, η_p^2 = .02 95% CI [0.00, 0.05]	3.68 ^a	0.76	3.88 ^a	0.66	3.87 ^a	0.68	−0.409, 0.011	−0.405, 0.026	−0.206, 0.225
Agreeableness <i>F</i> (2, 358) = 11.75, <i>p</i> < .001, η_p^2 = .06 95% CI [0.02, 0.11]	3.52 ^a	0.79	3.91 ^b	0.70	3.92 ^b	0.74	−0.616, −0.172	−0.634, −0.179	−0.240, 0.214
Negative emotionality <i>F</i> (2, 358) = 13.13, <i>p</i> < .001, η_p^2 = .07 95% CI [0.02, 0.12]	2.65 ^a	0.89	2.16 ^b	0.83	2.16 ^b	0.85	0.233, 0.747	0.225, 0.752	−0.264, 0.261
Openness <i>F</i> (2, 358) = 4.19, <i>p</i> = .016, η_p^2 = .02 95% CI [0.00, 0.06]	3.11 ^a	0.59	3.25 ^{a,b}	0.65	3.36 ^b	0.76	−0.329, 0.041	−0.460, −0.040	−0.323, 0.112
Extraversion <i>F</i> (2, 358) = 8.84, <i>p</i> < .001, η_p^2 = .05 95% CI [0.01, 0.09]	2.88 ^a	0.68	3.22 ^b	0.67	3.22 ^b	0.81	−0.549, −0.119	−0.559, −0.118	−0.224, 0.215
Basic needs <i>F</i> (2, 358) = 104.55, <i>p</i> < .001, η_p^2 = .37 95% CI [0.29, 0.43]	2.06 ^a	0.80	3.54 ^b	0.76	3.18 ^c	0.96	−1.716, −1.248	−1.399, −0.854	0.089, 0.621
Negative affect <i>F</i> (2, 358) = 80.13, <i>p</i> < .001, η_p^2 = .31 95% CI [0.23, 0.38]	3.20 ^a	0.84	1.99 ^b	0.79	2.19 ^b	0.77	0.964, 1.442	0.765, 1.255	−0.437, −0.051
Social pain <i>F</i> (2, 358) = 13.68, <i>p</i> < .001, η_p^2 = .07 95% CI [0.03, 0.12]	1.74 ^a	1.04	1.23 ^b	0.66	1.31 ^b	0.70	0.246, 0.769	0.160, 0.700	−0.286, 0.130
Solitude seeking									
Work alone <i>F</i> (2, 358) = 3.66, <i>p</i> = .027, η_p^2 = .02 95% CI [0.00, 0.05]	4.08 ^a	1.17	3.70 ^a	1.34	3.69 ^a	1.32	−0.005, 0.760	−0.001, 0.783	−0.377, 0.404
Join the previous group <i>F</i> (2, 358) = 26.69, <i>p</i> < .001, η_p^2 = .13 95% CI [0.07, 0.19]	1.84 ^a	1.28	3.12 ^b	1.52	2.81 ^b	1.50	−1.703, −0.862	−1.397, −0.538	−0.148, 0.777
Join a new group <i>F</i> (2, 358) = 0.44, <i>p</i> = .646, η_p^2 < .01 95% CI [0.0, 0.02]	2.82 ^a	1.47	2.98 ^a	1.40	2.96 ^a	1.51	−0.599, 0.273	−0.582, 0.313	−0.417, 0.474
Solitude seeking scale <i>F</i> (2, 358) = 4.09, <i>p</i> = .018, η_p^2 = .02 95% CI [0.00, 0.06]	4.54 ^a	1.65	4.13 ^{a,b}	1.80	3.91 ^a	1.76	−0.108, 0.929	0.102, 1.165	−0.307, 0.752

Note: Different superscripts denote significant differences between conditions, $p < .05$. Confidence intervals are calculated based on the mean differences. Abbreviation: CI, confidence intervals.

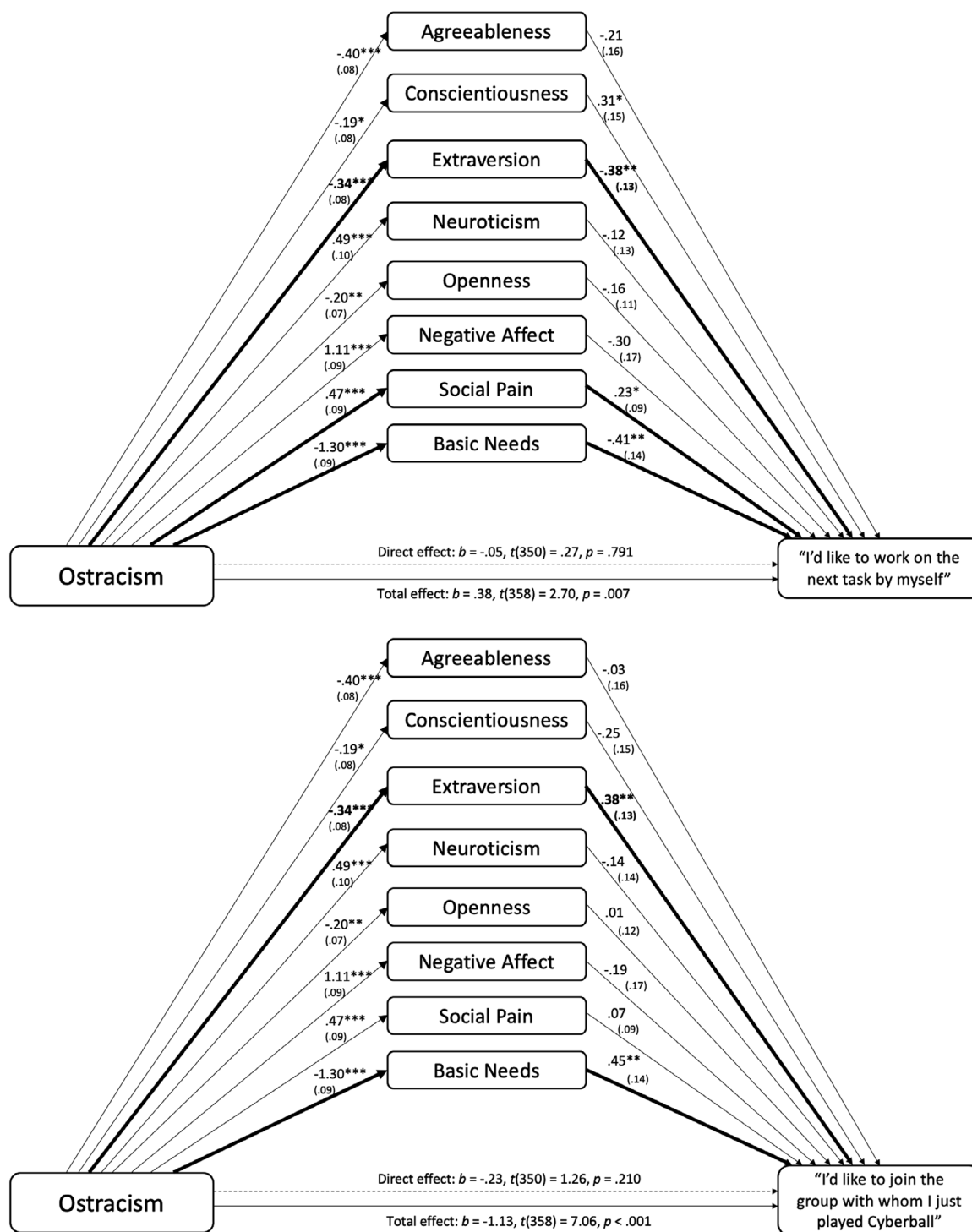


FIGURE 3 Mediation model testing the indirect effect of ostracism on solitude seeking (using four outcome measures) through the Big Five Personality dimensions, negative affect, social pain and basic needs in Study 3. Study 3 ($N = 361$). Values are unstandardized regression coefficients, and standard errors are in parentheses. * = significant at the .05 level, ** = significant at the .01 level and *** = significant at the .001 level. The three levels of the condition variable were represented with Helmert codes comparing ostracism to the collapsed values of the inclusion and mental visualization conditions. For ease of presentation, the second Helmert code (comparing the inclusion and mental visualization conditions to each other) is not depicted here but was included in the model to fully represent the effect of the condition. Significant indirect pathways are bolded for emphasis.

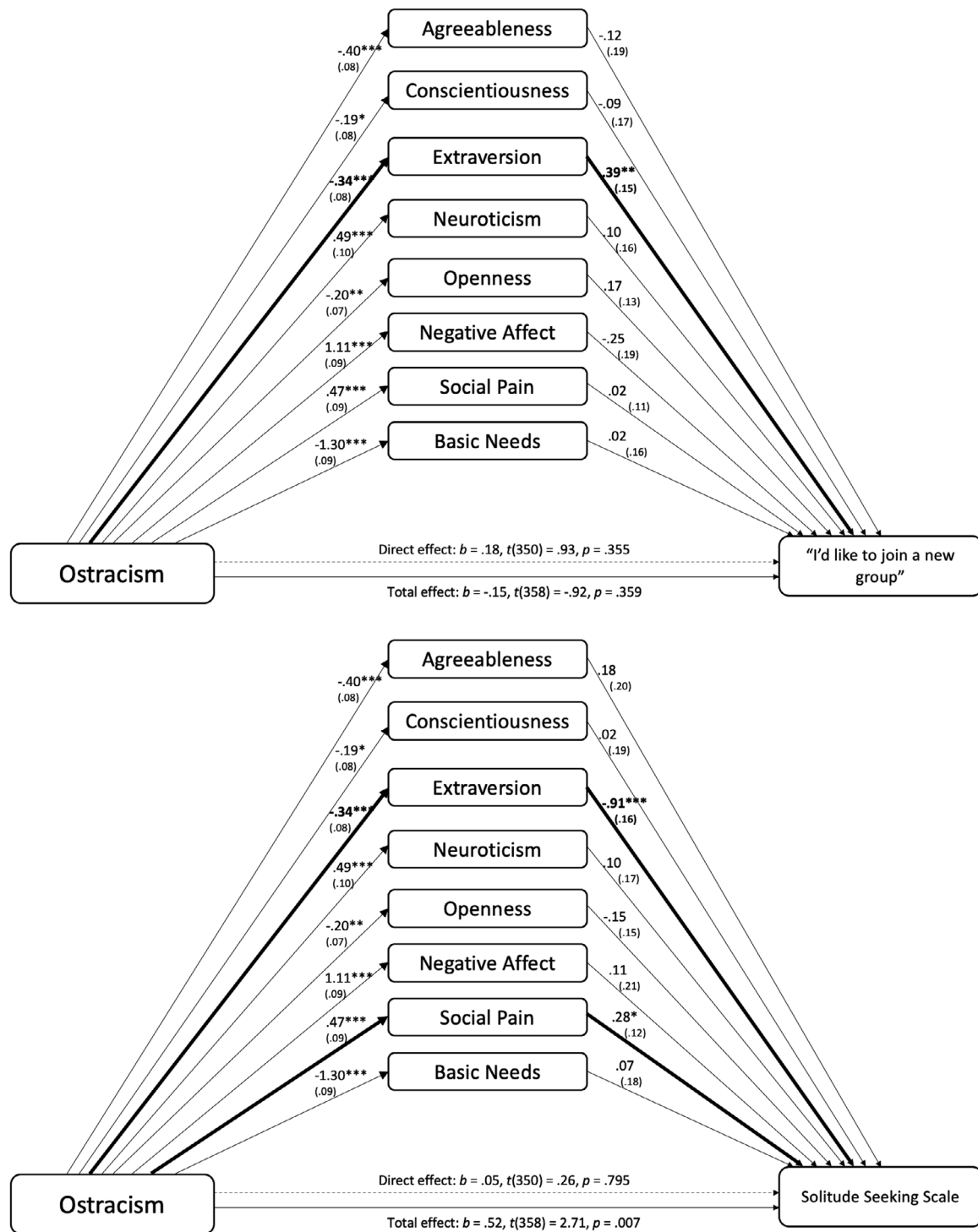


FIGURE 3 Continued

the Big Five dimensions (weakest $b = -.19$, $t(358) = 2.49$, $p = .013$). We first conducted mediations of our key solitude seeking measure, wanting to do the next task alone. This behaviour was significantly predicted by conscientiousness ($b = .31$, $t(358) = 2.11$, $p = .036$), extraversion ($b = -.38$, $t(358) = -3.00$, $p = .003$), social pain ($b = .23$, $t(358) = 2.50$, $p = .013$) and basic needs ($b = -.41$, $t(358) = -3.00$, $p = .003$). Of these, the effect of ostracism was significantly mediated by extraversion (indi-

rect effect = .13 [.04, .23]), social pain (indirect effect = .11 [.03, .21]) and basic needs (indirect effect = .54 [.20, .89]).

We then explored our three remaining measures of solitude seeking independently: wanting to work with the group again, wanting to work with a new group and the four-item measure of wanting to be alone. Across these variables, the only factor to consistently mediate between ostracism and the solitude-seeking behaviour was

extraversion (weakest $b = .39$, $t(358) = 2.63$, $p = .009$). Extraversion significantly mediated the effect of ostracism for all three of the solitude seeking exploratory measures (weakest *indirect effect* = $-.13$ [$-.26, -.02$]).

4.3 | Discussion

Study 3 further establishes that, following playing Cyberball, an ostracized individual's self-perception of personality influences behavioural intentions. In this case, we found ostracism's effect on self-perception of personality accounted (at least partially) for a different behavioural intention: solitude seeking. We also found this new behavioural intention was mediated by a *different* personality dimension: extraversion. Whereas an ostracized individual's self-perception of agreeableness mediated between ostracism and aggressive behaviour temptations (Studies 1 and 2), self-perception of extraversion was a mediator between being ostracized and the desire to seek solitude (across several measures). Ostracism in Cyberball adversely affects individual's perception of their personality dimensions (particularly for agreeableness, extraversion and negative emotionality), and these self-perceptions of personality can be linked to specific behavioural intentions in responses to ostracism, even when accounting for reflexive ostracism effect (e.g., thwarted basic needs).

4.3.1 | Integrative data analysis

To better evaluate the impact of ostracism in Cyberball on self-perception of personality dimensions, we followed the recommendations of several researchers (e.g., Braver et al., 2014; Curran & Hussong, 2009; Stanley & Spence, 2014) by implementing an integrative data analysis. This approach prescribes combining the previous studies into one dataset, which we then examined. Due to having greater power to discern effects, the integrative data analysis will present a clearer overall depiction of the results, which did vary in strength between studies.

For the following analyses, we conducted a one-way ANOVA, with Tukey post hoc comparisons, based on exclusionary status (ostracism vs. inclusion vs. mental visualization).

4.3.2 | Personality dimensions

Ostracized participants reported being less conscientious, agreeable, open, and extraverted, and more neurotic (negative emotionality) compared to included participants and those who mentally visualized ($ps \leq .009$, $ds \geq 0.24$; all ANOVAs: $F(2,940) \geq 8.79$, $ps < .001$, $\eta_p^2s \geq .02$).

4.3.3 | Basic needs, negative affect and social pain

Ostracized participants felt less basic need satisfaction, more negative affect and more social pain compared to the control conditions

($ps < .001$, $ds \geq 0.31$; all ANOVAs: $F(2,940) \geq 13.52$, $ps < .001$, $\eta_p^2s \geq .03$; see Table 4).

4.3.4 | Comparing the control conditions

We did not hypothesize differences in outcomes for included participants compared to those who mentally visualized, but we did want to explore if any significant effects occurred. We found no significant differences between the inclusion and mental visualization control conditions ($ps \geq .160$, $ds \leq 0.14$).

4.4 | Discussion

Our integrative data analysis confirmed ostracized participants in Cyberball had a more negatively impacted working self-perception of *all* personality dimensions compared to both of the control conditions (i.e., inclusion, mental visualization). Additionally, compared to the control conditions, ostracized individuals felt worse on basic need satisfaction, negative affect and social pain.

To test the boundaries of our effects, Studies 4a and 4b investigated if ostracism affects personality perception in the moment or also persists beyond the ostracism experience to influence global personality dimensions.

5 | STUDY 4A AND 4B

Study 4a ($N = 729$) investigated if a single ostracism experience in Cyberball can be so aversive as to change one's assessment of their overall perception of their personality. Alternatively, there is a longer experience of exclusion — or at least contemplating a long experience of exclusion — necessary? In Study 4b ($N = 283$), participants imagined living a life alone (vs. future alone or misfortune; e.g., Baumeister et al., 2005; Baumeister et al., 2002; Bernstein & Claypool, 2012a, 2012b; DeWall & Baumeister, 2006; Twenge et al., 2001).

Despite successful manipulations and showing exclusion effects (see <https://osf.io/g7mnx/> for a full write-up of both studies), there were no significant differences in an individual's perception of their overall personality following a single ostracism experience or imagining a life alone ($ps \geq .118$, $ds \leq 0.24$; $F(5) \leq 2.09$, $ps \geq .124$, $\eta_p^2s \leq .01$). Ostracism's effects on personality dimensions may be based on the perception of one's personality state during the ostracism experience and not persist after the experience ends.

6 | GENERAL DISCUSSION

Ostracism in Cyberball can change working self-perceptions of personality. While personality traits are stable, the working self-concept is argued to be malleable to social cues (Alexander & Knight, 1971; Markus & Kunda, 1986; McConnell, 2011), which in the current

TABLE 4 Means, Standard Deviations and 95% Confidence Intervals for the Dependent Variables for the Integrative Data Analysis.

Variable	Means and standard deviations						95% Confidence intervals		
	Ostracism (n = 317)		Inclusion (n = 320)		Mental visualization (n = 306)		Ostracism vs. inclusion	Ostracism vs. mental visualization	Inclusion vs. mental visualization
	M	SD	M	SD	M	SD			
Personality traits									
Conscientious $F(2, 940) = 8.79, p < .001, \eta_p^2 = .02$ 95% CI [0.00, 0.04]	3.52 ^a	0.79	3.73 ^b	0.68	3.72 ^b	0.68	−0.348, −0.075	−0.340, −0.064	−0.118, 0.137
Agreeableness $F(2, 940) = 24.91, p < .001, \eta_p^2 = .05$ 95% CI [0.03, 0.08]	3.36 ^a	0.75	3.72 ^b	0.70	3.70 ^b	0.71	−0.494, −0.227	−0.474, −0.203	−0.113, 0.157
Neuroticism (Negative emotionality) $F(2, 940) = 26.03, p < .001, \eta_p^2 = .05$ 95% CI [0.03, 0.08]	2.71 ^a	0.86	2.29 ^b	0.81	2.31 ^b	0.79	0.265, 0.571	0.245, 0.555	−0.173, 0.136
Openness $F(2, 940) = 11.59, p < .001, \eta_p^2 = .02$ 95% CI [0.01, 0.05]	3.05 ^a	0.61	3.20 ^b	0.65	3.29 ^b	0.65	−0.268, −0.031	−0.363, −0.123	−0.213, 0.026
Extraversion $F(2, 940) = 27.80, p < .001, \eta_p^2 = .06$ 95% CI [0.03, 0.09]	2.83 ^a	0.75	3.17 ^b	0.71	3.23 ^b	0.74	−0.476, −0.204	−0.543, −0.268	−0.203, 0.072
Basic needs $F(2, 940) = 228.13, p < .001, \eta_p^2 = .33$ 95% CI [0.28, 0.37]	2.09 ^a	0.74	3.33 ^b	0.85	3.29 ^b	0.90	−1.392, −1.094	−1.361, −1.050	−0.127, 0.202
Negative affect $F(2, 940) = 141.83, p < .001, \eta_p^2 = .23$ 95% CI [0.19, 0.28]	3.12 ^a	0.84	2.17 ^b	0.81	2.19 ^b	0.77	0.800, 1.109	0.776, 1.081	−0.175, 0.123
Social pain $F(2, 940) = 13.52, p < .001, \eta_p^2 = .03$ 95% CI [0.01, 0.05]	1.63 ^a	1.02	1.30 ^b	0.75	1.35 ^b	0.76	0.161, 0.495	0.108, 0.448	−0.192, 0.092

Note: Different superscripts denote significant differences between conditions, $p < .05$. Confidence intervals are calculated based on the mean differences. Abbreviation: CI, confidence intervals.

research meant ostracized individuals perceived their personality dimensions negatively. Specifically, ostracized participants in Cyberball self-reported being less conscientious, agreeable, open, and extraverted, and more neurotic (negative emotionality), compared to controls. Ostracism not only increased disagreeableness, replicating Hales et al. (2016) but also adversely impacted working self-perception of all Big-five personality traits. The current findings align with previous research (Richman et al., 2015) showing excluded individuals change their working self-concept. The current results also indicate changes in working self-perception of personality are part of the ostracism experience.

The effect of ostracism in Cyberball on working self-perception of personality is an integral part of the ostracism experience because these perceptions predict downstream consequences on post-ostracism behavioural intentions, even when accounting for ostracism's immediate effects. Ostracism researchers focus primarily on reflexive effects (i.e., basic needs, negative affect, social pain; see Nezlek et al., 2012), but the current research suggests ostracism's impact on identity (i.e., working self-perception of personality) can uniquely contribute to understanding post-ostracism behaviour

intentions. Parallel multiple mediation analyses indicated when Big Five personality dimensions and reflexive effects were included as mediators of the relationship between ostracism on behavioural intentions (i.e., aggressive temptations, solitude seeking), personality dimensions (i.e., agreeableness and extraversion) were significant mediators.

Specifically, we found the self-perception of two different personality dimensions mediated the relationship between ostracism in Cyberball and two separate behavioural intentions: agreeableness was a significant mediator of aggressive behaviour temptations and extraversion mediated solitude seeking. The link between *working self-perception* of agreeableness and extraversion to aggressive behaviour temptations and solitude seeking (respectively) are similar to the link between *traits* of agreeableness and extraversion affecting these behavioural outcomes (e.g., Ren et al., 2016; Sharpe & Desai, 2001; Tremblay & Ewart, 2005). The mediation findings also make sense conceptually. Agreeableness would be the most logical mediator of ostracism and aggression because individuals who become disagreeable are no longer interested in maintaining positive relations with others, thereby making post-ostracism aggression more acceptable.

Similarly, extraversion is associated with lively social interactions (McCrae & John, 1992), which suggests if an individual is low in extraversion, they would be less likely to seek these interactions and prefer solitude. When predicting post-ostracism behaviours, it appears some traits are more closely associated with a specific outcome than others, and the mostly closely related trait may change between the different post-ostracism behaviours.

Collectively, the mediation findings provide support for changes in working self-perception of personality being important to investigate considering we find how an ostracized individual in Cyberball perceives their personality can predict how they may later behave. Such subsequent behaviours would likely affect the ability to restore fundamental needs and alleviate social pain (depending on how aggressing and solitude seeking later affect opportunities for need fulfilment).

6.1 | Limitations

There are aspects of the current research which limit the conclusions we can draw. We focused on two behavioural temptations and did not systematically examine behaviour directly. Ostracized participants may be tempted to act a particular way, but their intentions and actual behaviour may not align (see Sutton, 1998; Wicker, 1969). However, ostracized participants report both aggressive behaviour temptations and exhibit aggression, suggesting temptations and behaviours may be aligned (e.g., Buckley et al., 2004; Chow et al., 2008; Gaertner et al., 2008; Twenge et al., 2001; Warburton et al., 2006; Wesselmann et al., 2010; Wirth et al., 2010). We also did not analyse all possible behaviour intentions as we did not examine what, if any, personality dimensions are associated with a pro-social response. Future research can examine if self-perception of personality dimensions following ostracism goes beyond predicting intentions to understanding a variety of actual behaviours.

We also have to be cautious about what conclusions we can draw from the mediation analyses. The mediation analyses found changes in self-perception of personality are newly identified aspects of the ostracism process in Cyberball which can further explain post-ostracism behaviours above and beyond ostracism's previously identified reflexive effects. Due to the correlational nature of mediation analyses, we are not able to conclusively determine the direction of the effects. Specifically, based on self-perception theory (Bem, 1967, 1972), it is possible ostracized participants reported their aggressive temptations and desire to seek solitude and then changed their working self-perceptions of personality to match their temptations. Additionally, for reasons expressed by others (e.g., Pirlott & MacKinnon, 2016), it is possible that unmeasured variables could account for the associations between trait ratings and behavioural measures. The current mediation-based findings are just the first step in documenting a fully causal process.

To establish causality, future research could implement several approaches. Researchers could utilize a longitudinal method, such as using a daily diary to measure participants' Big Five traits and aggressive or solitude-seeking behaviour multiple days before and

after experiencing ostracism or inclusion. This approach could test changes in working self-perception of personality from pre- through post-ostracism (vs. inclusion) and how long any change to the working self-perception of personality lasts following ostracism. Additionally, researchers could assess how personality traits, based on pre-ostracism measures, influence the response to ostracism and interact with changes in working self-perception following ostracism. The current mediation analyses are not able to determine the directionality of effects, but the pattern of correlations is at least consistent with ostracism-induced changes in working self-perception predicting certain post-ostracism behaviours (aggression and solitude seeking).

Our research may have restricted generalizability due to only using Cyberball as an ostracism manipulation, and we relied on an online sample across the studies. We focused primarily on manipulating ostracism through Cyberball, which means we did not include investigating other social exclusion manipulations which could produce different responses (e.g., Bernstein & Claypool, 2012a, 2012b). Our results should be replicated using other exclusion manipulations and during in-person interactions given online interactions are meaningful, people behave in a similar way online as they do offline (Guadagno et al., 2011, 2013; Okdie et al., 2014; see special issue by Okdie & Ewoldsen, 2018), and the effects on working self-perception of personality may be stronger when others are present (i.e., immediate; social impact theory; Latané, 1981). However, if participants ostracized during Cyberball believed they had no opportunity for reinclusion, this could increase aggression and solitude seeking. Given minimal inclusionary cues assuage ostracism's aversive response (Rudert et al., 2017), reinclusion opportunities could change possible behavioural responses. We also note being limited by using only online participants which may have issues (e.g., lack of attention, being non-naïve) and could contribute to low-quality data (e.g., Chmielewski & Kucker, 2020; S. M. Smith et al., 2016; see Hauser et al., 2019, for a review). We attempted to limit the negative aspects by using best practices (Hauser et al., 2019), such as removing participants who self-reported being inattentive, making sure MTurk workers did not play Cyberball previously, and making the task engaging and concise.

6.2 | Implications and future directions

In contrast to previous ostracism literature, we found personality dimensions matter in response to ostracism in Cyberball. Previous research (Wirth et al., 2010; although see Yaakobi, 2021, for an update) found Big Five traits did not moderate ostracism's immediate (reflexive) effects. Instead, personality dimensions may play a more prominent role in the aversive response to being ostracized, negatively impacting one's sense of self. Variations in self-perceived personality dimensions following ostracism appear to prepare individuals to take action to accomplish behavioural goals (Fleeson & Jayawickreme, 2021). In this case, ostracism-induced disagreeableness could have paved the way for aggressive behaviour temptations towards the

ostracizers, which may reestablish a sense of control (Warburton et al., 2006). And ostracism-induced introversion may have paved the way for seeking time to oneself and respite from potential future ostracism. Working self-perceptions may, alternatively, lead to socially connecting with others, as excluded individuals perceived having more similarity of traits as a potential interaction partner in order to be more appealing (Richman et al., 2015). Regarding the current findings, without a clear direction to shape working self-perception of traits, participants may perceive themselves using a looking-glass self (Cooley, 1902; Tice, 1992). That is, given individuals ostracize those who are disagreeable (Hales et al., 2016), participants may have been perceiving their personality similarly as disagreeable. Future research could determine what factors influence variability in working self-perception of personality following ostracism, including important contextual factors (i.e., whether someone is ostracized in a social versus a workplace context; Rudert et al., 2021).

We provided evidence ostracism negatively affects reflexive working self-perception of personality following ostracism in Cyberball, but future research could establish boundaries. We found a single ostracism experience does not persist sufficiently to change overall self-perception (Studies 4a and 4b). However, future research may benefit from using a non-experimental longitudinal approach. Research on chronic ostracism (Riva et al., 2017) found prolonged basic need threat resulted in the resignation stage feelings of alienation, helplessness, depression and unworthiness. It may be plausible then for chronic ostracism, if sustained long enough, to change a person's traits. Future research could also examine responses in the reflective stage, the delayed response to ostracism. Research in this stage could examine how long it takes for self-perceptions to return to their typical, everyday levels. Similarly, future work might examine how the impact of ostracism on working self-perception influences behavioural and other responses (e.g., basic needs recovery) in the reflective stage. Additionally, future studies could identify if there is a range of negative experiences affecting working self-perceptions of traits (e.g., physical pain, trauma), in addition to ostracism. Ostracism is likely not the only negative experience affecting working self-perceptions. Our initial findings provide a foundation for future research examining the extent of self-perceptions of personality change based on chronic ostracism or the moments after ostracism occurs.

There are additional elements of ostracism negatively affecting working self-perceptions of personality and their link to post-ostracism behaviours which we were not able to address but warrant further investigation. Across the studies, we analysed several post-ostracism behaviours, but we did not offer them simultaneously to see which behaviour ostracized participants are more likely to do. We also could learn more if we examined how working self-perceptions of personality are connected when participants consider several post-ostracism behaviours. Similarly, we could investigate if an opportunity for reinclusion, which may not be perceived as possible with Cyberball, could influence the relationship between working self-perceptions following ostracism and post-ostracism behaviours. This variable has been

theorized to affect responses to rejection (Smart Richman & Leary, 2009). Further, the possibility of reinclusion may be influential given minimal inclusionary cues can assuage ostracism's aversive impact (Rudert et al., 2017). An ostracized individual's negative perception of their personality dimensions may lead to a continuing cycle of exclusion. The negatively affected personality dimensions were linked to behaviours which led ostracized individuals away from positive social interactions, not towards needed social partners.

To address this problematic cycle, ostracized individuals could practice self-compassion (Neff, 2003), showing oneself kindness and keeping emotions balanced (i.e., mindfulness), which could result in less harm to working self-perceptions of personality. Additionally, the profile of personality dimensions of ostracized individuals reported here warrants further attention considering high neuroticism, low conscientiousness and low extraversion are linked to psychological disorders (Kotov et al., 2010) and all changes in traits following ostracism are linked to enhanced suicidal ideation (Kerby, 2003).

Lastly, future research could further examine differences in mediators between ostracism and pro-social versus aggressive behaviour temptations. In exploratory analyses, we found variability in agreeableness and negative affect related to pro-social versus aggressive behaviour temptations; although, mediation results were in the predicted directions. It may be the case personality traits and negative affect have subtle differences in how they relate to pro-social versus aggressive behaviour. However, the current research was not set up to have the sensitivity to discern differences in mediators between ostracism and pro-social versus aggressive behaviour temptations, which leaves this as an area of further investigation. Research could include more sensitive measures of each behaviour, replace temptations with actual behaviours and potentially use a lab-based approach.

7 | CONCLUSION

Using Cyberball, ostracism's aversive effect negatively impacted important perspectives of identity (i.e., personality dimensions), adding a new element to predict problematic behaviour intentions which can harm social relationships when they are needed the most.

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CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest with respect to the research, authorship and/or publication of this article.

DATA AVAILABILITY STATEMENT

All data and materials are published on the Open Science Framework. The link is included in the paper.

TRANSPARENCY STATEMENT

We reported all outcomes honestly, conducted the research ethically, and submitted original work. Data and study materials can be found on OSF (<https://osf.io/g7mnx/>).

ETHICS STATEMENT

We conducted all studies in accordance with the ethical guidelines of the American Psychological Association and the university's Institutional Review Board. All participants provided informed consent.

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