**The relationship between narcissism and acceptance of violence revealed through a game designed to induce social ostracism**

**Abstract**

Research shows that social exclusion may provoke aggression, especially in those who exhibit high levels of sensitivity to rejection, which has been related to aspects of narcissism. Few studies have investigated how individuals with high levels of narcissism react to social exclusion. In two experiments, we created and tested the effectiveness of a new game, Cyberpass, and investigated whether exclusion in this game increased positive attitudes towards violence in participants with high levels of narcissism. Cyberpass was effective in influencing feelings of lack of acceptance, and feelings of exclusion. Narcissism was correlated with less boredom and stronger feelings of rejection in the exclusion condition in Cyberpass. The Entitlement/Exploitativeness facet of narcissism was correlated with higher acceptance of violence in the exclusion condition. Results indicate that narcissistic individuals may be more supportive of violence after social exclusion but in order to experience this, they may require more explicit cues of ostracism.

Keywords: Narcissism; adaptive; maladaptive; exclusion; attitudes; violence

**Introduction**

 The need to belong is an essential human requirement. People feel a strong need to belong to social groups and to feel accepted by others (Baumeister & Leary, 1995). When this need is not met, and one feels socially ostracised, there can be numerous, sometimes serious, consequences. Social ostracism is defined as “the perception of being ignored by others in one’s presence” (Williams & Sommer, 1997, p. 693) and can destabilise a person’s sense of belonging, control, and self-esteem (Zadro, Williams, & Richardson, 2004). Those who are rejected can be prone to maladaptive behaviours such as self-defeating choices (Twenge, Catanese, & Baumeister, 2002) and reduced reasoning ability (Baumeister, Twenge, & Nuss, 2002). It has also been shown that socially ostracised individuals can react in an aggressive manner (Ren, Wesselmann, & Williams, 2018; Twenge, Baumeister, Tice, & Stucke, 2001), especially if they are sensitive to rejection (Ayduk, Gyurak, & Luerssen, 2008). Rejection sensitivity has been linked to vulnerable aspects of narcissism (Besser & Priel, 2010), suggesting that this personality trait is particularly prone to aggressive responding after ostracism.

 It is generally agreed that narcissism, as a sub-clinical personality construct, is associated with low empathy (Watson & Morris, 1991), exploitativeness (Campbell, Bush, Brunell, & Shelton, 2005), aggressive reactions to threat (Bushman & Baumeister, 1998), and high need for positive regard and admiration (Morf & Rhodewalt, 2001). In addition, research has found that narcissism relates to violence and aggression (Lambe, Hamilton-Giachritsis, Garner, & Walker, 2018), including sexual violence (Blinkhorn, Lyons, & Almond, 2015; Mouilso & Calhoun, 2012; Widman & McNulty, 2010), and general offending (Blinkhorn, Lyons, & Almond, 2018; Hepper, Hart, Meek, Cisek, & Sedikides, 2014). Interestingly, the aggressive tendencies may be localised especially to the socially toxic Entitlement/Exploitativeness facet of narcissism (Blinkhorn et al., 2016; Reidy, Zeichner, Foster, & Martinez, 2008). Coupled with aggressive potential (Blinkhorn et al., 2018), and a pathological need to be popular (Casale & Fioravanti, 2018), highly narcissistic individuals may be at risk of aggressive responding when excluded socially.

To date, the few studies that have investigated narcissism and reactions to social exclusion have had inconsistent results. Research utilising confederates in a laboratory setting (Twenge & Campbell, 2003), or an essay-writing exercise (Lamarche & Seery, 2019) have found that participants with high levels of narcissism react aggressively when socially rejected. In addition, imagining a situation of social rejection elicited cardiovascular responses from individuals with high levels of the Entitlement/Exploitativeness facet (Sommer et al., 2009). However, studies that have used the virtual ball-toss Cyberball game (Williams, Cheung, & Choi, 2000) have had somewhat mixed results, suggesting that individuals with high levels of narcissism may not always show explicit negative or aggressive responses to social exclusion (Cascio, Konrath, & Falk 2014; Chester & DeWall, 2016; McDonald & Donnellan, 2012). This could be because the cognitive-perceptual style related to narcissism is characterised by high self-focus, and low other-focus (Konrath, Bushman, & Grove, 2009). This could lead to a failure to notice exclusion. Narcissism has been linked with a lack of insight about one’s social popularity (Carlson & DesJardins, 2015), suggesting that narcissistic individuals may need clear, explicit cues to elicit feelings of ostracism. It is possible that individuals with high levels of narcissistic traits may require more direct or visible messages of ostracism than are provided in the Cyberball game.

We conducted two experiments to test the effectiveness of a new game that is very similar to Cyberball, but with some additional features (i.e., an additional chat box to make the interactions in the game more realistic). In Experiment 1, we tested the new game (which we named “Cyberpass”) alongside Cyberball, in order to explore both games with regards to relationship between narcissism and feelings of exclusion. In Experiment 2, we further tested Cyberpass by investigating whether in the social exclusion condition; we would observe a positive correlation between narcissism and higher acceptance of violence.

**Experiment 1**

In this experiment, we tested the new game Cyberpass alongside Cyberball and measured the effects related to narcissism. We anticipated that, due to the additional features, Cyberpass would elicit stronger feelings of exclusion than Cyberball. We expected that Cyberpass would generate lower feelings of happiness, boredom, and acceptance, and higher feelings of exclusion, in particular in those who have high levels of trait narcissism.

**Method**

*Participants*

 The sample consisted of 80 participants (*M* = 20.06, *SD* = 3.34, 26.3% males). A laboratory-based experiment was advertised at a University in North-West England to undergraduate students who could participate in exchange for course credit.

*Measures*

 Narcissism was measured using the 40-item forced-choice Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988). Participants chose between two statements, one of which indicated high narcissism (e.g., I have a natural talent for influencing people) and one indicated low narcissism (e.g., I am not good at influencing people). A score of 1 was given for each high narcissism choice (0 for a low narcissism choice) and these points were totalled to create an overall narcissism score (range = 1–36; Cronbach’s α = .87).

Participants’ feelings regarding the games were recorded using 4 visual analogue scales on a sheet of paper, each with a 10cm line underneath with ‘very’ on the left and ‘not at all’ on the right. They were asked to make a cross on the line to indicate to what extent they felt happy, bored, accepted, and excluded based on the game they had just played. For example, ‘How happy do you feel right now?’ The answers were calculated by measuring the distances of the marks on the lines and then entered into SPSS.

*Materials*

 For social exclusion, we used the Cyberball 4.0 (Williams, Yeager, Cheung & Choi, 2012), which is an online ball tossing game. In this game, participants are lead to believe they are playing with two other people. However, the two others are computer-generated confederates represented by an avatar and randomised name. When the participant’s own avatar is in possession of the ball, they have to use the mouse to indicate which of the other two players they wished to throw the ball to. Within the inclusion condition, participants are passed the ball equally mimicking a typical fair game of ball passing. In the exclusion condition, they are only passed the ball twice at the start and then excluded for the remainder of the game.

 Cyberpass was created for the purposes of this study using Java. It mimics Cyberball in terms of the number of participants, the two conditions, and general game-play. Extra detail was added in the form of a chat box in the bottom right of the screen, which presented randomised comments from the two computer-generated confederates such as ‘got it’ and ‘haha’. The way in which the chat box was displayed mimicked what chat boxes look like on real games, therefore, participants may be more convinced that the game they were playing was real. A message in red text was visible in the bottom left of the screen that read ‘We are currently experiencing difficulties with the in game chat service, we apologise for any inconvenience caused’. As such, participants were unable to type a response in the chat box (see Figure 1).

[Figure 1 here]

*Procedure*

 First, participants answered demographic questions and completed the NPI. Second, they played the first game and answered 4 questions regarding their feelings. Third, they were then asked to do a word search for 3 minutes that acted as a distraction task. Fourth, they played the second game and answered the same 4 questions regarding their feelings. There were four conditions involved in the study, 20 participants in each. In condition 1 and 2, participants were included in both games and played Cyberball or Cyberpass first, respectively. In conditions 3 and 4, participants were ostracised in both games and played Cyberball or Cyberpass first, respectively. All participants were fully debriefed at the end of the study.

**Results**

 In order to test for any order effects, we explored the post-hoc (LSD) statistics from Mixed ANOVAs to see whether ratings of happiness, boredom, acceptance, and exclusion were different to each other depending on the condition. If order effects were absent, we would expect that there are no differences between condition 1 (inclusion, Cyberball first, Cyberpass second) and condition 2 (inclusion, Cyberpass first, Cyberball second). Similarly, we would not expect differences between condition 3 (exclusion, Cyberball first, Cyberpass second) and condition 4 (exclusion, Cyberpass first, Cyberball second). No order effects were found for happiness, exclusion, and acceptance (all *p*’s > .25). For boredom, there was an order effect indicating that those who played Cyberball first in the inclusion condition indicated feeling more bored that those who played Cyberpass first (*p* < .01). Because of the order effect, we left boredom out from the subsequent analyses. For happiness, acceptance, and exclusion, we collapsed the four conditions into two, inclusion and exclusion.

Next, in order to assess participants’ experiences of each game, ratings for each of the four visual analogue scales (happiness, boredom, acceptance and exclusion) were analysed in separate mixed ANOVAs, where game (Cyberball/Cyberpass) was a within-subjects factor and group (Inclusion/Exclusion) was a between-subjects factor (all pairwise comparisons were Bonferroni corrected).

 Ratings of *happiness* did not differ between games, *F*(1, 78) = 0.32, *p* = .60, ηp2 = .004. There was a significant effect of group, *F*(1, 78) = 19.58, *p* < 0.001, ηp2 = .20, where the Inclusion group (*M* = 66.05, *SE* = 2.77) reported feeling happier than the Exclusion group (*M* = 48.75, *SE* = 2.77). There was no game × group interaction, *F*(1, 78) = 1.10, *p* = .30, ηp2 = .01.

 For ratings of *acceptance,* there was a significant effect of game, *F*(1, 78) = 12.95, *p* = .001, ηp2 = .14, where ratingswere greater for Cyberball (*M* = 58.13, *SE* = 1.96) than for Cyberpass (*M* = 50.43, *SE* = 2.19). There was a significant effect of group, *F*(1, 78) = 74.61, *p* < .001, ηp2 = .49, where the Inclusion group (*M* = 69.64, *SE* = 2.52) reported feeling more accepted than the Exclusion group (*M* = 38.91, *SE* = 2.52). There was also a significant game × group interaction, *F*(1, 78) = 7.41, *p* = .01, ηp2 = .09, where the Exclusion group reported feeling less included in Cyberpass than in Cyberball (mean difference = -13.53, *p* < .001) but ratings did not differ between games for the Inclusion group (mean difference = -1.88, *p* = .5), see Figure 2.

 For ratings of *exclusion,* there was a significant effect of game, *F*(1, 78) = 8.37, *p* = .005, ηp2 = .097, where ratings were greater for Cyberpass (*M* = 52.763, *SE* = 2.48) than for Cyberball (*M* = 45.94, *SE* = 2.58). There was a significant effect of group, *F*(1, 78) = 67.92, *p* < .001, ηp2 = .47, where the Exclusion group (*M* = 67.56, *SE* = 3.13) reported feeling more excluded than the Inclusion group (*M* = 31.14, *SE* = 3.13).There was also a significant game × group interaction, *F*(1, 78) = 4.31, *p* = .04, ηp2 = .05, where the Exclusion group reported feeling more excluded in Cyberpass than in Cyberball (mean difference = 11.73, *p* = .001) but ratings did not differ between games for the Inclusion group (mean difference = 1.93, *p* = .6), see Figure 2.

[Figure 2 here]

 In Table 1, we report the correlations between the NPI score and the ratings for both games in each condition. No relationships were found between the total NPI score and the ratings for both games in the included condition. In the excluded condition, Total NPI score was negatively associated with happiness in the Cyberball game. For the Cyberpass game, NPI score was negatively associated with happiness, boredom, and being accepted.

 In order to test the differences in the strength of the correlations between narcissism and reactions (happiness, acceptance, and exclusion) in the inclusion and exclusion conditions depending on the game, we conducted Steiger’s Z’s comparing related correlations. Participants with higher narcissism scores who were excluded in the Cyberpass felt more excluded (Steiger’s *Z =* 1.76*, p =* .04) than when excluded in the Cyberball. None of the other correlations were significantly different from each other.

**Table 1**

Multiple correlations for Total NPI score and the game ratings for each condition.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Happiness*r* | Boredom*r* | Accepted*r* | Excluded*r* |
| Included Cyberball (n=20) |  |  |  |  |
| Total NPI | -.06 | -.06 | .19 | -.09 |
|  |  |  |  |  |
| Included Cyberpass (n=20) |  |  |  |  |
| Total NPI | .18 | -.10 | .08 | .01 |
|  |  |  |  |  |
| Excluded Cyberball (n=20) |  |  |  |  |
| Total NPI | -.35\* | .16 | -.13 | -.17 |
|  |  |  |  |  |
| Excluded Cyberpass (n=20) |  |  |  |  |
| Total NPI | -.45\*\* | -.34\* | -.37\* | .23 |

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

**Discussion**

This experiment tested a new game, Cyberpass, alongside Cyberball, and measured the effects they had on participants generally, and also more specifically those with high levels of trait narcissism. We hoped that due to the additional features, Cyberpass would elicit stronger feelings of social ostracism than Cyberball, specifically in relation to narcissism. Firstly, we found that Cyberpass generally evoked significantly stronger feelings of exclusion and a lack of acceptance. Secondly, in relation to those with high levels of narcissistic traits, Cyberpass created a significant lack of acceptance, less boredom, and less happiness. In addition, Cyberpass also elicited stronger feelings of exclusion and less boredom than Cyberball.

**Experiment 2**

 This experiment further tested Cyberpass by conducting a laboratory-based version of a previous questionnaire study that found a positive correlation between narcissism and acceptance of different types of violent acts (Blinkhorn et al., 2016). Based on the results from Experiment 1, which demonstrated that Cyberpass is capable of eliciting feelings of social rejection, we expected that when participants with high levels of trait narcissism are excluded in Cyberpass, it may lead to them having more accepting attitudes towards violence. As research has previously shown that narcissists react aggressively when socially rejected (Twenge & Campbell, 2003), it is possible that participants in the excluded condition may answer more ruthlessly regarding their attitudes towards violence.

*Participants*

 The sample consisted of 80 female participants (*M*age = 20.49, *SD* = 5.00). A lab-based experiment was advertised at a University in North-West England to undergraduate students who could participate in exchange for course credit.

*Measures*

As in Experiment 1, narcissism was measured using the 40-item forced-choice NPI (Raskin & Terry, 1988). A score of 1 was given for each high narcissism choice (0 for a low narcissism choice) and these points were totalled to create an overall narcissism score (range = 1-36) (Cronbach’s *a* = .89). In the present paper we used the three-factor structure (Ackerman et al., 2011) where the NPI is split into Leadership/Authority (*a* = .76), Grandiose Exhibitionism (*a* = .70), and Entitlement/Exploitativeness (*a* = .70).

 Attitudes towards violence were measured by the VATVS (Anderson et al., 2006), a 39-item self-report questionnaire. The VATVS is separated into subcategories that assess attitudes towards different types of violence: 1) war (e.g., killing of civilians should be accepted as an unavoidable part of war), 2) corporal punishment of children (e.g., a child's habitual disobedience should be punished physically), 3) penal code violence (e.g., capital punishment is often necessary), and 4) intimate violence (e.g., it is all right for a partner to slap the other's face if challenged). Participants were asked to indicate the extent to which they agreed with each statement using a 5-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Responses were totalled to create an overall score (range = 45–195) (α = .99) and four individual subscale scores; war (α = .97), corporal punishment of children (α = .99), penal code violence (α = .96), and intimate violence (α = .99).

*Materials*

 We used Cyberpass (see Experiment 1) to elicit social inclusion or social exclusion. In the inclusion condition, participants were passed the ball equally, mimicking a typical fair game of ball passing. In the exclusion condition, they were only passed the ball twice at the start and then excluded for the remainder of the game. Within both conditions, there was a chat box in the bottom right of the screen, which presented randomised comments from the two computer-generated confederates such as ‘got it’ and ‘haha’. A message in red text was visible in the bottom left of the screen that read ‘we are currently experiencing difficulties with the in game chat service, we apologise for any inconvenience caused’. As such, participants were unable to type a response in the chat box.

*Procedure*

 Firstly, participants answered demographic questions and completed the NPI. Secondly, they played Cyberpass, and then finally completed the VATVS. There were two conditions involved in the study, 40 participants in each. In condition 1, participants were included in the Cyberpass game and in condition 2, they were ostracised. All participants were fully debriefed at the end of the study.

**Results**

 Table 1 presents the descriptive statistics and condition differences for all measures (all p-values were adjusted using the Holm-Bonferroni method). No significant differences were found in relation to narcissism and the subscales. Participants in the excluded condition scored significantly higher on Total Attitudes Towards Violence and each of the subscales.

**Table 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mean (*SD*) |  |  | *t* |
|  | Overall*n* = 80 | Included*n =* 40 | Excluded *n =* 40 |  |
| Total NPI | 13.13 (7.63) | 11.63 (7.16) | 14.63 (7.88) | -1.78 |
| Leadership/Authority | 3.53 (2.58) | 2.83 (2.35) | 4.23 (2.63) | -2.51 |
| Grandiose Exhibitionism | 2.91 (2.33) | 3.00 (2.45) | 2.83 (2.24) | 0.33 |
| Entitlement/Exploitativeness | 1.15 (1.30) | 0.90 (1.06) | 1.40 (1.48) | -1.74 |
|  |  |  |  |  |
| Total Attitudes Towards Violence | 92.03 (47.81) | 74.33 (23.49) | 109.73 (58.61) | -3.55\*\* |
| War | 35.41 (13.25) | 31.48 (7.71) | 39.35 (16.25) | -2.77\*\* |
| Corporal Punishment of Children | 16.55 (11.51) | 12.50 (6.31) | 20.55 (13.98) | -3.32\*\* |
| Penal Code Violence | 19.01 (8.94) | 15.88 (6.00) | 22.15 (10.28) | -3.34\*\* |
| Intimate Violence | 21.08 (16.00) | 14.48 (7.60) | 27.68 (19.30) | -4.03\*\*\* |

Descriptive statistics and condition differences for all measures.

\*\* *p* <.01; \*\*\* *p* <.001

In Table 2, we report the associations between the NPI and VATVS subscales for both conditions (all p-values were adjusted using the Holm-Bonferroni method). In the included condition, the total NPI score was positively associated with War and Intimate Violence. No relationships were found in relation to the NPI subscales. In the excluded condition, Total NPI, Leadership/Authority and Entitlement/Exploitativeness were positively associated with each of the four VATVS subscales. Grandiose Exhibitionism was positively associated with Corporal Punishment of Children.

Age and relationship status were included as factors in multiple linear regression on Total Violence. This provided a significant model, accounting for around 42% of the variance (R2 = .415, *F*(2, 77) = 27.31, *p*  < .001) where both age (β = 5.46, *p* < .001) and relationship status (β = 23.23, *p* = .012) were positively related to Total Violence scores. Including Condition (excluded/included), the subscales of the NPI and their interaction terms in this model significantly improved the model (Δ R2 = .286, *p* < .001). Relationship status became a non-significant predictor (β = 7.49, *p* = .3) although age remained significant (β = 2.37, *p* = .008). Somewhat surprisingly, Entitlement/Exploitativeness was negatively related to Total Violence (β = 26.38, *p* = .035) however there was also a significant Condition × Entitlement/Exploitativeness interaction (β = 23.86, *p* = .001), indicating that scoring high on this subscale and being in the exclusion condition was associated with significantly higher Total Violence scores. In other words, the more “toxic” narcissism type seems to be associated with increases in acceptance of violence after being subjected to social exclusion.

Finally, the Fisher r-z transformation was used to further test the significance of the condition differences within Table 2. Five significant differences were found. The correlation between War (z = -2.28, *p* < .05), Corporal Punishment of Children (z = -3.61, *p* < .001), Penal Code Violence (z = -3.18, *p* < .01), Intimate Violence (z = -2.62, *p* < .01), and Entitlement/Exploitativeness was significantly different within the excluded condition than in the included condition. Further, the correlation between Penal Code Violence and Total NPI (z = -2.08, *p* < .05) was also significantly different within the excluded condition than in the included condition.

**Table 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Leadership/ Authority*r* (B) | Grandiose Exhibitionism*R* (B) | Entitlement/ Exploitativeness*r* (B) | Total NPI*r* |
| Condition 1 - Included (n=40) |  |  |  |  |
| 1. War | .48 (.30) | .44 (.21) | .36 (.09) | .52\*\* |
| 2. Corporal Punishment of Children | .42 (.39) | .34 (.14) | .18 (-.11) | .42 |
| 3. Penal Code Violence | .21 (.04) | .35 (.36) | .09 (-.10) | .30 |
| 4. Intimate Violence | .42 (.23) | .42 (.25) | .31 (.06) | .55\*\*\* |
| Condition 2 - Excluded (n=40) |  |  |  |  |
| 1. War | .54\*\*\* (.25) | .46 (-.06) | .72\*\*\* (.63\*\*\*) | .63\*\*\* |
| 2. Corporal Punishment of Children | .54\*\*\* (.19) | .50\*\* (-.02) | .77\*\*\* (.69\*\*\*) | .69\*\*\* |
| 3. Penal Code Violence | .51\*\* (.22) | .46 (-.01) | .68\*\*\* (.58\*\*) | .66\*\*\* |
| 4. Intimate Violence | .55\*\*\* (.28) | .44 (-.11) | .73\*\*\* (.65\*\*\*) | .65\*\*\* |

Zero-order correlations and standardised regression coefficients for NPI and VATVS subscales.

\*\* *p* <.01; \*\*\* *p* <.001

**Discussion**

In this experiment, we found that exclusion in an on-line ball tossing game was, indeed, enough to elicit more positive attitudes towards violence in individuals with high levels of narcissism. Irrespective of the experimental condition, narcissism was generally positively correlated with higher acceptance of all types of violence. However, especially the maladaptive Entitlement/Exploitativeness facet was more strongly correlated with attitudes towards violence in the exclusion, as opposed to the inclusion condition. The results indicate that the maladaptive aspects of narcissism are associated with vulnerability to react in an aggressive manner after social exclusion that is impactful enough to be experienced as such by high narcissism individuals.

**General Discussion**

We conducted two experiments to test the effectiveness of a new, but very similar, game to Cyberball with additional features to further contribute to the feelings of social ostracism, particularly in those who have high levels of narcissistic traits. In Experiment 1, we tested the new game (which we named “Cyberpass”) alongside Cyberball and measured the effects they had in those participants with specifically high levels of trait narcissism. In Experiment 2, we further tested Cyberpass by conducting an experimental version of a previous study (Blinkhorn et al., 2016) in which the game was played before answering questions relating to attitudes towards violence.

 In Experiment 1, the inclusion conditions of Cyberball and Cyberpass did not elicit different feelings for our participants. In contrast, in the exclusion condition, participants felt significantly less accepted and significantly more excluded when playing Cyberpass compared to Cyberball. Our results are congruent with those of Zadro et al (2004) in that games such as Cyberball and Cyberpass can elicit feelings of exclusion and low acceptance when a participant is not passed to in game. Due to additional visual stimuli (i.e., the chat box feature and error message), Cyberpass emphasised the social exclusion, and elicited feelings of exclusion and low acceptance. Indeed, when debriefing participants in both Experiment 1 and 2, approximately 80 per cent mentioned that they thought Cyberpass was real. In Experiment 1, the majority of participants thought Cyberball was not a real online multiplayer game.

Experiment 2 added to the sparse evidence base on the link between social exclusion and aggression in narcissistic individuals. Although narcissism had positive correlations with acceptance of violence in both conditions, the correlations were stronger in the exclusion condition. These findings suggest that when feeling socially excluded, those with high levels of narcissistic traits are likely to have more accepting attitudes towards violence. This was especially the case for the socially toxic Entitlement/Exploitativeness facet (Ackerman et al., 2011), which had significant, positive correlations with acceptance of all kinds of violence, but only in the social exclusion condition. Previous studies have found that this facet of narcissism relates to increased vulnerability to psychosocial distress (Grubbs & Exline, 2016), including cardiovascular reactivity to social exclusion (Sommer et al., 2009). Entitlement/Exploitativeness has also been associated with courtship (Ryan, Weikel & Sprechini, 2008) and sexual violence (Mouilso & Calhoun, 2015; Russell & King, 2017), and a range of general violent offending behaviours (Blinkhorn et al., 2018). Thus, especially the maladaptive, toxic aspects of narcissism warrant further investigation with regards to social exclusion-provoked violence.

 Of course, this study does have some limitations. First, as our sample only involves university students, the results have lower generalisability which means lower levels of external validity (Hultsch, MacDonald, Hunter, Maitland, & Dixon, 2002). Second, as with all self-report methods, it is never guaranteed that participants are fully honest in their answers. However, the study was carefully planned and adhered to strict ethical guidelines concerning anonymity, therefore, our results may be less susceptible to socially desirable responding. Also, when the first initial self-report measures for narcissism were constructed, they were found not to be related to social desirability (e.g. Emons, 1987; Watson, Grisham, Trotter, & Biderman, 1984). Thirdly, study 1 used a between-participants design which, when coupled with the somewhat small sample size for a study including personality measures, was not the strongest test for assessing the ability of Cyberpass to induce a sense of social ostracism. However, we believe that by employing a within-participants design in study 2, we have offset this limitation somewhat. An online version of study 2 capable of reaching a wider sample would be fruitful in further testing the strength and validity of the results presented here. Further research into the specific cues that can induce a sense of social ostracism that those with higher narcissism are sensitive to should also be conducted. In addition, if exposure to such cues can enhance acceptance of violence in some individuals scoring higher on toxic narcissism, which in turn could put others at risk.

 It is important to note that after we completed this study, a new version of the Cyberball (version 5.0) has been released. The new version includes numerous additional features, including a possibility to send messages between the players. Future research should test the new version of the Cyberball against the Cyberpass game in order to see which one is more effective, specifically in high narcissistic individuals. A copy of the Cyberpass game will be provided upon request to the first author.

 In conclusion, the results of this experiment provide preliminary evidence that specific visual features are required to induce feelings of social ostracism in narcissistic individuals when using tools such as ball-toss games. We have discussed what types of features in a game are required to provoke a reaction in individuals with high levels of narcissistic traits, and provided an alternative tool to use when conducting research on the area. These results suggest that despite being highly sensitive to being socially ostracised, narcissists may employ defensive strategies to protect themselves from these feelings. These strategies appear to break down in the face of specific visual cues, such as a broken chat box, which may symbolise restriction in self-expression or being able to control a social situation.

**Data Availability Statement**

The data associated with this article is available on the lead author’s OSF account via the following link:

[Public Profile: https://osf.io/2uc7x/](https://osf.io/profile/)

**References**

Ackerman, R. A., Witt, E. A., Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., & Kashy, D. A. (2011). What does the narcissistic personality inventory really measure? Assessment, 18, 67–87.

Anderson, C. A., Benjamin, A. J., Wood, P. K., & Bonacci, A. M. (2006). Development and testing of the Velicer Attitudes Toward Violence Scale: Evidence for a four-factor model. *Aggressive Behaviour*, 32, 122–136.

Ayduk, Ö., Gyurak, A., & Luerssen, A. (2008). Individual differences in the rejection–aggression link in the hot sauce paradigm: The case of rejection sensitivity. *Journal of Experimental Social Psychology*, *44*, 775-782.

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

Baumeister, R. F., Twenge, J. M., & Nuss, C. K. (2002). Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of Personality and Social Psychology*, *83*, 817-827.

Besser, A., & Priel, B. (2010). Grandiose narcissism versus vulnerable narcissism in threatening situations: Emotional reactions to achievement failure and interpersonal rejection. *Journal of Social and Clinical Psychology*, *29*, 874-902.

Blinkhorn, V., Lyons, M., & Almond, L. (2015). The ultimate femme fatale? Narcissism predicts serious and aggressive sexually coercive behaviour in females. *Journal of Personality and Individual Differences, 87,* 219–223.

Blinkhorn, V., Lyons, M., & Almond, L. (2016). Drop the bad attitude! Narcissism predicts acceptance of violent behaviour. *Personality and Individual Differences, 98,* 157-161.

Blinkhorn, V., Lyons, M., & Almond, L. (2018). Criminal minds: Narcissism predicts offending behaviour in a non-forensic sample. *Deviant Behaviour.*

Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology, 75,* 219–229.

Casale, S., & Fioravanti, G. (2018). Why narcissists are at risk for developing Facebook addiction: The need to be admired and the need to belong. *Addictive behaviors*, *76*, 312-318.

Cascio, C. N., Konrath, S. H., & Falk, E. B. (2014). Narcissists’ social pain seen only in the brain. *Social Cognitive and Affective Neuroscience*, *10*, 335-341.

Campbell, W. K., Bush, C. P., Brunell, A. B., & Shelton, J. (2005). Understanding the social costs of narcissism: The case of tragedy of the commons. *Personality and Social Psychology Bulletin, 31,* 1358–1368.

Carlson, E. N., & DesJardins, N. M. L. (2015). Do mean guys always finish first or just say that they do? Narcissists’ awareness of their social status and popularity over time. *Personality and Social Psychology Bulletin*, *41*(7), 901-917.

Chester, D. S., & DeWall, C. N. (2016). Sound the alarm: The effect of narcissism on retaliatory aggression is moderated by dACC reactivity to rejection. *Journal of Personality*, *84*, 361-368.

Grubbs, J. B., & Exline, J. J. (2016). Trait entitlement: A cognitive-personality source of vulnerability to psychological distress. *Psychological Bulletin*, *142*, 1204-1226.

Hepper, E. G., Hart, C. M., Meek, R., Cisek, S. Z., & Sedikides, C. (2014). Narcissism and empathy in young offenders and non-offenders. *European Journal of Personality, 28,* 201–210.

Hultsch, D. F., MacDonald, S. W. S., Hunter, M. A., Maitland, S. B., & Dixon, R. A. (2002). Sampling and generalisability in developmental research: Comparison of random and convenience samples of older adults. *International Journal of Behavioural Development*, 26, 345-359.

Konrath, S., Bushman, B. J., & Grove, T. (2009). Seeing my world in a million little pieces: Narcissism, self‐construal, and cognitive–perceptual Style. *Journal of Personality*, *77*, 1197-1228.

Lamarche, V. M., & Seery, M. D. (2019). Come on, give it to me baby: Self-esteem, narcissism, and endorsing sexual coercion following social rejection. *Personality and Individual Differences*, *149*, 315-325.

Lambe, S., Hamilton-Giachritsis, C., Garner, E., & Walker, J. (2018). The role of narcissism in aggression and violence: A systematic review. *Trauma, Violence, & Abuse*, *19*, 209-230.

McDonald , M. M., & Donnellan, M. B. (2012). Is ostracism a strong situation? The influence of personality in reactions to rejection. *Journal of Research in Personality*, *46*, 614-618.

Morf, C. C., & Rhodewalt, F. (2001). Unravelling the paradoxes of narcissism: A dynamic self-regulatory processing model. *Psychological Inquiry, 12,* 177–196.

Mouilso, E. R., & Calhoun, K. S. (2012). A mediation model of the role of sociosexuality in the aggression between narcissism, psychopathy, and sexual aggression. *Psychology of Violence, 2,* 16–27.

Mouilso, E. R. & Calhoun, K. S. (2015). Personality and perpetration: Narcissism among college sexual assault perpetrators. *Violence Against Women, 22,* 1228-1242.

Raskin, R., & Terry, H. (1988). A principal-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology, 54,* 890-902.

Reidy, D. E., Zeichner, A., Foster, J. D., & Martinez, M. A. (2008). Effects of narcissistic entitlement and exploitativeness on human physical aggression. *Personality and Individual Differences*, *44*, 865-875.

Ren, D., Wesselmann, E. D., & Williams, K. D. (2018). Hurt people hurt people: ostracism and aggression. *Current Opinion in Psychology*, *19*, 34-38.

Russell, T. D., & King, A. R. (2017). Distrustful, Conventional, Entitled, and Dysregulated: PID-5 personality facets predict hostile masculinity and sexual violence in community men. *Journal of Interpersonal Violence,* DOI: 10.1177/0886260517689887.

Ryan, K. M., Weikel, K. & Sprechini, G. (2008). Gender differences in narcissism and courtship violence in dating couples. *Sex Roles, 58*, 802-813.

Sommer, K. L., Kirkland, K. L., Newman, S. R., Estrella, P., & Andreassi, J. L. (2009). Narcissism and Cardiovascular Reactivity to Rejection Imagery 1. *Journal of Applied Social Psychology*, *39*, 1083-1115.

Twenge, J. M., Baumeister, R. F., Tice, D. M., & Stucke, T. S. (2001). If you can’t join them, beat them: Effects of social exclusion on aggressive behavior. *Journal of Personality and Social Psychology*, *81*, 1058-1069.

Twenge, J. M. & Campbell, K. W. (2003). “Isn’t it fun to get the respect that we’re going to deserve?” Narcissism, social rejection, and aggression. *Personality and Social Psychology Bulletin,29,*261-272.

Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2002). Social exclusion causes self-defeating behavior. *Journal of Personality and Social Psychology*, *83*, 606-615.

Watson, P. J., Grisham, S. O., Trotter, M. V., & Biderman, M. D. (1984). Narcissism and empathy: Validity evidence for the Narcissistic Personality Inventory. *Journal of Personality Assessment, 48,* 301-305.

Watson, P. J., & Morris, R. J. (1991). Narcissism, empathy and social desirability. *Personality and Individual Differences, 12,* 575–579.

Widman, L., & McNulty, J. K. (2010). Sexual narcissism and the perpetration of sexual aggression. *Archives of Sexual Behaviour, 39,* 926–939.

Williams, K. D., Cheung, C. K. T., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality & Social Psychology*, 79, 748-762.

Williams, K. D., & Sommer, K. L. (1997). Social ostracism by coworkers: Does rejection lead to loafing or compensation? *Personality and Social Psychology Bulletin, 23,* 693-706.

Williams, K. D., Yeager, D. S., Cheung, C. K. T., & Choi, W. (2012). Cyberball 4.0 [Software].

Zadro, L., Williams, K. D., & Richardson, R. (2004). How long can you go? How low can you go? Ostracism by a computer is sufficient to lower self-reported levels of belonging, control, self-esteem and meaningful existence. *Journal of Experimental Social Psychology, 40,* 560–567.

Zadro, L., & Williams, K. D. (2006). How do you teach the power of ostracism? Evaluating the Train Ride demonstration. *Social Influence, 1,* 1-24.