Having a CyberBall: Using a Ball-Throwing Game as an Experimental Social Stressor to Examine the Relationship between Neuroticism and Coping

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Abstract

Research examining the relationship between neuroticism and coping has been limited by reliance on dispositional and retrospective methodologies. The current experiments evaluated the utility of a ball-throwing game used in ostracism research, as an experimental stressor with which to examine neuroticism-related differences in coping. Experiment 1 revealed that being excluded during Cyberball is associated with lowered mood and self-esteem, even when widely-used measures are employed. Being ostracised also evoked an emotion-focused coping response. Experiment 2 increased the sensitivity of response-scales and introduced an ambiguous Cyberball condition. When exclusion was ambiguous, high-neuroticism participants perceived themselves as having less control during the game. Being excluded evoked emotion-focused and avoidance coping responses. Consistent with previous research high-neuroticism participants engaged in more emotion-focused coping. Future research should consider the utility of ambiguous conditions in examining experimental manipulations, as well as individual differences in sensitivity to social ostracism.

Ostracism, Cyberball, Coping, Neuroticism

1. Introduction

Coping is defined as cognitive and behavioural efforts to manage specific demands that are appraised as taxing or exceeding the resources of the person (Lazarus & Folkman, 1984). One of the central features of this concept is that the coping process unfolds in a dynamic interplay between the person and the stressful situation (O'Brien & DeLongis, 1996). This has led researchers to explore the role of personality-related variables in the coping process. Research has revealed some evidence of consistency in coping strategy use over time and across stressful situations (Terry, 1994). Additionally, there is evidence that personality traits are significant short and long-term predictors of coping styles (Vollrath, Torgersen, & Alnaes, 1995). In particular, the role of neuroticism in the coping process has received attention. Neuroticism is associated with a greater likelihood of experiencing negative emotions such as anxiety and depression (Costa & McCrae, 1987).

Why might neuroticism be correlated with coping responses? Watson and Hubbard (1996) offer two considerations. Firstly, there is no reason to believe that coping responses differ fundamentally from other cognitive, affective, and behavioural responses. Coping responses are distinguished from other adaptive responses only in that they are inextricably linked to stress. Because individuals show some degree of consistency across experiences, responses to stressors should be systematically related to responses in other situations. Secondly, dispositional differences are likely to have implications for the resources (and options for coping) that are available to the stressed individual.

Research has linked neuroticism with both appraisals of stressful events and coping. Neuroticism is positively associated with subjective measures of stress level and the occurrence of stressful life-events (Magnus, Diener, Fujita, & Pavot, 1993). Furthermore, high-neuroticism individuals are thought to interpret ambiguous stimuli in a negative or threatening manner, and are therefore more likely to see threats or problems where others do not (Costa & McCrae, 1987; Schneider, 2004). Research examining coping strategy use reports that neuroticism is positively correlated with emotion-focused and avoidant coping strategies, such as disengagement, wishful-thinking, escape-avoidance, and emotional-venting. Neuroticism is negatively associated with more effective and direct coping strategies, often referred to as problem/task-focused coping (Bouchard, 2003; McCrae & Costa, 1986; O'Brien & DeLongis, 1996; Penley & Tomaka, 2002).

Although the relationships between neuroticism, appraisal, and coping appear consistent with a personality-type characterized as prone to experience negative emotions, these findings have important limitations. Typically researchers have utilized one of two methodologies to assess coping: 1) participants are asked how they generally cope with stressful situations; or 2) participants are asked to recall coping efforts used in relation to the most stressful event experienced in up to the last year (David & Suls, 1999). Over 80% of papers published between 1980 and 2004 used dispositional or retrospective recall methodologies (Connor-Smith & Flachsbart, 2007).

Both these methodologies are likely to inflate the relationship between personality and coping. Firstly, measures which tap how one generally copes with stress are likely to reflect dispositions to a greater extent than situation-specific measures (David & Suls,

1999). Secondly, the more time which elapses between an event and its assessment, the more likely individuals will be biased towards giving dispositional reports of their behaviour. Retrospective reports are also influenced by whether individuals experience an (un)successful outcome (Coyne & Gottlieb, 1996). Finally, when retrospective methodologies are used participants may recall different stressors making conclusions about individual differences in coping difficult.

Due to these limitations it is argued that examining the relationship between neuroticism and coping with a specific stressor, where coping is measured immediately after the event, would allow firmer conclusions to be made (Bolger, 1990). The impact of personality on coping may best be identified through the use of standardized laboratory-stressors, as presenting the same objective stressor to all participants minimizes confounds and allows for immediate self-reports of appraisal and coping (Connor-Smith & Flachsbart, 2007). In a series of experiments examining coping with task-induced stress, Matthews and colleagues (2006) reported correlations between neuroticism, emotion-focused and avoidant coping in a number of activities (including rapid information processing, mental arithmetic, and driving simulation). While these data support previous findings using dispositional/retrospective methodologies, and are a promising start in understanding the link between neuroticism and coping with cognitive stressors, it is still unclear how neuroticism is related to coping with specific social stressors. The current experiments used a ball-throwing game (Cyberball; Williams & Jarvis, 2006) during which the participant is either included or excluded as a laboratory-based social stressor with which to examine neuroticism and coping.

Research using Cyberball reveals that people subjected to ostracism for short periods of time report worsened mood, anger, and lower levels of belonging, control, and self-esteem (Zadro, Williams, & Richardson, 2004). These outcomes are measured using scales developed by Williams and colleagues. Importantly, Cyberball represents a controlled social situation, as excluded participants face exactly the same scenario. This should provide clarity in interpreting individual differences in coping. Moreover, by responding to all measures immediately after completing the game, limitations of dispositional and retrospective self-reporting are minimized.

2. Experiment 1: Cyberball as a Laboratory Stressor

Experiment 1 had two major aims. Firstly, it aimed to evaluate the utility of Cyberball as a laboratory-stressor. With regard to this, we aimed to replicate the negative effect of ostracism on mood and self-esteem using well-known and well-validated measures. It was hypothesized that ostracised individuals would report lower mood and self-esteem when compared with included individuals. Additionally, we aimed to determine whether being excluded during Cyberball could elicit a coping response. If Cyberball cannot evoke negative outcomes and elicit a coping response it is unlikely to be a useful laboratory-stressor. Secondly, Experiment 1 aimed to examine the relationship between neuroticism and coping with social ostracism. It was predicted that in the excluded group, neuroticism would be associated with emotion-focused and avoidance coping.

2.1. Method

2.1.1 Participants

Undergraduate students (n=334) were screened on neuroticism and the top and bottom quartiles invited to participate in Experiment 1. Eighty-nine participants (mean age = 20.44) took part in Experiment 1. Approximately equal numbers of male (n=42) and female (n=47) participants were recruited.

2.1.2. Materials

2.1.2.1. Cyberball

Cyberball is an animated ball-throwing computer game during which the participant is either included or ostracised (Williams & Jarvis, 2006). Participants were randomly allocated to either an Included condition (received the ball one third of the time) or an Excluded condition (received the ball twice at the start of the game but then excluded for the remainder of the game). The game was set for 40 throws.

2.1.2.2. Neuroticism

A neuroticism scale (10 items; $\alpha = .86$) compiled from the International Personality Item Pool (Goldberg et al., 2006) was used in pre-screening. Items are responded to on a five-point scale (*0: Very inaccurate; 4: Very accurate*). At time-of-testing participants completed the NEO-FFI (Costa & McCrae, 1992), which contains 60 items rated on a five-point scale (*0: Strongly disagree*; 4: *Strongly agree*). The

neuroticism sub-scale (12 items, α = .88, mean = 19.07) was of interest in the current experiments.

2.1.2.3. Mood

The Mood Adjective Checklist (MACL; Matthews, Jones, & Chamberlain, 1990) measures three bipolar dimensions: energetic arousal (vigorous vs. tired; α = .83), tense arousal (nervous vs. relaxed; α = .88), and hedonic tone (pleasant vs. unpleasant mood; α = .88). Items are responded to on a four-point scale (*1: Definitely; 4: Definitely not*).

2.1.2.4. Self-Esteem

The Rosenberg Self-Esteem scale (RSES; Rosenberg, 1965) consists of 10 items summed to give a total score. The RSES is responded to on a four-point scale (*1: Strongly agree; 4: Strongly disagree*). Extensive reliability and validity data exist for the RSES (Blascovich & Tomaka, 1991; α = .86 in Experiment 1).

2.1.2.5. Appraisal

An eight-item scale was constructed to measure appraisals of Cyberball. Five items assessed how excluded participants felt (During the game to what extent did you feel excluded? α = .92). Three items measured perceived control during the game (To what extent did you feel you had control over the game? α = .88). Items are responded to on a four-point scale (*1: Not at all; 4: Extremely*). A principal-components analysis (oblique rotation) revealed the two predicted components, accounting for 79.02% of overall variance.

2.1.2.6. Coping Inventory for Task Stressors (Situational Version, CITS-S)

The CITS-S (Matthews & Campbell, 1998) is used for immediate post-task assessment of coping. It consists of task-focused (I worked out a strategy for successful performance), emotion-focused (I became preoccupied with my problem), and avoidance (I stayed detached or distanced from the situation) coping sub-scales. Sub-scales contain seven items responded to on a five-point scale (*0: Not at all; 4: Extremely*). Internal consistencies range between .84 and .86 (Matthews & Campbell, 1998).

2.1.3. Procedure

Participants were randomly allocated to the Included or Excluded condition. After completing the NEO-FFI participants played Cyberball and then completed the MACL, RSES, Appraisal scale, and CITS-S. After completing all measures participants were thoroughly debriefed.

2.2. Results

A median split was conducted (using NEO-FFI scores; median = 17) in order to classify individuals as high (n=47) or low neuroticism (n=42). The difference between mean neuroticism scores in the high (mean = 25.60) and low (mean = 12.52) groups was significant; $F(1, 87) = 152.85$, $p < .001$, partial $\eta^2 = .64$. Neuroticism scores did not differ as a function of Cyberball condition, $F(1, 87) = 1.93$, $p = .17$. Given that gender

differences in neuroticism have been reported (Hankin & Abramson, 2001), gender was entered as a covariate in all analyses. No significant effects of gender were obtained. A series of MANCOVAs were conducted to examine appraisal, mood and self-esteem, and coping as a function of Condition (included vs. excluded) and Neuroticism (high vs. low). Bonferroni correction was implemented to set critical α level for all univariate analyses.

2.2.1. Appraisal

A significant multivariate effect of Condition was obtained; Wilks' Lambda (λ) = .58, $F(2, 83) = 29.55$, $p < .001$, partial $\eta^2 = .42$. The multivariate effect of Neuroticism; $\lambda = .99$, $F(2, 83) = .44$, $p = .65$, partial $\eta^2 = .01$; and the multivariate interaction between Condition and Neuroticism; $\lambda = .96$, $F(2, 83) = 1.55$, $p = .22$, partial $\eta^2 = .04$; were not significant. Critical α level was set at .025 for univariate analyses. Ostracised individuals felt significantly more excluded and perceived themselves as having less control during Cyberball (see Table 1). No significant effects of Neuroticism on appraisal were obtained (see Table 2), and neither of the interactions was significant.

Table 1 (all tables and figures are appended to this document)

2.2.2. Mood and Self-Esteem

Significant multivariate effects of Condition; $\lambda = .78$, $F(4, 81) = 5.71$, $p < .001$, partial $\eta^2 = .22$; and Neuroticism; $\lambda = .87$, $F(4, 81) = 3.13$, $p = .02$, partial $\eta^2 = .13$; were

obtained. The multivariate interaction was not significant; $\lambda = .97$, $F(4, 81) = .58$, $p = .68$, partial $\eta^2 = .03$. Critical α level was set at .012 for univariate analyses. Ostracised individuals reported significantly higher levels of tense arousal and significantly lower levels of hedonic tone (see Table 1). The difference in energetic arousal was not statistically significant after correction. No significant effects of Neuroticism were obtained on any of the mood sub-scales (although approaching significance, the difference in tense arousal was not significant after correction – see Table 2). Excluded individuals reported significantly lower levels of self-esteem (see Table 1). High-neuroticism participants reported significantly lower levels of self-esteem regardless of which condition they were assigned to (see Table 2). None of the interactions were significant

Table 2 (all tables and figures are appended to this document)

2.2.3. Coping

The multivariate effect of Condition was approaching significance; $\lambda = .91$, $F(3, 82) = 2.53$, $p = .06$, partial $\eta^2 = .09$. The multivariate effect of Neuroticism; $\lambda = .98$, $F(3, 82) = .50$, $p = .68$, partial $\eta^2 = .02$; and multivariate interaction; $\lambda = .97$, $F(3, 82) = .83$, $p = .48$, partial $\eta^2 = .03$; were not significant. Critical α level was set at .017 for univariate analyses. Excluded participants reported engaging in significantly more emotion-focused coping than included participants (see Table 1). No differences in coping were obtained as a function of Neuroticism (see Table 2) and none of the interactions were significant.

2.3. Discussion

Experiment 1 had two aims. Firstly, we aimed to evaluate Cyberball as a laboratory-stressor by 1) replicating previously reported ostracism effects (using well-validated measures) and 2) assessing whether Cyberball could elicit a coping response. Secondly, we aimed to examine any neuroticism-related differences in coping with social ostracism. Results revealed that the ostracism manipulation was successful. Ostracised participants felt more excluded and perceived themselves as having less control than included participants. Excluded participants also reported lower levels of hedonic tone and self-esteem, as well as higher levels of tense arousal. Experiment 1 offers strong evidence for Williams and colleagues' contention that Cyberball does induce feelings of ostracism, and that this ostracism has a measurable negative impact (Zadro et al., 2004). Importantly, this is the case even when widely-used scales, such as the MACL and the RSES are used as outcome measures. Additionally, Experiment 1 revealed that excluded participants engaged in more emotion-focused coping than included participants. Therefore, Cyberball can elicit a coping response and may be a useful laboratory-stressor for examining individual differences in coping. However, no neuroticism-related differences in appraisals of Cyberball or coping were obtained.

3. Experiment 2: Increasing Scale Sensitivity and Introducing Ambiguity to Cyberball

Before it could be concluded that there are no neuroticism-related differences in appraisal or coping during Cyberball, two methodological limitations were considered and addressed in Experiment 2. Firstly, because predicted effects may be small, it is possible that measures were not sensitive enough to identify differences. Experiment 2 increased the sensitivity of response-scales. It was predicted that neuroticism-related differences in emotion-focused and avoidance coping would now be obtained. Secondly, the fact that no neuroticism-related differences in appraisals of Cyberball were obtained in Experiment 1 was unexpected. Research suggests that high-neuroticism individuals appraise ambiguous stimuli in a threatening manner (Watson & Clark, 1984). It is possible that the ostracism experienced during Cyberball was so unequivocal that it was not an ambiguous situation. Experiment 2 employed an ambiguous Cyberball condition to determine whether this impacted on appraisals of the game. It was predicted that neuroticism-linked differences in appraisal would be obtained when ostracism is ambiguous.

3.1. Method

3.1.1. Participants

Undergraduate students (n=457) were screened on neuroticism and the top and bottom quartiles invited to participate in Experiment 2. Eighty-seven participants (mean

age = 19.42) took part in Experiment 2. The gender-ratio of the sample reflected the undergraduate psychology population (61 females; 26 males).

3.1.2. Materials

3.1.2.1. Cyberball

Cyberball was reprogrammed so the probability of computer-generated 'players' throwing to the participant could be manipulated. Given the game consists of a triad of 'players', a probability of .5 is analogous to complete inclusion (computerized-player is equally likely to throw the ball the participant or the other 'player') and a probability of 0 is analogous to complete exclusion. Altering the probability allows the extent to which participants are excluded to be manipulated. Various probability conditions were pilot-tested. A probability of .3 was determined to be the most ambiguous level of exclusion (defined as the condition with the most variation in appraisals of Cyberball) and was used as the Ambiguous condition in Experiment 2.

3.1.2.2. Other Measures

Personality, mood, self-esteem, appraisal, and coping measures were the same as those used in Experiment 1, however, the response scales of the MACL (0: Definitely; 10: Definitely not), RSES (0: Strongly agree; 10: Strongly disagree), Appraisal Scale (0: Not at all; 10: Extremely), and CITS-S (0: Not at all; 10: Extremely) were expanded.

3.1.3. Procedure

The procedure was the same as in Experiment 1; however, participants were randomly allocated to an Excluded or Ambiguous condition.

3.2. Results

A median split was conducted (using NEO-FFI scores; median = 20) to classify individuals as high (n=42) or low neuroticism (n=45). The difference between mean neuroticism scores in the high (mean = 27.02) and low (mean = 15.02) groups was significant; $F(1, 85) = 161.02$, $p < .001$, partial $\eta^2 = .64$. Neuroticism scores did not differ as a function of Cyberball condition, $F(1, 85) = 1.51$, $p = .22$. A series of MANCOVAs was conducted to examine appraisal, mood and self-esteem, and coping as a function of Condition (excluded vs. ambiguous) and Neuroticism (high vs. low). Bonferroni correction was implemented to set critical α level for all univariate analyses. Gender was again entered as a covariate in all analyses. No significant effects of gender were obtained.

3.2.1. Appraisal

A significant multivariate effect of Condition was obtained; $\lambda = .58$, $F(2, 81) = 29.94$, $p < .001$, partial $\eta^2 = .43$. The multivariate effect of Neuroticism; $\lambda = .97$, $F(2, 81) = 1.38$, $p = .26$, partial $\eta^2 = .03$; and the multivariate interaction between Condition and Neuroticism Level; $\lambda = .95$, $F(2, 81) = 2.16$, $p = .12$ partial $\eta^2 = .05$; were not significant. Critical α level was set at .025 for univariate analyses. Completely ostracised participants

reported feeling significantly more excluded and less in control during Cyberball (see Table 3). No significant effects of Neuroticism were obtained (see Table 4); however, the interaction between Neuroticism and Condition with regard to appraised control was approaching significance; $F(1, 83) = 4.07$, $p = .04$. This interaction is illustrated in Figure 1.

Figure 1 (all tables and figures are appended to this document)

3.2.2. Mood and Self-Esteem

Significant multivariate effects of Condition; $\lambda = .70$, $F(4, 79) = 8.49$, $p < .001$, partial $\eta^2 = .30$; and Neuroticism; $\lambda = .88$, $F(4, 79) = 2.74$, $p = .03$, partial $\eta^2 = .12$; were obtained. The multivariate interaction was not significant; $\lambda = .97$, $F(4, 79) = .57$, $p = .69$, partial $\eta^2 = .03$. Critical α level was set at .012 for univariate analyses. Excluded individuals reported significantly higher levels of tense arousal and lower levels of hedonic tone (see Table 3). High-neuroticism participants reported significantly lower levels of hedonic tone regardless of which condition they were assigned to (see Table 4). Although approaching significance, the difference in energetic arousal was not statistically significant after correction. Excluded participants reported significantly lower levels of self-esteem. High-neuroticism participants reported significantly lower levels of self-esteem regardless of which condition they were assigned to. None of the interactions were statistically significant.

Table 3 (all tables and figures are appended to this document)

3.2.3. Coping

The multivariate effects of Condition, $\lambda = .74$, $F(3, 80) = 9.61$, $p < .001$, partial $\eta^2 = .27$, and Neuroticism, $\lambda = .87$, $F(3, 80) = .3.92$, $p = .01$, partial $\eta^2 = .13$, were significant. The multivariate interaction between was not significant; $\lambda = .99$, $F(3, 80) = .05$, $p = .99$, partial $\eta^2 = .00$. Critical α level was set at .017 for univariate analyses. Excluded participants reported engaging in significantly more emotion-focused and avoidant coping (see Table 3). High-neuroticism participants reported engaging in significantly more emotion-focused coping than low neuroticism participants, regardless of which condition they were assigned to (see Table 4). None of the interactions were statistically significant.

Table 4 (all tables and figures are appended to this document)

3.3. Discussion

Experiment 2 increased the sensitivity of response-scales and used an ambiguous Cyberball condition to determine if small neuroticism-related differences in appraisal and coping could be observed. It was predicted that neuroticism-related differences in appraisal would be obtained when social ostracism was ambiguous. With regard to ostracism, results replicated the findings of Experiment 1. Excluded participants felt more left-out and perceived themselves as having less control than those in the Ambiguous condition. Being excluded was also associated with higher levels of tense

arousal, and lower levels of hedonic tone and self-esteem. Furthermore, excluded individuals reported engaging in more emotion-focused and avoidance coping. These results suggest that Cyberball does evoke a coping response and is a useful experimental social stressor with which to examine individual differences in coping.

The interaction between Neuroticism and Condition in relation to appraised controllability approached significance. A neuroticism-related difference in appraised controllability was only observed in the Ambiguous condition. This is consistent with research suggesting that high-neuroticism individuals appraise ambiguous stimuli negatively and warrants further investigation (Watson & Clark, 1984). This finding also has implications for Cyberball research. No individual difference variables or experimental manipulations (Zadro et al., 2004) that moderate the effects of being excluded during traditional Cyberball games have been identified. Ambiguous Cyberball conditions offer exciting opportunities to examine individual differences in sensitivity to social ostracism.

In Experiment 2, high-neuroticism participants engaged in more emotion-focused coping than low-neuroticism participants regardless of condition. This finding is consistent with previous research using both dispositional/retrospective methodologies and experimental cognitive tasks. Experiment 2 extends previous findings by revealing that neuroticism is also associated with emotion-focused coping in the context of an experimental social stressor. However, the real-world validity of Cyberball is questionable and attempts should be made to replicate these findings in real-life social interactions.

4. Conclusion

These experiments reveal that being excluded during Cyberball is associated with lowered mood and self-esteem, even when well-known outcome measures are employed. Being ostracised also elicits an emotion-focused and avoidance coping response, suggesting that Cyberball is a promising laboratory-stressor for examining individual differences in coping with social stress. Importantly, Cyberball overcomes a reliance on dispositional and retrospective methodologies. Experiment 2 revealed that neuroticism is associated with emotion-focused coping during Cyberball. Future research should examine the relationship between neuroticism and coping using laboratory-tasks in other domains; for example, anagram-solving tasks may be used as cognitive stressors (Endler, Macrodimitris, & Kocovski, 2000). Finally, manipulating the extent to which participants are excluded during Cyberball allows ambiguity to be introduced into the game. Ambiguous conditions may be useful for examining the impact of experimental manipulations (such as in-group/out-group manipulations) and individual differences in sensitivity to social ostracism. Cyberball research can benefit from this finding.

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Captions:

Table 1. Differences in appraisals, mood, self-esteem, and coping as a function of being included or excluded during Cyberball in Experiment 1.

Table 2. Differences in appraisals, mood, self-esteem, and coping as a function of Neuroticism in Experiment 1.

Table 3. Differences in appraisals, mood, self-esteem, and coping as a function of being assigned to the Excluded or Ambiguous Condition during Cyberball in Experiment 2.

Table 4. Differences in appraisals, mood, self-esteem, and coping as a function of Neuroticism Level in Experiment 2.

Figure 1: Mean Appraised Control Scores (and Standard Error) for High and Low Neuroticism (N) participants in the Excluded and Ambiguous Cyberball Conditions.

Table 1. Differences in appraisals, mood, self-esteem, and coping as a function of being included or excluded during Cyberball in Experiment 1.

	Mean	SD	*F*	df	Error df	*p*	Partial η^2
Appraised Exclusion:							
Included	9.75	3.77					
Excluded	16.07	4.76	48.46	1	84	< .001*	.36
Appraised Control:							
Included	12.00	2.48					
Excluded	9.07	1.97	40.42	1	84	< .001*	.32
Energetic Arousal:							
Included	21.61	4.45					
Excluded	19.69	4.32	4.10	1	84	.04	.05
Tense Arousal:							
Included	13.61	3.62					
Excluded	16.49	5.29	9.86	1	84	< .001*	.10
Hedonic Tone:							
Included	34.70	1.89					
Excluded	33.04	2.95	9.33	1	84	<.001*	.10
RSES:							
Included	29.70	3.84					
Excluded	26.13	4.91	18.23	1	84	< .001*	.18
T-F Coping:							
Included	13.14	4.62					
Excluded	13.98	4.17	.54	1	84	.47	.01
E-F Coping:							
Included	2.70	2.53					
Excluded	4.56	3.85	6.96	1	84	.01*	.08
Avoidance Coping:							
Included	6.54	4.30					
Excluded	7.96	4.32	2.40	1	84	.13	.03

* Significant after Bonferroni correction

Table 2. Differences in appraisals, mood, self-esteem, and coping as a function of Neuroticism in Experiment 1.

	Mean	SD	*F*	df	Error df	*p*	Partial η^2
Appraised Exclusion:							
Low N	12.76	5.45					
High N	13.11	5.26	.88	1	84	.35	.01
Appraised Control:							
Low N	10.52	2.97					
High N	10.51	2.40	.32	1	84	.58	.00
Energetic Arousal:							
Low N	20.48	4.68					
High N	20.79	4.30	.03	1	84	.87	.00
Tense Arousal:							
Low N	14.19	4.78					
High N	15.85	4.61	3.92	1	84	.05	.04
Hedonic Tone:							
Low N	33.71	2.67					
High N	34.00	2.56	.09	1	84	.76	.00
RSES:							
Low N	29.19	4.95					
High N	26.74	4.27	9.46	1	84	.01*	.10
T-F Coping:							
Low N	14.07	4.32					
High N	13.11	4.46	2.65	1	84	.11	.03
E-F Coping:							
Low N	3.76	3.70					
High N	3.53	3.10	.01	1	84	.91	.00
Avoidance Coping:							
Low N	7.48	4.49					
High N	7.06	4.25	.09	1	84	.76	.00

* Significant after Bonferroni correction

Table 3. Differences in appraisals, mood, self-esteem, and coping as a function of being assigned to the Excluded or Ambiguous Condition during Cyberball in Experiment 2.

	Mean	SD	*F*	df	Error df	*p*	Partial η^2
Appraised Exclusion:							
Excluded	42.71	10.43					
Ambiguous	25.49	13.76	40.90	1	82	< .001*	.33
Appraised Control:							
Excluded	12.36	2.93					
Ambiguous	20.93	7.49	47.38	1	82	< .001*	.37
Energetic Arousal:							
Excluded	43.88	12.70					
Ambiguous	46.53	14.11	.58	1	82	.45	.01
Tense Arousal:							
Excluded	32.86	18.17					
Ambiguous	23.84	12.81	6.41	1	82	.01*	.07
Hedonic Tone:							
Excluded	67.36	28.95					
Ambiguous	96.58	21.17	28.47	1	82	< .001*	.26
RSES:							
Excluded	63.43	20.00					
Ambiguous	78.53	15.42	14.97	1	82	< .001*	.15
T-F Coping:							
Excluded	39.32	8.91					
Ambiguous	36.61	11.88	1.34	1	82	.25	.02
E-F Coping:							
Excluded	25.16	13.24					
Ambiguous	12.61	8.42	27.88	1	82	< .001*	.25
Avoidance Coping:							
Excluded	25.88	8.96					
Ambiguous	21.05	7.66	6.81	1	82	.01*	.08

* Significant after Bonferroni correction

Table 4. Differences in appraisals, mood, self-esteem, and coping as a function of Neuroticism Level in Experiment 2.

	Mean	SD	*F*	df	Error df	*p*	Partial η^2
Appraised Exclusion:							
Low N	31.44	14.73					
High N	36.33	14.95	1.75	1	82	.19	.02
Appraised Control:							
Low N	18.00	7.76					
High N	15.50	6.31	2.29	1	82	.13	.03
Energetic Arousal:							
Low N	48.11	13.42					
High N	42.19	12.92	4.73	1	82	.03	.06
Tense Arousal:							
Low N	25.31	14.62					
High N	31.29	17.35	2.20	1	82	.14	.03
Hedonic Tone:							
Low N	89.96	28.68					
High N	74.45	27.60	7.14	1	82	.01*	.08
RSES:							
Low N	77.20	19.13					
High N	64.86	17.39	9.75	1	82	. 01*	.11
T-F Coping:							
Low N	37.59	10.09					
High N	38.32	11.10	.04	1	82	.846	.00
E-F Coping:							
Low N	14.64	11.02					
High N	23.09	12.96	11.75	1	82	.01*	.13
Avoidance Coping:							
Low N	21.91	9.41					
High N	25.00	7.54	3.13	1	82	.08	.04

* Significant after Bonferroni correction

Figure 1. Mean Appraised Control Scores (and Standard Error) for High and Low Neuroticism (N) participants in the Excluded and Ambiguous Cyberball Conditions.

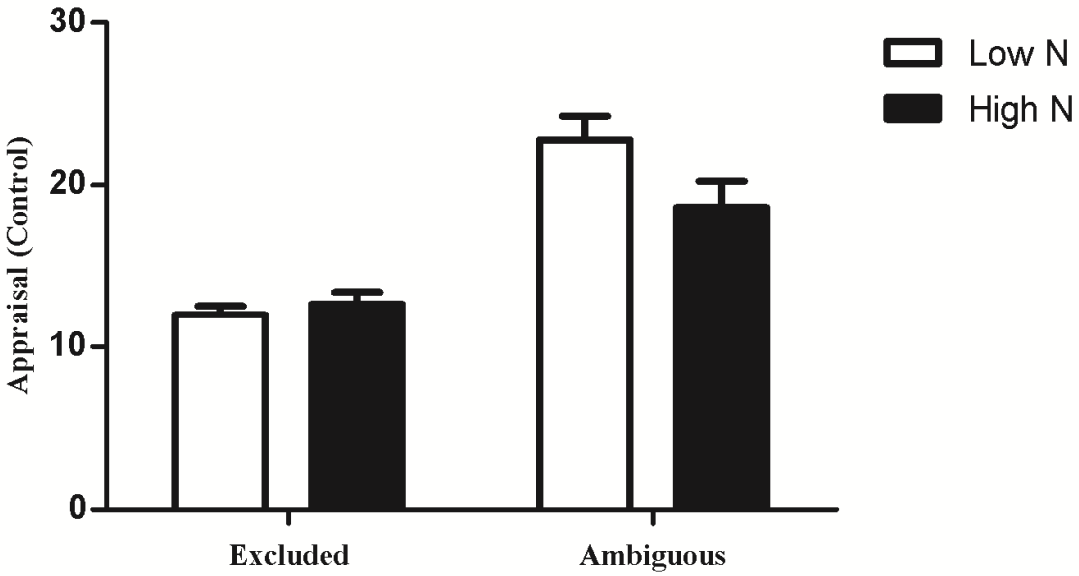

Figure 1.

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Ethical Statement:

The authors do not have any interests that might be interpreted as influencing the research, and the research protocol was approved by the University Human Research Ethics Committee.