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Does social connectedness increase pro-environmental behaviour?

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Abstract
Extensive research has shown that pro-environmental behaviour (PEB) is encouraged by nature connectedness. Recently, however, researchers have investigated the effects of connectedness to others on socially responsible behaviours. It has been found that a higher sense of connectedness to others increases one's socially responsible behaviour. A similar construct, known as social connectedness, has been implemented in prosocial behaviours and motivation, yet has not been investigated in terms of PEB. The present study investigated the effects of situational and trait social connectedness on PEB, using self-report and the novel Pro-Environmental Behaviour Task to measure PEB. 90 participants were randomly assigned to one of two conditions (socially connected and socially ostracised) in an independent measures design. Social connectedness and ostracism were induced using the Cyberball Social Exclusion Task. Relative to ostracised participants, the connected participants did not select more pro-environmental choices and did not self-report a greater number or frequency of PEBs. Further, it was also found that trait social connectedness was not related to pro-environmental choices. The present study did, however, find that trait connectedness was linked to specific self-reported PEBs. Although the results provided new insights into social connectedness and PEB, the findings may have been confounded by certain limitations such as modifying the PEBT. It is also important to consider prior research regarding the identity of the group one is connected to. Implications and directions for future research are discussed.

Keywords: pro-environmental behaviour, PEB, biophilia hypothesis, nature connectedness, socially responsible behaviours, socially connected, socially ostracised, Cyberball Social Exclusion

Introduction

Anthropogenic environmental changes continue to threaten the future of the natural world (Lange & Dewitte, 2019). With the aim to mitigate environmental harm, research has sought to determine the psychological processes that underlie pro-environmental behaviours (PEBs) (e.g. Mayer & Frantz, 2004). PEBs are human actions that intentionally lessen or do not contribute to contemporary environmental burdens (Dono, Webb, & Richardson, 2010). These behaviours can include recycling (e.g. paper, plastic bottles, glass), waste reduction (e.g. reusing products such as shopping bags), and conserving energy and resources (e.g. water and electricity). Although PEBs are beneficial for the environment, they often involve costs such as time-consumption, inconvenience, and may require greater effort (e.g. walking to work in the rain instead of driving) (Schmitt, Aknin, Axsen, & Shwom, 2018). An individual's choice to adopt environmentally friendly behaviours would thus require a desire to preserve nature (Perkins, 2010).

Often used interchangeably with 'natural environment', the term 'nature' refers to a naturalistic space with minimal or no apparent human interference (Hartig, Mitchell, de Vries, & Frumkin, 2014). Natural environments, comprising a variety of rich colours, life, and scenic beauty, are universally preferred over built environments (Kaplan & Kaplan, 1989). People's aesthetic preference for natural environments can be explained by the biophilia hypothesis. The notion of biophilia posits that human beings, having evolved in nature, are instinctively attracted to natural environments and possess an innate tendency to seek contact with nature (Kellert & Wilson, 1993). There has been recent interest in how exposure to nature can affect pro-environmental attitudes (Hinds & Sparks, 2009). Specifically, contemporary research has investigated nature contact (i.e. direct interactions with nature) and has found that visiting nature at least once a week is positively related to PEB (Martin et al., 2020). This means that the more contact with nature a person has, the more likely they are to adopt PEBs.

Exposure to nature can strengthen and optimise one's sense of nature connectedness, which in turn, is strongly correlated with PEB (Wyles et al., 2019; Mackay & Schmitt, 2019). Nature connectedness is commonly defined as a personal sense of kinship with the natural world, which includes a strong emotional bond with nature (Restall & Conrad, 2015; Wyles et al., 2019). Several instruments have been established to measure nature connectedness including the Connectedness to Nature scale (CNS) (Mayer & Frantz, 2004). The CNS comprises 14 items which measure the extent to which an individual feels a part of nature. Mayer and Frantz (2004) found that higher levels of nature connectedness were predictive of ecological behaviours and environmental self-identity (i.e. the extent to which an individual views their actions as environmentally friendly). Other constructs of nature connectedness include relatedness to nature (Nisbet, Zelenski, & Murphy, 2009), love and care for nature (Perkins, 2010), and including nature within one's self-definition (Schultz, 2002). All of these constructs are highly intercorrelated and refer to the self-nature connection (Martin & Czellar, 2016).

The self-nature connection refers to the extent to which an individual incorporates aspects of the natural world in their 'self' (i.e. a person's cognitive representation of their own self-identity) (Schultz, 2002; Schultz & Tabanico, 2007). This concept, also known as environmental identity (Clayton, 2003), is important to consider as expanding one's self to include various aspects of nature has been shown to relate to one's environmental behaviour (Hinds & Sparks, 2009). For instance, Davis, Green, and Reed (2009) presented participants with 7 Venn-like pictorial diagrams comprising two circles: one representing the self, and the other representing nature. The diagrams varied in the extent to which the two circles overlapped. The participants were required to select the diagram that best matched their personal relationship with nature. The study found that participants who selected diagrams representing a larger overlap were more likely to report a greater number of PEBs. Relative to previous research, these findings support the notion that the more one identifies with nature, or sees themselves as a part of nature, the less likely they are to engage in environmentally harmful behaviours (e.g. Mayer & Frantz, 2004). In fact, it has even been suggested that perceiving the self and nature as 'one' evokes a personal sense of responsibility to protect both the self and nature from harm (Perkins, 2010; Barbaro & Pickett, 2016).

Similar processes (i.e. the expansion of the self to include various aspects of the world) can be seen in other forms of connectedness (Hoot & Friedman, 2011). Connectedness to others is defined as an individual's sense of unity and interdependence with other human beings (Cojuharenco, Cornelissen, & Karelaia, 2016). Relative to nature connectedness, a sense of connectedness to others satisfies an evolutionary need to belong (Ryan & Deci, 2000) and also yields restorative effects (Cartwright, White, & Clitherow, 2018). Connectedness to others is often prevalent between group members (e.g. members of an activist group) who are likely to share emotional connections and moral beliefs (Cojuharenco et al., 2016; Polletta & Jasper, 2001).

Cojuharenco et al. (2016) investigated the effect of connectedness on socially responsible behaviours, such as recycling. In this study, participants completed the Self-Concept Scale which measures the extent to which individuals define the self in terms of others and potential group members (Johnson, Selenta, & Lord, 2006). The participants also reported their current socially responsible behaviours and the perceived effectiveness of their actions (i.e. the extent to which they believe their actions are impactful). Across four studies, it was consistently found that participants who reported a greater sense of connectedness were more likely to report socially responsible behaviours. In addition, a higher sense of connectedness was also related to a greater belief in one's actions. The results suggest that people who expand their self to include others and others' beliefs are more willing to be socially responsible.

This effect is even stronger when other group members share environmental beliefs. According to Schmitt, Mackay, Droogendyk, and Payne (2019), identifying with a politicised group that accepts (versus denies) climate change is a strong predictor of PEB and environmental activism (see also Hornsey, Harris, Bain, & Fielding, 2016). In their study, participants were required to

complete items of politicised environmental identity (e.g. “I have a lot in common with other environmental activists”) and were also required to self-report their current pro-environmental and activist behaviours. The study found that, consistent with previous research, nature connection was related to PEBs but was not related to activist behaviours. In fact, the strongest predictor of PEB and environmental activism was the extent to which individuals identified with a politicised group. Identifying with an environmental activist group means that individuals are likely to “take on” the collective identity (i.e. accepting climate change) and are thus likely to adopt behaviours that are valued by the collective. In this case, if one were to identify with an environmental group who aimed to mitigate climate change, then that individual would be likely to adopt environmentally friendly behaviours.

A similar construct to connectedness to others is known as social connectedness. Social connectedness is commonly conceptualised as feelings of love, protection, and a connection towards peers as well as the broader social world (Lee & Robbins, 1995). Lee, Draper, and Lee (2001) postulate that early social relationships create an overall sense of affinity with others which is gradually incorporated into one’s sense of self. If by adulthood a person has incorporated positive social experiences into their sense of self, they are more likely to feel connected to society and perceive unknown others are trustworthy and approachable (Lee et al., 2001). Social connectedness differs from connectedness to others in that it does not just refer to emotional bonds between close others (e.g. friends and family), but also how connected one feels to humankind (Lee & Robbins, 1998). People who experience negative social experiences (e.g. abandonment, ostracism) have a lower sense of social connectedness, and thus perceive humanity as unfavourable (Lee et al., 2001).

In terms of ecological behaviour, it has been suggested that individuals with a higher sense of ostracism (or a lower sense of social connectedness) are more likely to engage in ecological behaviours (Poon, Teng, Chow, & Chen, 2015). According to Poon et al. (2015), people who feel ostracised are likely to seek restorative effects from natural environments in order to compensate for their lack of social connection. This desire to connect to nature is believed to mediate the relationship between ostracism and ecological behaviour, given that nature connectedness is highly associated with such behaviours (e.g. Mayer & Frantz, 2004). Although the findings from Poon et al. (2015) suggest that ostracism is linked to ecological behaviour, this study only measured inclinations to behave ecologically and not actual ecological behaviours. Other studies which have found opposing results (e.g. Cojuharenco et al., 2016; Schmitt et al., 2019), have found that connectedness and social-identity processes are, in fact, linked to actual ecological behaviours and even environmental activism. Moreover, research has suggested that individuals with a higher sense of ostracism are less likely to perform prosocial behaviours, relative to individuals with a lower sense of ostracism (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Bearing in mind that PEB is a form of prosocial behaviour, it can be argued that ostracised individuals are less likely to perform PEBs (Li, Zhao, & Yu, 2020). Indeed, Li et al. (2020) measured participant’s trait ostracism and their actual

PEBs and found that ostracism was negatively associated with PEB. In other words, as ostracism increased, PEBs decreased.

Further, a sense of connectedness to others and society has also been implemented in ecological behaviours in terms of motivation. Deci and Ryan's (1985) self-determination theory (SDT) posits that humans possess three innate needs that are crucial for motivation, one of which being relatedness. Indeed, relatedness refers to feeling connected to others and experiencing an overall sense of belonging (Ryan & Deci, 2000). Levels of motivation are dependent on the extent to which these needs are satisfied, suggesting that the more connected a person feels, the more likely they are to be motivated to engage in positive behaviours (Ryan & Deci, 2000). In fact, self-determined motivation has been found to correlate with a variety of PEBs (see Pelletier, 2002; Webb, Soutar, Mazzarol, & Saldaris, 2013).

Taken together, prior research has suggested that connectedness to others is linked to socially responsible behaviours (Cojuharenco et al., 2016), and that social connectedness (a similar construct) is implemented in prosocial behaviour and motivation to behave ecologically (e.g. Li et al., 2020; Pelletier, 2002). Nevertheless, research has not yet investigated the effects of social connectedness on PEB, despite pre-existing links between social connectedness and positive behaviours. This validated the present study's decision to investigate the gap in understanding between social connectedness and PEB. Prior research has investigated the effects of situational connectedness (e.g. Poon et al., 2015) and trait connectedness (e.g. Li et al., 2020) on ecological behaviour. Therefore, the present study also decided to investigate the effects of situational and trait social connectedness on PEB. Participants were exposed to a short-term manipulation of ostracism or connectedness (depending on which condition they were in), and also completed a measure of trait social connectedness. PEB was measured using a questionnaire, yet after considering the likelihood of self-report bias, the present study also incorporated the Pro-Environmental Behaviour Task (Lange, Steinke, and Dewitte, 2018). This task was designed to reduce unreliable responses through measuring true ecological behaviour in a controlled laboratory setting (Lange & Dewitte, 2019). With reference to previous research, the present study had two hypotheses:

In terms of situational connectedness, the present study hypothesised that participants in the socially connected condition would be more likely to select a higher proportion of the environmentally friendly option during the PEBT (relative to those in the ostracised condition). In addition, it was also predicted that participants in the connected condition would also self-report a greater number and frequency of
PEBs.

In terms of trait connectedness, it was predicted that trait social connectedness would positively correlate with PEB. In other words, the present study anticipated that participants with higher trait social connectedness would select

a greater number of environmentally friendly responses during the PEBT and would also self-report a greater number and frequency of PEBs.

Method

Participants

Ninety (75 female; 15 male) psychology undergraduate students from the University of Plymouth participated in this study. Participants were randomly split into one of two conditions (45 socially connectedness; 45 socially excluded). No other demographic data were collected.

Materials

A 15-item measure of social connectedness (SCS-15) was used. The present study modified the 20-item social connectedness scale used in Lee et al. (2001). Five items were excluded from the scale as they were found to overlap with measures of extraversion (see Lee et al., 2008). The SCS-15 included items such as "I feel disconnected from the world around me", some of which were reversed scored. Participants were required to report how much they agreed with each statement using a 6-point scale (1 = "Strongly Disagree; 6 = "Strongly Agree"), $\alpha = .90$. Higher scores indicate a higher sense of social connectedness.

The Cyberball Social Exclusion Task (Williams & Jarvis, 2006) was used to manipulate participants' situational social connectedness during an online ball game. Participants were told that they were playing with two real people, however, the two other 'players' were pre-programmed to either exclude (condition one) or include (condition two) the participant. In the excluded condition, participants were only thrown the ball approximately 2 out of 30 times. In the included condition, however, participants were thrown the ball approximately one-third of the time.

A jug, a clear drinking glass, and a clear plastic cup were used for a baseline behaviour task. A modified version of the Pro-Environmental Behaviour Task (PEBT) (Lange et al., 2018) was used to measure the participants' proenvironmental choices. The task was run using OpenSesame version 3.1.4 (Mathôt, Schreij, & Theeuwes, 2012) and was completed using a 24" Lenovo ThinkCentre Monitor. The task comprised a total of 24 trials (2 practice trials; 22 test trials) and each trial was preceded by a waiting period. The trials began with a choice display comprising an environmentally friendly option (a bike) and an environmentally unfriendly option (a car). Written information on the screen informed participants how long each mode of transportation would take and the disparity between the two choices (referring to the duration of the waiting period), and how much CO_2 would be emitted. This remained on the screen until the participant made a decision. After a decision is made, the waiting period commences depicting the waiting time, the amount of CO_2 being emitted, and twelve light bulbs. If the environmentally friendly option was chosen the waiting period would be shorter, the amount of CO_2 being emitted would be 0, and the lightbulbs would be shown in greyscale (i.e. they are not illuminated). If the

environmentally unfriendly option was chosen, then the waiting period would be longer, the amount of CO_2 being emitted would be "9000mg per hour" and the lightbulbs would also be illuminated on the screen. The waiting times varied over the trials, as did the disparity between the choices.

Finally, a PEB questionnaire was used to measure how frequently and the extent to which the participants perform PEBs. The items for the questionnaire were taken from the UK Household Longitudinal Study (2020). The first question, treated as a single item, enquired "Which of these bests describes how you feel about your current lifestyle and the environment." Participants responded using a 5-point scale (1 = "I don't really do anything that is environmentally friendly"; 5 = "I'm environmentally friendly in everything I do"). The remainder of the questionnaire included items such as "Could you tell me how often you personally leave your TV on standby for the night?". Participants reported how often they engaged in each behaviour using a 6-point scale (1 = "Always", ranging to 5 = "Never"; 6 = "Not applicable / I cannot do this"). The questionnaire included two final questions. The first was a manipulation check question for the Cyberball task. The second enquired whether the participants encountered the task before. They were required to circle either "yes" or "no" for each question. All questionnaires were completed on a sheet of A4 paper.

Design and Procedure

A between-subjects design with two conditions (socially included, socially excluded) was employed. Participants, tested one at a time, first completed the 15-item social connectedness questionnaire. After this, they participated in the Cyberball social exclusion task. The participants were mildly deceived and told that they must be hydrated before taking part in the next stage of the experiment. They were asked to pour themselves a drink of water and to drink it before beginning the PEBT. This was incorporated to determine which cup they would select. After the task, participants completed the PEB questionnaire. The experiment lasted approximately 30 minutes, but this varied depending on their PEBT choices.

Data Preparation and Manipulation Check

The SCS-15 and PEB questionnaire included items which were reversed scored. The data were re-coded prior to the analyses. Further, the items in the PEB questionnaire were found to have a low internal consistency ($\alpha = .31$), meaning that they do not measure a similar underlying construct. Therefore, all of the items were treated separately. Finally, to test the effectiveness the Cyberball task, a Chi-square test of goodness-of-fit was performed. The test determined that, for 14 participants, the manipulation was not successful, X^2 (1) = 44.9, $p < .001$.

Results

An independent samples *t*-test was conducted to determine whether participants in the socially connected condition made more pro-environmental choices during the PEBT than participants in the socially excluded condition. One participant's data for the task were not recorded due to a technical failure, therefore, they were excluded from the PEBT analysis. The test showed that the

participants in the socially connected condition were not significantly more pro-environmental (M = 60; SD = 22.71) than the socially excluded participants (M = 54.66; SD = 24.79) (see table 1), $t(87) = -1.06$, $p = .292$ (one tailed; equal variances assumed).

A second independent samples *t*-test was conducted excluding the participants who did not pass the manipulation check. 14 participants' data were thus removed from the analysis. The test indicated that the socially connected participants still did not make significantly more pro-environmental choices during the PEBT than the socially excluded participants, $t(74) = -.53$, $p = .410$ (one tailed; equal variances assumed).

A third independent samples *t*-test was performed to test whether the participants in the socially connected condition reported higher pro-environmental behaviour than the participants in the socially excluded condition. The analysis revealed that the socially connected participants were not significantly more proenvironmental than the socially excluded participants, $t(88) = -.298$, $p = .316$ (one tailed; equal variances assumed). When controlling for the manipulation check, the difference between the two conditions was, again, non-significant, $t(74) = 0$, $p = .112$ (one tailed; equal variances assumed).

Table 1: Independent samples t-test results for the PEBT and the self-reported PEB items.

	t	*p*-value	Mean difference
PEBT Total	-1.06	.292	-5.34
PEB	-.30	.766	-.04
PEB 1	-.78	.438	-.178
PEB 2	.23	.817	.07
PEB 3	-.13	.90	-.02
PEB 4	.28	.783	.07
PEB 5	.79	.432	.16
PEB 6	-.91	.363	-.19
PEB 7	-1.46	.149	-.34
PEB 8	.82	.413	.13

Note: Degrees of Freedom (df) = 87/88. Df are lower for the PEB items as some of the responses were reported as "not applicable." These data were recoded as missing. They are also lower for the PEBT as one participants' data was excluded.

A Pearson correlation was conducted to determine whether there is a relationship between general social connectedness and pro-environmental choices on the PEBT.

The test revealed that there was no significant relationship between general social connectedness and the total PEBT scores, $r(89) = -.024$, $p = .695$.

A second Pearson correlation was performed to test for an association between general social connectedness and PEB. The test showed that there was no significant relationship between general social connectedness and self-reported PEB except that there was a significant relationship between general social connectedness and PEB items 7 and 8 (see table 2), $r(90) = -.036$, $p = .735$.

Table 2: Correlation matrix for the total SCS scores, the PEBT, and each of the PEB questionnaire items.

		PEBT Total	PEB	PEB 1	PEB 2	PEB 3	PEB 4	PEB 5	PEB 6	PEB 8	PEB 8
SCS Total	Pearson Correlation	-.04	-.04	-.03	.12	.12	.04	-.05	.11	.18	.20
	Significance (one tailed)	.348	.368	.377	.128	.141	.370	.317	.162	.049*	.030*

Note: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

Exploratory Analysis

An independent samples t-test was conducted to determine whether the participants in the two conditions differed in terms of their trait social connectedness. The results showed that participants in the connected condition ($M = 65.82$; $SD = 10.6$) were not significantly higher on general social connectedness than those in the ostracised condition ($M = 69.2$; $SD = 1.82$), $t(88) = -1.39$, $p = .450$.

To make the analysis comparable to the experimental analyses above, we performed a median split on the SCS-15 scores to indicate higher and lower scores. The test revealed that the median score was 70.5. The data were recoded so that any score higher than 70.5 would be categorised into one group (higher scores) and any score lower than 70.5 would be another group (lower scores). A One-Way ANOVA (see table 3) was thus conducted to determine whether there is a significant difference between higher trait social connectedness and lower trait social connectedness in terms of the PEB outcomes. The test revealed that there was no significant difference between those with higher ($M = 57.24$; $SD = 24.52$) and those with lower ($M = 57.5$; $SD = 23.15$) social connectedness scores in terms of PEBT scores, $F(1, 87) = .003$, $p = .690$, and the first PEB item, $F(1, 88) = .329$, $p = .568$.

Table 3: ANOVA output for the higher and lower trait social connectedness scores and PEB outcomes.

Measure	Mean	*F* value	*p*-value

	High SC	Low SC		
PEBT scores	57.24	57.5	.003	.960
PEB (first item)	2.98	3.02	.329	.568

Note: SC = social connectedness.

Discussion

The present study investigated the effects of trait and situational social connectedness on PEB. It was found that participants in the connected condition did not select a higher proportion of the environmentally friendly choices during the PEBT than those in the ostracised condition. Further, participants in the connected condition (relative to those who were excluded) also did not self-report a higher number or frequency of PEBs on the PEB questionnaire. These findings remained consistent even when the analysis excluded those whose feelings of connectedness were incongruent with the condition they were in. Both of these findings are not consistent with the first experimental hypothesis that participants included in the Cyberball task would be more pro-environmental than those who were excluded. The results of the present study are somewhat consistent with that of previous research. For instance, Poon et al. (2015) found that their experimental manipulation (to induce a situational sense of ostracism) was related to inclinations to behave ecologically. Considering that they did not measure actual PEBs, it could be that situational social connectedness does not underlie true PEB. Taken together, the results from the present study suggest that situational connectedness may not enough to elicit PEB.

Moreover, the present study also found no significant relationship between trait social connectedness and the proportion of environmentally friendly choices during the PEBT. This finding contradicts the second hypothesis that higher trait connectedness would be linked to a greater number of environmentally friendly responses. This suggests that trait connectedness may not be an underlying factor of PEB. Nevertheless, partially consistent with the second hypotheses, the present study found significant correlations between trait social connectedness and two of the PEB questionnaire items, namely, items 7 and 8. As previous research has found a similar link between connectedness and socially responsible behaviour (e.g. Cojuharenco et al., 2016), this finding suggests that social connectedness (being a similar construct) may also underlie PEB. This pattern was not consistent across all of PEB items, however, suggesting that trait connected may only be related to specific PEBs (i.e. buying recycled items such as tissues and using a reusable shopping bag). This finding in itself is not uncommon and has been found in previous research. For instance, Martin et al. (2020) found that nature contact was only related to household PEBs such as recycling.

Conversely, this finding suggests that those with lower trait connectedness (or a higher sense of ostracism) are less likely to engaged in specific PEBs. This finding in consistent with Li et al. (2020) who found that participants with a higher sense of ostracism were less likely to perform prosocial behaviours (including PEBs). Taken together, the findings suggest that PEB is more likely to be a product of trait connectedness rather than situational connectedness. Indeed, ostracism that occurs in real life is more likely to be long-term (Li et al., 2020) meaning that people with a general sense of exclusion are more likely to show a reduction in prosocial behaviours (Twenge et al., 2007).

Relative to Deci and Ryan (1985) and Pelletier (2002), the finding that trait connectedness is related to certain PEBs can be explained via SDT. Human beings possess an innate need to belong (Ryan & Deci, 2000), and, according to SDT, the satisfaction of this need is required for optimal motivation to engage in positive behaviours (including ecological behaviours) (Pelletier, 2002). The present findings thus suggest that those with a higher sense of trait connectedness are more motivated to engage in PEBs. The finding that trait connectedness was unrelated to the proportion of environmentally-friendly choices on the PEBT, however, was not consistent with this theory. Of course, the present study only tested one of the three basic human needs outlined by Deci and Ryan (1985). Future research could thus replicate the present study and aim to investigate the fulfilment of all three needs in relation to environmental motivation.

Although the present study did detect some evidence for trait social connectedness and PEB, the finding was not consistent for all of the PEB items and the PEBT. This could be explained by findings from Schmitt et al. (2019). It could be that social connectedness only facilitates PEB if the individual in question feels connected to people who accept climate change. Indeed, Schmitt et al. (2019) found that identification with a politicised environmental group that accepts climate change is a strong predictor of PEB. Considering this finding, it could be that the participants in the present study with higher trait connectedness were not connected to individuals who accept climate change. This means that the participants may have been less pro-environmental as they did not adopt an environmental identity and thus did not adopt ecological behaviours. If those with higher trait connectedness were connected to individuals who valued ecological behaviour, then it would be expected that their PEB would be higher than those with lower trait connectedness.

The present study provided new information for the effects of social connectedness on PEB, a construct that, to our knowledge, has not been tested before in terms of PEB. Despite this, the present study is not without limitations. Firstly, one of the ways in which the present study measured PEB relied on self-report. Self-report measures of PEBs have been extensively discussed in terms of their disadvantages (e.g. Kormos & Gifford, 2014; Lange & Dewitte, 2019). For instance, self-reported ecological behaviours tend to be exaggerated and overreported as they are socially desired (Lange & Dewitte, 2019). Moreover, there are individual differences in how people interpret the items within a questionnaire. For example, Participant 1 may recycle more often than

Participant 2. Participant 1 should thus report a higher frequency of recycling behaviours (e.g. by reporting that they recycle “often”), but this does not always occur. It is unlikely that all participants have the same concepts of “sometimes” or “often.” One participant may conceptualise “often” as once a week whereas others may interpret it as a few times a week, thus causing unreliable results (Kormos & Gifford, 2014). In terms of the present study, it could be that participants in the ostracism condition over-reported their PEBs or conceptualised the language differently (relative to those in the connected condition). This could explain why there were no differences between the two conditions.

The present study controlled for self-report limitations by incorporating the PEBT (Lange et al., 2018). This task was designed to measure actual PEB within a controlled laboratory setting. Despite this, the present study used a modified version, which may have confounded the results.
The original PEBT included real lights which were illuminated if the environmentally unfriendly option was chosen. The version used in the present study did not include real lights. Using the modified version may offer an explanation as to why participants with higher trait social connectedness did not choose the bike more often, as predicted. Through not using real lights and merely having an illustration on the screen, it may have been clear to the participants that choosing the environmentally unfriendly option would not truly emit CO_2. Given that the friendly option was thus likely perceived as being no more pro-environmental and was less time consuming, participants may have been more prone to selecting this option.
From this, it could be argued that participants with a higher sense of trait connectedness were indeed more pro-environmental (relative to those with a lower sense of trait connectedness) but the lack of real lights (and subsequent CO_2) could mean that they did not take the task seriously. This could explain why an effect was not found. Future research could therefore control for this limitation by replicating the present study and including real lightbulbs. A study that controls for this limitation could expect to find an increase in PEB for higher (versus lower) trait connectedness. This would tie-in with our second hypothesis and findings from previous research (e.g. Cojuharenco et al., 2016; Li et al., 2020).

Notwithstanding the limitations, the present study has provided new insights into social connectedness and PEB. The results, though preliminary, may help us to understand how specific PEBs can be increased, thus potentially mitigating further environmental harm and preserving the natural environment.

Conclusions

The present study set out to investigate the effects of trait and situational social connectedness on PEB. The results of this investigation primarily suggest that situational social connectedness does not facilitate PEB. The present research has also suggested that trait social connectedness may only be related to specific PEBs. Relative to previous research, social connectedness was expected to increase PEB, however, flaws in the present research likely resulted

in the incongruent results. It is unfortunate that the study did not include the full version of the PEBT (i.e. the lights) as this would have made the task more lifelike. In spite of its limitations, the present study did explore a new and potential underlying factor of PEB. Future research is thus encouraged to incorporate the full PEBT which may result in a significant relationship between social connectedness and PEB.

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