

Nakedness and body image

Short title: Nakedness and body image

I feel better naked: Communal naked activity increases body appreciation by reducing social
physique anxiety.

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Abstract

Positive body image predicts several measures of happiness, well-being, and sexual functioning. Prior research has suggested a link between communal naked activity and positive body image, but has thus far not clarified either the direction or mechanisms of this relationship. This was the first randomised controlled trial of the effects of nakedness on body image. Two potential explanatory mediators of this effect were also investigated. Fifty-one participants were randomly assigned to one of two groups in which they interacted with other people either naked (naked condition) or clothed (control condition). All participants completed measures of body appreciation before and after the intervention, as well as measures of the relative perceived attractiveness of others and social physique anxiety immediately after the intervention. Perceived attractiveness of others was neither affected by the manipulation nor correlated with body appreciation. However, as expected, participants in the naked condition reported more body appreciation, an effect that was mediated by reductions in social physique anxiety. This research provides initial evidence that naked activity can lead to improvements in body image and evidence of a specific explanatory mechanism. Theoretical and practical implications are discussed.

Keywords: nakedness; naturism; body image; body appreciation; social physique anxiety

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Naturism (or nudism) is a complex concept that varies between locations and time periods. However, a central aspect of most naturist subcultures is the behaviour of going without clothes in the company of people other than one's intimate partners, or being *publicly naked* without necessarily implying a sexual context (Carr-Gomm, 2012; Deschenes, 2016; Smith & King, 2009). Nudism is generally practiced with other members of the public, rather than with individuals who are expected to represent a particular aesthetic, and nudist groups usually aim to provide a safe and non-judgemental environment (British Naturism, 2016; Deschenes, 2016).

Little empirical research has investigated the potential positive effects of public or communal nakedness. This is perhaps due to widespread taboos about or negativity toward public nudity (Booth, 1997; Carr-Gomm, 2012; Ipsos-Mori, 2011), and to assumptions about its negative psychological consequences (Negy, 2004). However, past research failed to find the assumed negative effects of naked activity on a variety of outcomes including anti-social behaviour (Okami, Olmstead, Abramson, & Pendleton, 1998), sexual behaviour, and emotional adjustment (Lewis & Janda, 1988). Rather, some research has found positive associations between naturist ideology and psychological health, including self-acceptance and body image (Negy & Winton, 2008; Story, 1979, 1984). Furthermore, recent research has also found that participation in nude activities was accompanied by large, immediate, and enduring improvements in body image, self-esteem and life satisfaction (West, 2018; 2020).

These studies suggest that nakedness-based interventions could contribute to strategies to improve body image. However, to date this research has only ever involved correlational or prospective studies (Negy & Winton, 2008; Story, 1984; West, 2018; 2020), but no randomised, controlled trials. Thus, there has not yet been a direct test of the direction of the effect (e.g., nakedness could improve body image, but positive body image could also increase the likelihood of engaging in naked activity, or some unidentified third variable

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could predict both). Prior prospective studies in particular (West, 2018; 2020) have managed these limitations to some extent. Measuring body image before and after the naked activity ruled out the interpretation that body image was driving, rather than being affected by, participation in naked activity. Also, similar results from studies conducted in very different environments (i.e., both indoor and outdoor environments) ruled out some alternative interpretations, such as the possibility that changes in body image were due to time spent in nature (Swami, Barron, & Furnham, 2018). Nonetheless, as these prospective studies lacked control conditions, it was not possible to rule out the influence of potential confounds. A randomised control trial is necessary to support the directional hypothesis that communal naked activity leads to (rather than merely accompanies) improvements in body image.

Why would nakedness improve body image?

As well as the direction of the effect, prior research has not yet identified potential mediators or mechanisms that could explain it. One suggestion made by naturist organisations themselves is that the effect occurs due to a recalibration of one's perceptions of normal bodies and thus of one's own attractiveness compared to other people (British Naturism, 2016; de Vries, 2018). Some prior research supports this suggestion. For example, Re, Coetzee and Xiao (2011) found that exposure to heavier bodies increased participants' aesthetic preference for the faces of people with higher levels of body fat. Similarly, Hummel, Rudolf, Untch, Grabhorn, and Mohr (2012) found that, after exposure to images of fatter bodies, participants subsequently rated fatter body pictures to be more realistic. The authors noted that "adaptation renormalizes perception" (p. 5), pushing the image of "what looks normal" toward the available stimuli. In that way, public, communal nakedness with non-idealised others may also recalibrate an individual's sense of what normal bodies look like away from thin or idealised images, and thus change perceptions of how their own body looks compared to others.

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Another possible explanatory mechanism is a reduction in social physique anxiety, which is a feeling or concern that one's body is being judged or evaluated (negatively) by others (Ginis, Jung, & Gauvin, 2003; Hausenblas, Brewer, & Van Raalte, 2004). Multiple studies have found that social physique anxiety negatively predicts body appreciation (e.g., Alcaraz-Ibáñez, Cren Chiminazzo, Sicilia, & Teixeira Fernandes, 2017; Jalalvand, Yoosefy, & Farahani, 2012; Swami, Miah, Noorani, & Taylor, 2014). Furthermore, other research has shown that social physique anxiety can be reduced even by relatively brief interventions (Song, Kim, & Lee, 2014).

Though research on real-world naked activity is scarce, research on technologically-mediated exposure of one's own body also hints at the potential role of social physique anxiety. For example, a study of 361 university students found that sexting (i.e., sending nude and sexually themed images one oneself) was associated with feeling more attractive and with a greater comfort with nudity (Liong & Cheng, 2019). The authors argued that portraying one's body sexually allowed participants to grow more confident and comfortable about their nudity and sexuality, and thus led to increased sexual liberation and less anxiety about nudity. Similarly, a large-scale survey of male users of a gay online dating site ($N=9,235$) investigated the use of nude pictures in dating profiles (Lemke & Merz, 2018). The authors found that most participants did use nude photographs in their profiles and that one of the primary reasons was to receive affirmation from others: favourable responses to their nakedness allowed participants to feel more positively about their bodies. Though these two studies exclusively involve *online* exposure of one's body, both suggest that allowing others to see you naked may lead to less anxiety about nudity and more positive perceptions of your own body.

It is certainly the case that activities in which one is exposed (such as being nude or even wearing a bathing suit in public) may initially increase levels of social physique anxiety

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(Lamarche, Kerr, Faulkner, Gammage, & Klentrou, 2012). However, it is a well-established and widely-used principle in cognitive, clinical, and social psychology that an effective way to reduce anxiety is to confront an individual with an anxiety-inducing stimulus or situation in a safe environment where negative consequences do not occur (Birtel & Crisp, 2012; Choy, Fyer, & Lipsitz, 2007; Crisp, Stathi, Turner, & Husnu, 2009; Foa & Kozak, 1986; Foa, Rothbaum, Riggs, & Murdock, 1991; Hirsch & Holmes, 2007; Rothbaum & Schwartz, 2002; Wolpe, 1959). Relatedly, prior research has found that positive feedback, acceptance by others, or even a lack of negative judgement may lead to improvements in body appreciation (Andrew, Tiggemann, & Clark, 2016; Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006; Goldsmith & Byers, 2016). Thus, public, communal nudity may provide a method of reducing social physique anxiety (and thus improving body image) by engaging in an anxiety-inducing activity without experiencing negative consequences.

Body Appreciation

The central dependent variable of interest in this research is body appreciation, a specific aspect of positive body image. As has been increasingly acknowledged, body image is not a simple or unitary construct, but a complex and multidimensional one (Cash, 2004; Tylka & Wood-Barcalow, 2015b). It has been shown, for example, that negative body image and positive body image are two distinct constructs, not merely two ends of the same continuum (Tylka & Wood-Barcalow, 2015b). Furthermore, both negative and positive body image are themselves multifaceted. Negative body image encompasses many constructs including body image distortion, body preoccupation, and body dissatisfaction (Harris, King, & Gordon-Larson, 2005; Tylka & Wood-Barcalow, 2015a). Positive body image also encompasses a range of constructs including conceptualizing beauty broadly, inner positivity, body acceptance, and body appreciation (Tylka & Wood-Barcalow, 2015b).

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Body appreciation has been defined as “unconditional approval and respect of the body” (Avalos, Tylka, & Wood-Barcalow, 2005, p. 287) and is one of the most well-established aspects of positive body image (Tylka & Wood-Barcalow, 2015b). It positively predicts many aspects of psychological well-being including self-esteem, proactive coping, optimism, and overall life satisfaction (Avalos et al., 2005; West, 2018). Body appreciation is also a unique predictor of better sexual functioning, including greater condom use self-efficacy, sexual assertiveness, and entitlement to pleasure (Grower & Ward, 2018), as well as more arousal, more frequent orgasm, and greater overall sexual satisfaction (Satinsky, Reece, Dennis, Sanders, & Bardzell, 2012). These associations cannot be explained by, and even supersede, associations between these positive outcomes and other, related predictors, such as body-mass index (Robbins & Reissing, 2018), age, or partner status (Satinsky et al., 2012). Body appreciation has also been found to predict lower levels of mental distress, including depression, unhealthy dieting, drive for muscularity, body dissatisfaction, body image disturbance, and disordered eating (Andrew, Tiggemann, & Clark, 2015; Avalos et al., 2005; Gillen, 2015; Halliwell, 2013). Many of these associations are equally or similarly strong for men and women (Gillen, 2015).

Finally, body appreciation has been the central variable of interest in previous research on nude activity and body image (West, 2018; 2020). It should be noted that body appreciation (as measured in both that prior research and this current research) is a trait, and not a state (Tylka & Wood-Barcalow, 2015a), which raises questions about the implications of that prior research and this current design. These are addressed more extensively in the discussion section. However, to most directly expand upon that previous research, this current research used the same measure of body appreciation that has previously been used.

Current Research

To date, the research on nakedness and body image is quite sparse. This work built upon that research by being the first randomised controlled trial to investigate the effect of communal nakedness on body appreciation. It was also the first research to investigate potential explanatory mechanisms (mediators) of the effect. Using a genuinely experimental design, it investigated whether taking part in public nudity would increase body appreciation and whether either (a) relative perceived attractiveness of others or (b) social physique anxiety mediated this effect.

Method

The necessary sample size was determined using a-priori power analyses conducted with G*Power 3 (Faul, Erdfelder, Buchner, & Lang, 2009). Assuming a large effect size (based on West, 2018) for the effect of public nudity on body image – i.e., effect size (d_z) = .80, $\alpha = .05$, power = .80 – it was found that 52 participants would be sufficient for adequate power in a 2-condition experimental design. Ethical approval for the research was obtained via the relevant university-based ethics committee.

Participants. The first author and two research assistants posted advertisements on Twitter indicating that participants were required for a London-based experiment in which they would “hang out” with others, where wine would be available, and for which they would be paid £10. A link was attached to the advertisement which, when clicked, took participants to a page clarifying the maximum number of participants that could be recruited, that the experiment involved some aspects “interacting with others” and “the way we perceive ourselves” and that the experiment would last about an hour.

Further information was included on that webpage to comply with ethical requirements of informed consent. All potential participants were informed that “responses will be anonymous”, that “you can will withdraw from this study at any time”, and that “no

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photographs or images will be taken”. Further down on the same page participants were advised that “some participants may be asked to take part in safe, non-sexual nude activity” as part of the experiment. However, this warning was included as part of a much longer text on the requirements for participation to minimize the attention drawn to the nudity aspect of the study. No other information about the hypotheses or measures was given to participants prior to participation. Potential participants then supplied contact information and were contacted to receive the date, time, and location of the experiment. This additional step was done to further protect the privacy of the participants taking part. Once at the experiment, no identifying details were recorded.

The experiment was set to take place in June 2019. Between May and June 2019, 268 individuals (50% men, 50% women) clicked on the link and expressed interest in the experiment. Sixty of these (30 men and 30 women, the maximum capacity of the site of the experiment) were offered a place on a first-come, first-serve basis with the expectation of some attrition. Fifty-two participants initially arrived to take part in the experiment. However, one participant did not complete the measures and their data could not be used (reducing the achieved power of the experiment to .79). The remaining 51 participants were 27 men and 24 women, *mean age* = 37.96, *SD* = 14.78. Most of the participants were White (46 or 90%). The rest were either of South Asian (1, 2%), East Asian (1, 2%), Middle Eastern (1, 2%) or mixed ethnicity (2, 4%). All participants received £10 for their participation.

Procedure: All participants were welcomed to the experiment and reminded of their right to withdraw at any time. Before any manipulations participants first completed a measure of body appreciation. Then they were randomly divided into two groups. Men and women were randomised separately to ensure that both groups had the same proportions of men and women. The experimental groups were then separated and each group was sent to a different room in the same building. Participants were instructed to remain in their assigned

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rooms and not to leave or interact with anyone from a different room until the experiment had ended. The building used for the experiment was a bar in North London with two separate rooms of similar size and layout, and with no direct line of sight or communication between the rooms. As is normal in a bar, in both rooms chairs were arranged at the edges of the room, and a counter was situated at one end of the room with bottles of wine and glasses to which the participant were allowed to help themselves.

Participants in the *control* condition were then read the following instructions: “Thank you for agreeing to take part in this experiment. For this experiment all you have to do is enjoy yourself in the company of the other participants.” Participants in the *naked* condition were read the following instructions: “Thank you for agreeing to take part in this experiment. For this experiment all you have to do is (1) enjoy yourself in the company of the other participants and (2) do so naked. All participants are expected to disrobe for this part of the experiment.” All participants in the naked condition disrobed without incident. Participants were again reminded of their right to withdraw from the experiment at any time.

All participants (i.e., in both rooms) were encouraged to mingle with others and reminded of the importance of treating others with dignity and respect: “This is supposed to be a pleasant, social activity and you are encouraged to have fun. However, to ensure that everyone can have fun, we expect you to treat all other participants with dignity and respect at all times. You are strictly prohibited from doing anything offensive or inappropriate, or harassing any of the other participants. Everyone should feel safe to enjoy the experiment. There will be four research assistants roaming the room at all times to ensure appropriate conduct.” At this point participants were left to their own devices to interact as people would in any normal social interaction.

After forty-five minutes all participants were asked to complete measures of the relative perceived attractiveness of others and of social physique anxiety. They also

completed the measure of body appreciation a second time. All participants were then thanked, paid, and debriefed.

Measures. As in prior, similar research (Correll, Park, Judd, & Wittenbrink, 2002; West, 2018), participants indicated their responses to all measures by marking points on straight lines, anchored by two extremes (e.g., left = *Not at all*, right = *Very much*). Scores for each item were taken as the distance between the left-most point of the response line and the participant's mark on that line. This method is useful in research on sensitive topics as it limits participants' ability to deliberately avoid answering questions meaningfully by strategically choosing a middle numerical option (as they could on a Likert scale). Scores were computed for each scale by reversing the necessary items and taking the mean of the individual scale items.

Body Appreciation. Using 5-cm lines (anchored at *Not at all* vs *Very Much*) participants completed a shortened 6-item version ($\alpha_{\text{Before}} = .83$; $\alpha_{\text{After}} = .91$) of the widely-used Body Appreciation Scale (Avalos et al., 2005) that has also been used in recent research (West, 2018). Participants indicated their agreement with the following items: "I do not feel good about my body" (reversed), "I take a positive attitude towards my body", "I respect my body", "Despite its imperfections I still like my body", "I am attentive to my body's needs", "My feelings toward my body are mostly positive". Scores ranged from 0 to 5. Higher scores indicate more positive body image.

Relative perceived attractiveness of others. Using 10-cm lines, participants completed a 5-item scale ($\alpha = .90$) adapted from Barelds, Dijkstra, Koudenburg, and Swami (2011). Participants were asked to indicate "what you thought about the other people you interacted with during this process - specifically, what you thought about their bodies compared to your own": "How much do you think they looked like models or people in magazines?" (*Much less than I do* vs. *Much more than I do*); "How attractive do you think

they were overall?” (*Much less than I am* vs. *Much more than I am*); “How attractive do you think they were to members of the opposite sex?” (*Much less than I am* vs. *Much more than I am*); “How attractive do you think they were compared to other people of the same sex?” (*Much less than I am* vs. *Much more than I am*); “How attractive do you think they were compared to other people their own age?” (*Much less than I am* vs. *Much more than I am*). Scores ranged from 0 to 10. Higher values indicated greater perceived attractiveness of others compared to the self.

Social physique anxiety. Using 10-cm lines (anchored at *Not at all* vs *Very Much*), participants completed a 6-item ($\alpha = .73$) abbreviated version of the Social Physique Anxiety Scale (Leary, 2013; McAuley & Burman, 1993). Participants were asked to indicate “how you felt other people were responding to you - specifically, how you think they responded to the way you looked physically”: “They made me feel comfortable with the appearance of my physique” (reversed), “They made me feel worried about looking too thin or overweight”, “I was bothered by thoughts that they were are evaluating my body negatively”, “I was happy with how other people responded to by body” (reversed), “The way they responded to my body made me feel attractive” (reversed), “I felt relaxed when others were looking at my physique” (reversed). Similar modified versions of this scale have been used in previous research (Song et al., 2014). Scores ranged from 0 to 10. Higher values indicated greater social physique anxiety.

Mediation analyses. These were conducted using PROCESS macros (Hayes, 2012), Model 4 with 5,000 bias-corrected bootstrap samples, 95% confidence intervals and variables standardized prior to analyses. Nakedness was included as the predictor variable, the variable identified by the results below (social physique anxiety) was included as the mediator, and body appreciation at Time 2 (after the manipulation) was the outcome variable. Body appreciation at Time 1 (before the manipulation) was included as a covariate.

Results

Descriptive statistics and correlations are reported in Table 1. Neither age nor gender differed between conditions ($.57 < p < .87$), nor did including them as covariates in the analyses alter the pattern of results. Thus, neither is considered further in these analyses. Differences in body appreciation between conditions were investigated using a 2 (Condition: Naked vs. Control) x 2 (Time: Before vs. After) mixed analysis of variance with repeated measures on the second factor and Fisher's LSD post-hoc tests to further investigate potential interactions. There was no significant main effect of nakedness, $F(1, 49) = 1.54, p = .22, \eta_p^2 = .03$. There was, however, a main effect of time, $F(1, 49) = 27.01, p < .001, \eta_p^2 = .36$. Overall, participants reported more body appreciation at the end of the experiment ($M = 3.63, SD = .11$) than at the beginning of the experiment ($M = 3.32, SD = .11$), Most relevant for the main hypotheses; there was also an interaction between nakedness and time; $F(1, 49) = 5.99, p = .018, \eta_p^2 = .11$. Supporting the hypothesis that communal nakedness increased body appreciation, participants in the naked condition reported more positive body image after the manipulation ($M = 3.83, SD = .15$) than before the manipulation ($M = 3.38, SD = .15$), $p < .001$. Participants in the control condition did not report more positive body image after the manipulation ($M = 3.43, SD = .16$) than before the manipulation ($M = 3.27, SD = .15$), $p = .07$ (see Figure 1).

Mediation analyses. To identify the potential mediators of this effect, a 2-condition (Naked vs. Clothed) multivariate between-participants analysis of variance was used to test differences between the conditions in both relative perceived attractiveness of others and social physique anxiety. These variables were not included in the previous mixed ANOVA as they were only measured at one time point. There was no effect of nakedness on the relative perceived attractiveness of others, $F(1, 49) = .21, p = .65, \eta_p^2 = .004$. There was, however, a significant effect of nakedness on social physique anxiety, $F(1, 49) = 4.44, p = .04, \eta_p^2 = .08$.

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Participants in the naked condition reported less social physique anxiety ($M = 2.22$, $SD = 1.27$) than did participants in the control condition ($M = 3.03$, $SD = 1.47$). Thus, social physique anxiety (but not perceived attractiveness of others) was identified as a potential mediator.

As expected, nakedness reduced social physique anxiety ($\beta = -.52$, $p = .048$). When the mediating effect of social physique anxiety was accounted for, nakedness no longer directly increased body appreciation ($\beta = .28$, $p = .058$). However, social physique anxiety negatively predicted body appreciation ($\beta = -.19$, $p = .022$). There was also a significant mediated effect of nudity on body appreciation via reductions in social physique anxiety, $\beta = .10$; 95% $CI = .001, .25$ (see Figure 2).

Discussion

Body appreciation, a component of positive body image, leads to a variety of positive outcomes including better sexual functioning, higher self-esteem, and greater overall life satisfaction, (Avalos et al., 2005; Grower & Ward, 2018; Satinsky et al., 2012; West, 2018). It can also reduce a number of negative outcomes including depression, body dissatisfaction, and disordered eating (Andrew et al., 2015; Avalos et al., 2005; Gillen, 2015; Halliwell, 2013). Recent research has suggested that public or communal naked activity could improve body appreciation and related outcomes (e.g., West, 2018; 2020). This current research extended that work, and was the first to use a randomised controlled trial to investigate the effects of nakedness on body image. Furthermore, this research found that social physique anxiety, but *not* perceptions of the attractiveness of others, mediated these effects. Below, these findings are discussed with relevance to theoretical and practical implications, study design and limitations, and possible directions for future research.

The investigation of the causal effects of nakedness on body image is an important step in this body of research. For many lay people at least, the assumed causal direction is

reversed: from positive body image to willingness to engage in public nakedness (see, e.g., Mitchell, 2019). This perspective also aligns with past research showing that certain demographic groups (e.g., men) are both higher in positive body image and more likely to engage in naked activity (Story, 1979, 1984). However, this current research is the first to directly investigate whether nakedness could result in improvements in body image rather than merely result from them. That said, though the explicit purpose of randomised controlled trials is to determine causal effects, it should be noted that current research on nudity and body image is still limited in both amount and scope, even with the inclusion of this current work. Thus, these results should be considered preliminary and would be strengthened by replication and further research that explicitly rules potential confounds or alternative explanations.

This study also found support for a specific explanatory mechanism; reductions in social physique anxiety. This suggests that the act of exposing one's body in a safe, non-judgemental environment may be crucial for obtaining the body-image-related benefits of communal nudity, and that the same effects would not be achieved by merely observing other people naked. Indeed, perceptions of the relative attractiveness of others were entirely unrelated to either the nakedness manipulation or body appreciation at either timepoint, suggesting that observing other naked people was not a crucial aspect of the activity.

There are some reasons, however, to be sceptical of that latter conclusion. First, it conflicts with some prior research (albeit correlational research rather than experimental research) suggesting that viewing non-idealised nakedness improves body image (West, 2018). Furthermore, it should be noted that naked spaces in the UK and Europe are characterised by an explicit, almost exaggerated downplaying of sexuality (Smith & King, 2009; West & Geering, 2018). This is often done to distance naturist groups from other stigmatised social groups such as swingers, voyeurs, or exhibitionists. Consequently,

participants may have been unwilling to report their perceptions of the attractiveness of others' bodies, as this could be interpreted as evaluating them sexually. In line with this reasoning it is noteworthy that the mean score on the measure of the perceived attractiveness of others (5.30) was not statistically distinct from the midpoint of the scale (i.e., 5.50), $t(49) = .98, p = .33$, and that this measure did not correlate with any other measures in the study. It is possible that participants were resistant to the measure or unwilling to respond to it meaningfully. Future research using more subtle measures (or even manipulations) of the traditional attractiveness of others in the naked environment could yield more enlightening results.

Practically, continued widespread taboos surrounding public nudity (Carr-Gomm, 2012) may seem to exclude the use of nudity-based interventions for the improvement of body image. Even in prior empirical research, only participants with a pre-existing interest in nakedness have been involved, leaving it unclear whether (1) non-naturists could, without prohibitive difficulty, be convinced to try naked activities and (2) whether such activities would have similar positive effects for non-naturists. This current research somewhat undermined both those concerns, finding that all participants engaged naked activity without reported incident (no participants withdrew or refused to participate), and that the positive effects of nakedness were detectable in a non-naturist identified group.

Limitations

This research benefitted from an age-diverse, gender-balanced, non-student sample, a somewhat bold and risky manipulation, before-and-after measures, and a genuinely experimental design. However, there were also some important limitations. The sample size was somewhat small, even assuming a large effect size, and fell just shy of achieving adequate power ($\beta = .79$). Thus, despite the positive findings, the reliability of these results should be strengthened through replication with larger samples.

Concerning the participants, almost all were White, and the study took place in the UK, raising questions of whether these positive effects would apply to ethnic minorities, or to individuals from different cultures. These questions are important for a number of reasons. Prior research has found significant variation in body image, self-esteem, and idealised body types between ethnic and national groups (Molloy & Herzberger, 1998). It is thus worth considering whether cross-ethnic communal nudity and intra-ethnic communal nudity would have similar or divergent effects. Furthermore, nudist movements are not independent of the cultures in which they are based. Members of some cultures are more likely to interpret public nudity as a White, Western, and sexually immoral activity (Monterrubio, 2019), and thus may experience different responses to participation. Also, nudism in predominantly White countries has a complicated history of racism and stereotyping, affecting the freedom and willingness of ethnic minorities to take part (Hoffman, 2011).

All participants were aware of the *potential* for engaging in naked activity (this was necessary for informed, ethical consent). Thus, a possible criticism of these findings could be that the positive effects would be limited only to participants with an a-priori willingness to engage in naked activity. However, it is worth noting that this research is not suggesting that communal nudity (or any other intervention) would have positive results if it were administered non-consensually or without warning. Thus, this concern seems simultaneously applicable to *all interventions* and not particularly relevant. There is the more relevant concern that participants also did not indicate their prior experience with public nudity, and thus, it remains possible that such interventions would only be beneficial for individuals who already had some prior experience of it. However, this does not align well with prior research, which found that the positive effects of public nudity seem to weaken, not strengthen, as one participates in it more frequently (West, 2018).

Concerning the measures, all were explicit and relied on self-reported questionnaire responses. Thus, a variety of factors including social norms and self-presentation biases could have affected participants' responses. Future research using implicit or more subtle measures would be useful for bolstering the interpretation of these current findings.

Also, the measure of body appreciation used in this study was a modified version of the Body Appreciation Scale. This version was used to keep the measures brief, easy to complete, and in line with prior research on the effects of nudity (West, 2018). However, it had a number of limitations. Most notably, body appreciation, as measured by the Body Appreciation Scale, is conceptualised as a trait (a stable and enduring characteristic), not a state (a temporary way of being). This raises questions about the plausibility of trait-level change after the intervention. One possible interpretation is that trait-level changes could occur through (repeated) state-level changes as has been theorised by some researchers (Wrzus & Roberts, 2017). Traits can be understood as an average of state expressions across time and situations (Fleeson, 2001; Fleeson & Jayawickreme, 2015). Thus, a state-level change due to the intervention may still be detectable in trait-level measures. Alternatively, it is possible that the intervention caused a more enduring change. Prior, prospective research on nudity-based interventions has found that changes in body appreciation endured for at least a month after the intervention (West, 2020). Future research specifically designed to clarify the stability and durability of changes in body appreciation would add meaningfully to our understanding of nudity's effects.

Finally measures of other potential outcomes would be useful for expanding upon the findings of this current research. This could include other positive aspects of body image, such as broad conceptualisation of beauty. In a similar vein, future research could investigate potential *negative* effects of such interventions. Prior research on technologically-mediated exposure (e.g., sexting) has found negative effects (e.g., body surveillance and body shame)

as well as positive ones (Liong & Cheng, 2019). Thus, awareness that communal nakedness could have a range of effects, not just positive ones, is important for its consideration as a body-image improving strategy.

Conclusion

As society becomes more diverse and tolerant of varied activities, we can find new methods of confronting old problems. This research adds to the scant work to date on nakedness and body image, and is the first to find evidence that public nakedness leads to improvements in body image and that this effect is mediated by reductions in social physique anxiety. This research is still in its relative infancy and must be seen as tentative rather than conclusive. Nonetheless, given this slowly accumulating body of evidence, it is not unreasonable to invest further resources into investigating a low-cost, widely available, and potentially effective means of improving body image and related outcomes.

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Tables

Table 1. Descriptive statistics and correlations between variables.

		(1)	(2)	(3)	(4)
Time 1: Body appreciation (1)					
Perceived attractiveness of others (2)		-.17			
Social physique anxiety (3)		.37**	.12		
Time 2: Body appreciation (4)		.84***	-.15	-.51***	
Naked condition					
	M	3.38	5.37	2.22	3.83
	SD	.74	1.49	1.27	.67
Control condition					
	M	3.27	5.19	3.03	3.43
	SD	.78	1.37	1.47	.88
Overall					
	M	3.32	5.29	2.61	3.63
	SD	.75	1.43	1.42	.80

Notes: (1) * = $p < .05$; ** = $p < .01$; *** = $p < .001$;

(2) Scores for perceived attractiveness of others and social physique anxiety range from 0 to 10. Scores for body appreciation range from 0 to 5.

Figures

Figure 1. Body appreciation scores before and after the intervention in the naked and control conditions.

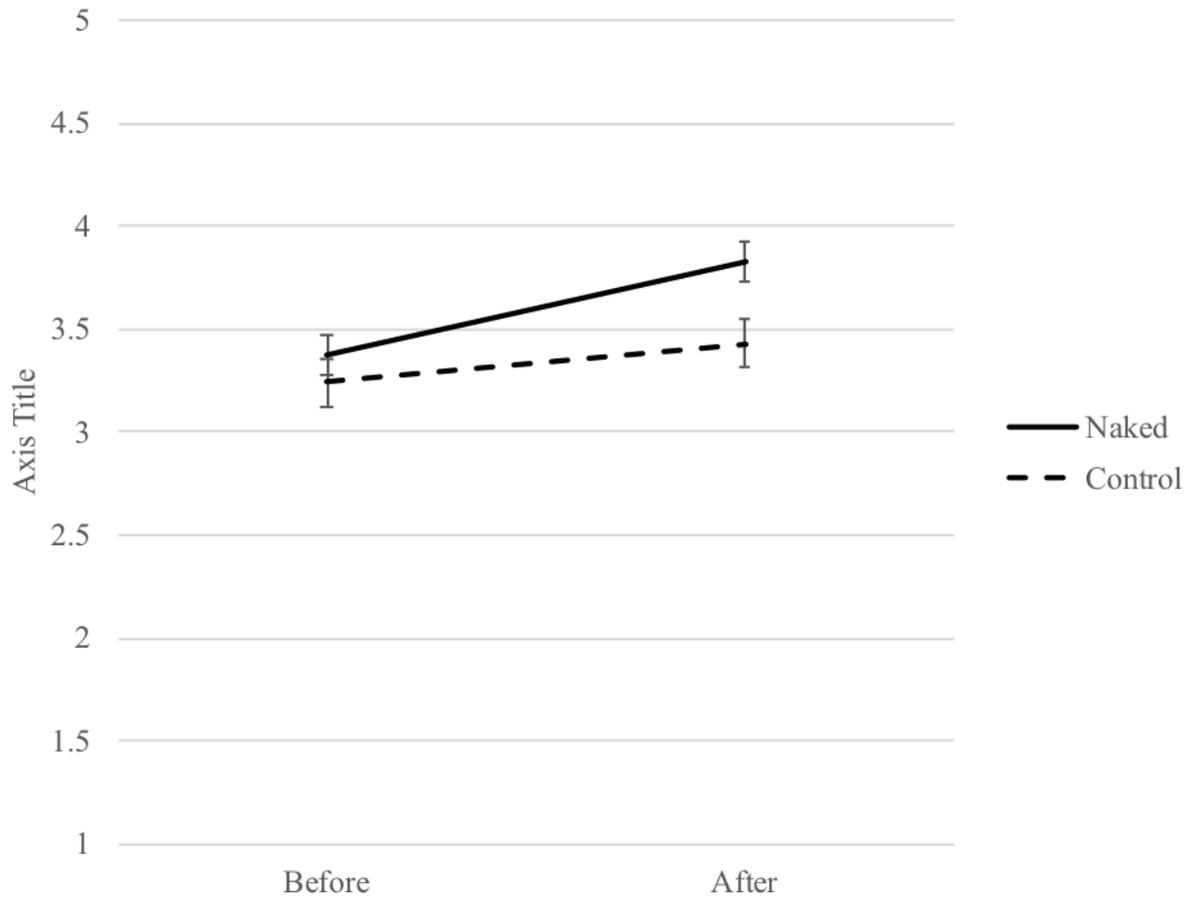
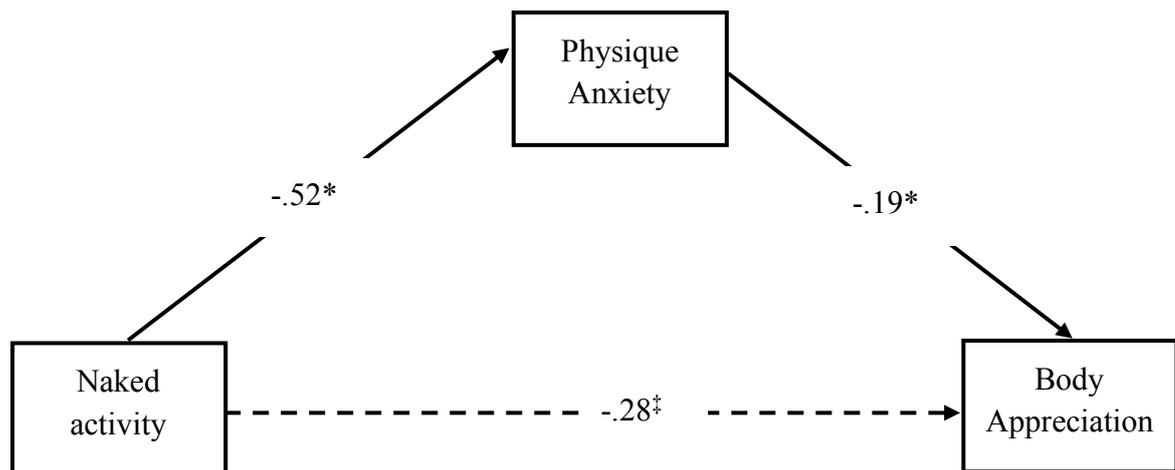


Figure 2. The effect of nakedness on body appreciation mediated by social physique anxiety.



Note: 1) $^\ddagger = p = .058$; $* = p < .05$;

2) The indirect effect of naked activity on body appreciation was $\beta = .10$, 95 % $CI = .001, .25$

3) Body appreciation at Time 1 was included as a covariate in the model

Conflict of interest statement:

Part of this research was funded (£682.85) by British Naturism.

Informed Consent

This research used human participants, all of whom were fully informed about the nature and activities of the research before taking part. All participants signed consent forms giving explicit, positive consent to their participation and the use of their data. All participants were fully debriefed concerning the hypotheses of the research at the end of the study and allowed to withdraw their data if they desired.

Compliance of ethical standard statement

Ethical approval for the research was obtained via the relevant university-based ethics committee, which complied with the standards of the British Psychological Society's ethical guidelines for research with humans.