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RESEARCH

How thin is too thin? Evidence from visual aftereffects in body size estimation

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Abstract

Exposure to unrealistic body ideals on social media may distort individuals' body image, potentially leading to increased body dissatisfaction. One proposed mechanism for this phenomenon is visual adaptation: prolonged exposure to thin bodies can shift subsequent judgments of body size, leading to subsequent bodies being perceived as fatter than they are. This study investigated whether exposure to body images of varying thinness alters judgments of body size relative to one's own bodyand whether individual differences in body image concerns moderate these aftereffects. Thirty-four young women completed a psychophysical task in which they judged whether test bodies were thinner or fatter than themselves, following adaptation to either an extremely thin or a slightly thinner (but closer-to-self) body. Results showed stronger aftereffects following exposure to extreme-thin adaptors, with lower points of subjective equality (PSEs), indicating a shift toward judging thinner bodies as equivalent to one's own body size. The point of subjective equality (PSE) is the body size at which participants are equally likely to judge a test body as thinner or fatter than their own. Adaptation to both close-thin and extreme-thin bodies resulted in lower PSEs, consistent with a contrastive aftereffect in which test stimuli were perceived as larger following exposure to thin adaptors. Higher body concern was positively associated with larger baseline PSEs, indicating greater perceived body size. These findings support the role of visual adaptation in shaping perceptual judgments of body size and suggest that individual differences in body concern influence this process. Opponent coding may underlie this mechanism, as greater aftereffects were observed for more extreme adaptors.

Keywords Body weight estimation · Body size estimation · Body concern · Adaptation effect · Body image

Introduction

Body image dissatisfaction is a prevalent issue among young women, often influenced by sociocultural ideals of thinness perpetuated through media and social networks (Jiotsa et al., 2021; Rodgers et al., 2020). These ideals promote a narrow standard of beauty that various individuals find difficult to attain, resulting in negative self-evaluations and greater risk for disordered eating behaviors and psychological distress (Rodgers et al., 2015; Stice & Whitenton, 2002). Platforms such as Instagram (Huang et al., 2021; Talbot et al., 2017) and TikTok (Munro et al., 2024; Pryde et al., 2024; Raiter et al., 2023) frequently portray bodies that are significantly thinner, more muscular, or more conventionally attractive than those in the general population. Repeated exposure to such images has been linked to increased body dissatisfaction, especially among young women, who are disproportionately targeted by thin-ideal content (Myers & Crowther, 2009; Saiphoo & Vahedi, 2019).

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The internalization of these body ideals can distort how individuals perceive and evaluate their own bodies. According to sociocultural models, people compare themselves to perceived standards of beauty; when these standards are unattainably thin, upward comparisons often lead to dissatisfaction with one's body shape or size(Festinger, 1954; Strahan et al., 2006). Over time, these comparisons may contribute to the internalization of thin ideals—where people adopt these unrealistic standards as personal goals or references for self-evaluation (Tiggemann & Slater, 2004). Significantly, these comparisons may not only influence attitudes and emotions but also perceptual representations of body size (Brooks et al. 2020a, b; Cornelissen et al. 2015; Stephen et al. 2018).

Beyond sociocultural theories, recent research has explored how exposure to idealized body images might shape perceptual representations of body size. Specifically, visual adaptation—a fundamental property of sensory systems—provides a plausible mechanism through which repeated exposure to thin bodies may alter perceived body size. Visual adaptation occurs when prolonged exposure to a specific stimulus alters the perception of subsequent stimuli along the same dimension, typically in the opposite direction (Webster, 2015). At the neural level, such aftereffects are thought to arise from recalibration within populations of neurons tuned to specific stimulus dimensions. In the context of body perception, adaptation to thin bodies can cause average or even underweight bodies—including one's own—to appear larger, potentially reinforcing body dissatisfaction.

Experimental research has demonstrated robust body-form aftereffects, whereby exposure to very thin or fat bodies can shift judgments of "normal" body size (Glauert et al., 2009; Hummel et al., 2012; Palumbo et al., 2013; Sturman et al., 2017; Winkler & Rhodes, 2005), affecting self-estimated body size (Ambroziak et al., 2019; Bratch et al., 2021), and modulating perceived attractiveness (Brooks et al. 2016, 2020a, b; Challinor et al. 2017). These effects are particularly pronounced in individuals with elevated body image concerns, as measured by self-report instruments assessing preoccupation with body shape (House et al., 2022; Mohr et al., 2016; Nazareth et al., 2020; Stephen et al., 2018). Importantly, converging neural and behavioral evidence suggests that these aftereffects arise from recalibration within high-level body-selective visual mechanisms, which generalize across identities, viewpoints, and race, and are selective for different body dimensions such as fat and muscle mass (Brooks et al. 2020a, b; Hummel et al. 2012; Sturman et al. 2017).

A growing body of work indicates that body-form aftereffects reflect norm-based or opponent coding mechanisms, like those proposed for face perception. For example, it has been shown that body adaptation effects depend on stimulus orientation, supporting a high-level, object-based representation of body form (Brooks et al., 2018). Also, adaptation effects transfer fully between Asian and Caucasian body stimuli, suggesting race-general neural encoding of body size (Gould-Fensom et al., 2019). Further, contingent- and cross-adaptation paradigms revealed partly distinct yet overlapping mechanisms for perceiving one's own versus another's body (Brooks et al., 2016). Together, these findings indicate that body-size adaptation operates at a representational level that supports cross-adaptation across identities, consistent with partially shared neural mechanisms. In addition, these insights have been extended to musculature, showing that exposure to highly or minimally muscled bodies shifts perceived muscularity in specific body regions, indicating recalibration at the neural encoding level for muscle dimensions(Ip et al., 2024). Finally, body-form aftereffects remain invariant across substantial changes in viewpoint and pose, underscoring high-level form representations tolerant to drastic retinal transformations(Sekunova et al., 2013). Together, these findings support the view that visual exposure recalibrates perceptual norms for body size rather than merely influencing low-level image properties.

Within this framework, the magnitude of visual aftereffects can provide insight into the underlying neural coding mechanisms. In multichannel coding systems, the strongest aftereffects are typically observed when adaptor and test stimuli are perceptually similar, due to overlapping tuning functions. In contrast, opponent coding models predict larger aftereffects for more extreme adaptors, as perception is determined by the relative activity of channels tuned to opposite ends of a continuum (Pond et al., 2013; Webster & Leonard, 2008; Winkler & Rhodes, 2005). Applying this logic to body-size perception allows adaptation paradigms to distinguish among these competing accounts.

Thus, the visual system may not only passively register body-related information but may also dynamically recalibrate based on exposure to socioculturally valued body types, with magnitude and selectivity of aftereffects shaped by both stimulus extremity and individual differences in body-image concerns(Brooks et al. 2020a, b; Brooks et al. 2020a, b; Challinor et al. 2017). While previous studies have linked visual adaptation effects to thin-ideal internalisation, this construct is conceptually distinct from body image concern. Thin-ideal internalisation refers to the endorsement of culturally prescribed appearance standards, whereas body image concern captures the evaluative and affective dimension of body image disturbance (Thompson & Stice, 2001; Tiggemann & Slater, 2004). The present study focuses on body image concern, which may bias baseline perceptual representations independently of adaptation strength(Cooper et al., 1987; Stephen et al., 2018).

The present study investigates whether exposure to female body images that differ in thinness—specifically, extreme-thin versus close-thin bodies—alters perceived body size in young women, and whether the magnitude of this adaptation effect is moderated by individual differences in body image concerns. Using a psychophysical task, participants judged whether a presented female body was thinner or fatter than themselves following adaptation to either an extreme-thin or a close-thin adaptor.

Young women were selected as the target population for three reasons: (1) body dissatisfaction and thin-ideal internalization are particularly prevalent in this group, (2) prior work indicates stronger and more reliable body-size adaptation effects when observers view same-gender stimuli, and (3) restricting the sample reduces variance associated with gender-related perceptual and attitudinal differences, thereby increasing sensitivity to adaptation effects (Brooks et al. 2020a, b; Brooks et al. 2020a, b; Grogan 2021; Wardle et al. 2006).

We tested whether adaptor extremity modulates the magnitude of body-size aftereffects. From a social-comparison perspective, one might expect stronger aftereffects following adaptation to a close-thin body, as stimuli that are more similar to one's own body may promote greater identification and self-referential comparison. In contrast, extremely thin bodies may be perceived as less self-relevant and therefore exert a weaker influence. At the same time, perceptual coding accounts of adaptation make different predictions regarding adaptor extremity. For example, opponent coding models predict larger aftereffects following more extreme adaptors, whereas multichannel models predict stronger effects when adaptor and test stimuli are perceptually similar. Thus, examining adaptor extremity enables the present study to inform both social-comparison and perceptual-coding accounts.

Materials and methods

Participants

Thirty-four female subjects participated in the experiment (mean age: 26.4 yrs., SD: 5.8 yrs., range: 18–38 yrs.). Participants self-reported height and weight, from which BMI values were calculated (mean BMI: 23.6, SD: 3.8, range 17.5–32.4). Self-reported measures were used for practical and ethical reasons, as weighting practices might distress participants and bias them in the task, consistent with previous studies in this literature (Ambroziak et al., 2019; Gorber et al., 2007). Importantly, these values were not used to generate the body stimuli directly, but only to contextualize participants' body size.

Data from an additional 5 participants were excluded from the analysis (3 due to technical difficulties). One participant was excluded because her self-reported BMI was outside the stimulus range and because an unusual discrepancy between self-reported BMI and the BMI corresponding to her point of subjective equality (PSE) was observed, exceeding that observed in all other participants. One additional participant was excluded due to extreme outliers between the baseline and adaptation phases. All participants had normal or corrected-to-normal vision.

Participants provided written informed consent and were compensated for their participation or awarded course credit. The procedures were approved by the Ethics Committee of the School of Psychological Sciences, Birkbeck University of London.

Previous studies from our lab using the same stimuli have found strong adaptation aftereffects comparing adaptation and baseline conditions (Ambroziak et al., 2019; Myga et al., 2024). Across the four studies in those two papers, the average effect size for adaptation to a thin body was Cohen's $d = 1.69$. A power analysis using G*Power 3.1 (Faul et al., 2007) indicated that 5 participants were required to achieve 0.8 statistical power to detect this effect. The key question here, however, concerns the difference in the magnitude of this adaptation between the two types of adaptors, which may have a smaller effect size. A second power analysis showed that our sample of 34 participants has a statistical power of 0.8 to detect an effect as small as Cohen's $d = 0.5$. Thus, we believe that our sample size is sufficiently powered to address this issue. The study was powered to detect within-subject adaptation effects. Correlational analyses involving individual differences were exploratory and may be underpowered; these findings should therefore be interpreted with caution.

Design

The experiment followed a within-subjects design with two adaptor conditions (extreme-thin and close-thin). Each condition consisted of two phases: a baseline phase and an adaptation phase. In the baseline phase, participants judged whether test bodies were thinner or fatter than their own body, thereby estimating a baseline point of subjective equality (PSE). In the adaptation phase, participants were first exposed to an adaptor body and then completed the same judgment task, with the adaptor presented before each test trial to maintain adaptation. The order of adaptor conditions was counterbalanced across participants, with a 10-minute break between conditions to allow adaptation effects to dissipate. During this break, participants were instructed to rest quietly and to avoid viewing body-related images or engaging in activities that could induce additional visual adaptation, such as using their cell phone. They could either go to the bathroom quickly or drink water, but most stayed and rested.

Materials

BSQ-34

The Body Shape Questionnaire is a self-report measure of body shape preoccupations (Cooper et al., 1987). The BSQ demonstrated excellent internal consistency, with Cronbach's α values typically exceeding 0.95, and good test–retest reliability over 2–4 weeks ($r \approx .88$), indicating stability of scores over time. Subsequent studies in the UK have replicated these findings, reporting similarly high internal consistency (α values in the 0.90–0.97 range) and supporting the BSQ's robust reliability and construct validity in both clinical and non-clinical populations (Evans & Dolan, 1993; Rosen et al., 1996).

A score of 1 to 6 is assigned to each item, with 1 representing "Never" and 6 representing "Always". The 34 items are summed to produce the overall score, which theoretically ranges from 34 to 204. It has been proposed (Taylor, 1987) that those who score below 80 do not show body concern, whereas those who obtain higher scores do, with ranges of mild (80 to 110), moderate (111 to 140), and marked (over 140) concern. Participants were grouped based on whether they reported body concerns (mild, moderate, or marked; see Table 1). The order of questionnaire administration was counterbalanced as evenly as possible across participants: sixteen participants completed the BSQ after the experimental task, whereas eighteen completed it beforehand. This slight imbalance reflects practical constraints during data collection. The order of presentation did not affect the final score ($t = 1.08$, $p = .21$). The BSQ was selected because it explicitly measures the evaluative–attitudinal component of body image disturbance, the focus of the present study. Other dimensions of body image (e.g., perceptual accuracy, behavioural avoidance) were beyond the scope of this design. Group labels are reported for descriptive purposes only; all inferential analyses treated BSQ as a continuous variable.

Table 1 Description statistics of body concern measured by the BSQ-34

Body Concern	*N*	Mean (SD)	Min-Max
Yes	12	119.0 (28.7)	80–177
No	22	54.5 (12.6)	37–78

SD=standard deviation. Participants were grouped descriptively based on whether their BSQ scores fell below or above the recommended clinical cut-off. BSQ scores were treated as a continuous variable in all inferential analyses

Stimuli

The stimulus set created by Ambroziak and colleagues (2019) was used in the present study (see Fig. 1). The stimuli were generated using the Genesis 2 Model in Daz Studio 4.8 software. To approximate the BMI of each avatar, they applied a formula that correlates waist-to-hip ratio (WHR) to BMI for white British women of reproductive age (Cornelissen et al., 2009), based on data from the 2003 Health Survey for England: WHR = (2.057*BMI* + *29.67)/(1.842*BMI + 56.004) (Health Survey for England, 2003). The waist and hip measurements of 7 Hand and Body Adaptation avatars were adjusted using the Universal Sizing Apparatus (Rocketship Technologies Inc., http://rocketship3d.com/*)*. This tool was used to systematically manipulate waist and hip dimensions while keeping height, posture, and overall body structure constant, thereby generating a smooth, biologically realistic continuum of body sizes for psychophysical testing. Each avatar's height was fixed at 170 cm, and the bodies were shown in frontal view. The BMI of these bodies ranged from 13 (emaciated) to 35 (obese), with a 0.25 BMI-unit increase between each stimulus (totalling 89 images). The extreme-thin adaptor corresponded to a body with an estimated BMI of 13, representing the lower extreme of the stimulus continuum. The close-thin adaptor was defined individually for each participant as a body approximately 5 BMI units thinner than their baseline PSE, ensuring that the adaptor was thinner than the participant's perceived body size while remaining closer to it than the extreme-thin stimulus. These values were chosen to operationalise perceptual extremity rather than to reflect clinical BMI categories. The bodies were manipulated to vary biologically realistically. Adaptor and test stimuli were drawn from the same set of avatar identities, consistent with previous studies that used this set. This approach maximizes adaptation strength while maintaining variability across trials.

The present study included only two adaptor types—an extreme-thin and a close-thin adaptor—to directly test whether the magnitude of body size adaptation depends on stimulus extremity. This design was motivated by theoretical accounts of visual coding, which make distinct predictions for adaptation to extreme versus nearby stimuli (e.g., opponent-coding vs. multichannel models). Specifically, comparing a highly extreme adaptor with a participant-specific close-thin adaptor allows a targeted test of whether larger aftereffects emerge for more extreme body sizes, as predicted by opponent-coding models. The study was not designed to map the full body-size continuum; instead, it aimed to contrast two theoretically informative points along this continuum. Expanding this approach to include additional adaptor levels (e.g., close-fat or extreme-fat) is an important direction for future research.

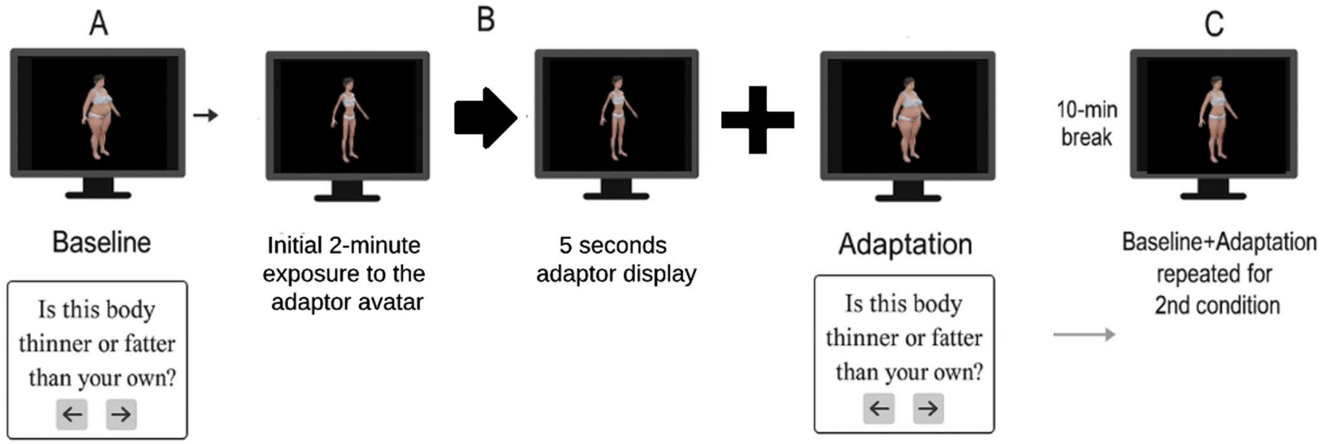

Fig. 1 *Note.* Experiment layout. (**A**) baseline phase: participants judged whether test bodies were thinner or fatter than their own body following the prompt "*Is this body thinner or fatter than your own*?". Baseline PSEs were estimated using a Bayesian adaptive staircase procedure. As an example, a BMI 35 stimulus is shown. (**B**) Adaptation phase: participants were initially exposed to an adaptor body for 2 minutes (example shown: extreme-thin, bmi 13), followed by trials in which the adaptor preceded each test body to maintain adaptation. (**C**) second adaptor condition: after a 10-minute break, the baseline and adaptation phases were repeated with the alternative adaptor (close-thin or extreme-thin; order counterbalanced across participants, example: BMI 25). Both adaptation conditions followed the same structure; only the extremity of the adaptor differed

It is important to note that the numerical BMI values assigned to stimuli are approximate and may not align exactly with true BMIs in the physical world. Critically, however, the experimental logic of the study does not depend on the numerical BMI values of stimuli corresponding to real BMI values. Several studies in our lab used these stimuli and observed strong adaptation aftereffects (Ambroziak et al., 2019, 2023; Myga et al., 2024). Stimuli and raw data are available on the Open Science Framework webpage: https://osf.io/5avq4/.

Procedure

Procedures were like those used in previous research in our lab investigating adaptation aftereffects for body size (Ambroziak et al., 2019, 2023; Myga et al., 2024). The experiment followed a clear three-stage structure comprising a baseline phase, an adaptation phase, and a test (comparison) phase, embedded within each block (see Fig. 1). In the baseline phase, participants performed a body-size comparison task without prior adaptation, yielding a reference measure of perceived own body size (point of subjective equality; PSE). In the adaptation phase, participants were first exposed to a prolonged adaptor stimulus, followed by repeated test trials identical to those in the baseline phase, allowing adaptation effects to be quantified as shifts in PSE relative to baseline.

The paradigm shows that the point of subjective equality for the comparison judgments (PSE, i.e., the stimulus for which the participant was equally likely to judge it as fatter or thinner) shifts depending on the type of adaptation that preceded it.

The key manipulation in the present study was the degree to which the adapting stimulus was extreme (i.e., emaciated). Two conditions were tested: in the *extreme-thin* condition, the adapting stimulus was an extremely thin body (BMI 13); in the *close-thin* condition, in contrast, the adapting stimulus was selected to be 5 BMI units thinner than the participant's judgment of their body size, obtained from the baseline phase before adaptation. On average, participants obtained a close-thin adaptor score of 19.9 (SD = 3.11), ranging from 14.8 to 27.3. Importantly, although this adaptor was defined relative to perceived body size, all close-thin adaptors were thinner than each participant's baseline PSE and fell within the lower portion of the stimulus continuum, ensuring that they constituted a perceptually thin reference rather than a neutral or average body.

Participants sat approximately 40 cm from a screen monitor, with head movements unrestricted. Images were presented in the center of a 24-inch screen (resolution: 1,900 × 1,200 pixels; refresh rate: 60 Hz), on a black background. The height of each image was 24 cm. We presented stimuli using Psychtoolbox (Brainard & Vision, 1997) in MATLAB (Mathworks, Natick, MA, USA).

The experiment comprised four blocks: two baseline blocks and two adaptation blocks, one for each adaptor type (extreme-thin and close-thin). Each adaptor type was always preceded by its own baseline block, ensuring that adaptation effects were calculated relative to a condition-specific baseline. Participants compared the images to their own bodies, answering, "Is this body thinner or fatter than your own?"

Both conditions started with the baseline phase. Each trial began with a blank screen (1,000 ms), followed by a fixation cross (1,000 ms) that turned from black to red to indicate the beginning of a new trial. At the beginning of each block, the question “Is this body fatter or thinner than your own?” appeared on the screen. This was followed by a 1,000-ms presentation of a test body selected from the stimulus set based on the participant’s response history in previous trials.

This calculation was done using a Bayesian adaptive algorithm QUEST (Watson & Pelli, 1983). The 72 trials within each block comprised two alternating QUEST staircases, one starting with a thin body (BMI = 18) and the other with an obese body (BMI = 30). At the end of each block, we calculated the PSE for each staircase and averaged them to obtain a single estimate for each condition, separately for the baseline and adaptation phases.

After the baseline phase, the adaptation phase began with an initial 2-minute exposure to the adaptor avatar. Following this initial adaptation period, participants completed a series of test trials identical to those in the baseline phase, with the adaptor presented briefly before each test stimulus to maintain adaptation. The adapter stimulus flickered every 4 s, disappearing for 500 ms and appearing again to maintain attention. In each trial, the adaptor was displayed for 5 s, followed by a 1-second blank screen, and then the test stimulus. Test trials were otherwise identical to those in the baseline phase and were controlled by the QUEST adaptive staircase procedure.

During the task, participants did not look at the experimenter seated behind them to avoid distraction. Participants took a 10-minute break between the two adaptation procedures (extreme-thin and close-thin) to allow adaptation effects to dissipate. The order of adaptor conditions was counterbalanced across participants.

No cover task was included during the adaptation phase. This design choice was made to maintain consistency with previous body-size adaptation paradigms, in which sustained viewing of the adaptor without a concurrent task has been shown to produce robust, reliable aftereffects (Ambroziak et al., 2019; Hummel et al., 2012; Sturman et al., 2017). In these paradigms, prolonged exposure itself is sufficient to induce high-level body-form adaptation. Unlike some facial adaptation studies that use cover tasks to control attention, body adaptation studies have often prioritised uninterrupted visual exposure to the adaptor. The absence of a cover task may have allowed participants to direct attention to the body stimuli; however, this is unlikely to account for the differential effects observed between extreme-thin and close-thin adaptors, as both conditions were identical in task demands and viewing duration. Any attentional effects would therefore add non-systematic variance rather than biasing one condition over the other. Nevertheless, future studies could use cover tasks during adaptation to more precisely dissociate the contributions of attention and perceptual recalibration to body size aftereffects.

Data analysis

All statistical analyses were conducted using R version 2025.0.0 (R Core Team, 2025). Assumptions for parametric repeated-measures ANCOVA were evaluated prior to selecting the final analysis strategy. Normality of residuals was assessed using the Shapiro–Wilk test in R, homogeneity of variances was tested with Levene’s test in the car package (Fox & Weisberg, 2019), and homogeneity of regression slopes was assessed by fitting an interaction term between the covariate and the within-subject groups.

All assumptions were met. Therefore, parametric repeated-measures ANCOVA was conducted using the aov() function. The model included two within-subjects factors: condition (thin vs. close) and time (baseline vs. adaptation), with PSE (Point of Subjective Equality) as the dependent variable and body concern, measured with the BSQ, as a continuous covariate. Post hoc contrasts were planned if any significant main effects or interactions were observed. Visualizations were created using the ggplot2 package (Wickham, 2016). Although BSQ scores showed some positive skew, ANCOVA residuals met normality assumptions, and correlation analyses were therefore considered appropriate.

Results

A repeated-measures ANCOVA was conducted to examine the effects of condition (thin vs. close) and time (baseline vs. adaptation) on PSE, while controlling for individual differences in body concern (see Table 2; Fig. 2).

The analysis revealed a significant effect of body concern, $F(1, 32) = 7.06$, $p = .012$, $\eta^2_p = 0.18$, with higher PSEs among participants who reported greater concern. Time had a strong effect, $F(1,33) = 115.4$, $p < .001$, $\eta^2_p = 0.51$, with baseline PSEs higher than adaptation PSEs in both conditions. Specifically, in the close-thin condition, mean PSE

Table 2 Note: This data is mandatory. Please provide

Adaptor type	Phase	Body Concern	
		Yes	No
Close-thin	Baseline	26.0 (3.1)	24.0 (2.8)
	Adaptation	24.6 (4.0)	22.2 (2.8)
Extreme thin	Baseline	26.3 (3.1)	24.4 (2.7)
	Adaptation	23.6 (4.2)	21.4 (2.5)

Description statistics of PSE for both phases and conditions for baseline and adaptation phases, presented separately for participants with and without body concern. Body concern grouping is shown for descriptive purposes only and was not treated as a categorical factor in inferential analyses. Mean (standard deviation)

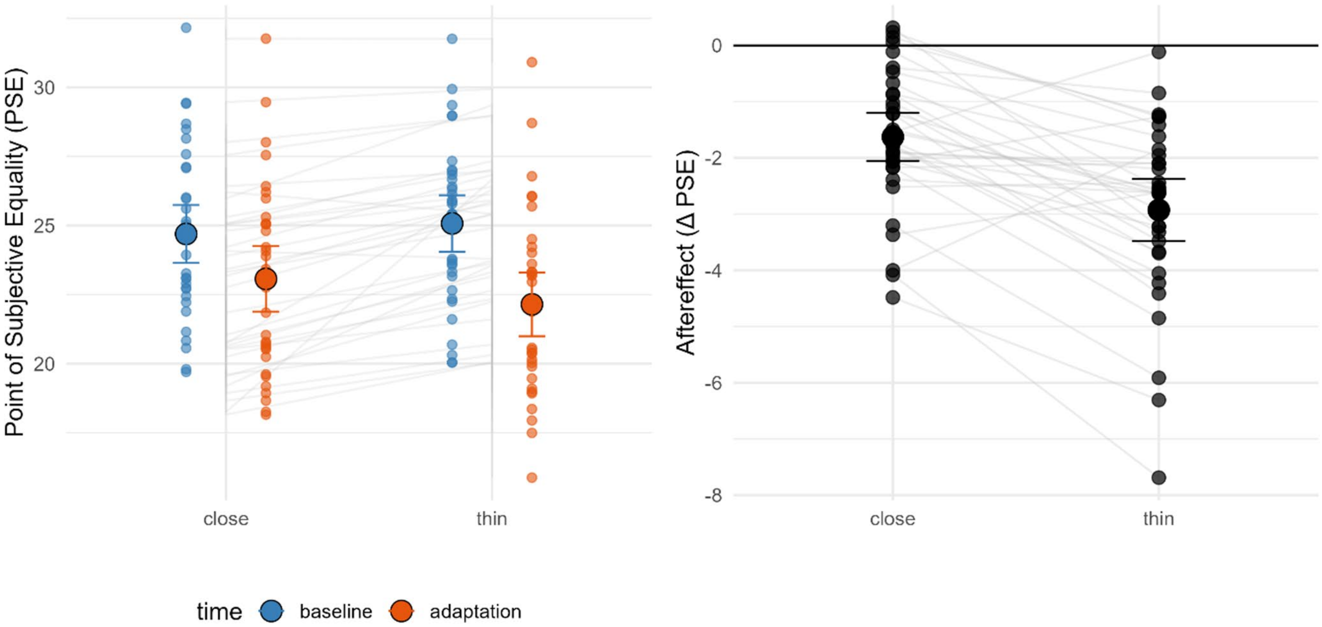

Fig. 2 *Note:* The left panel displays PSEs for each condition. Adaptation to both close and extreme adaptors produced clear reductions in PSEs. Right panel: Aftereffects are quantified as the difference in PSE between adaptation and baseline conditions. The magnitude of adaptation was larger for the extreme than for close adaptors. Error bars represent 95% confidence intervals. A direct comparison of aftereffect magnitudes confirmed that adaptation was significantly stronger in the extreme-thin than in the close-thin condition (paired *t*-test, $p < .001$)

decreased from baseline (M = 24.69, SD = 3.01) to adaptation (M = 23.07, SD = 3.39). In the extreme-thin condition, mean PSE decreased from baseline (M = 25.07, SD = 2.92) to adaptation (M = 22.14, SD = 3.31). Condition (body type) did not reach significance, $F(1,33) = 2.71$, $p = .109$, $\eta^2_p = 0.002$. There was a significant time × condition interaction, $F(1,33) = 29.73$, $p < .001$, $\eta^2_p = 0.15$, reflecting a larger adaptation magnitude in the extreme-thin condition relative to the close-thin condition. No other interactions involving body concern were significant ($\eta^2_p \leq 0.008$).

Paired-samples t-tests were conducted to examine adaptation effects separately for each body type. These paired-samples comparisons are mathematically equivalent to one-sample t-tests testing whether the adaptation-induced change in PSE differs from zero and therefore provide a direct test of the presence of visual adaptation aftereffects in each condition. For close-thin bodies, PSEs decreased significantly from baseline (M = 24.69, SD = 3.01) to adaptation (M = 23.07, SD = 3.39), $t(33) = 7.75$, $p < .001$, Cohen's $d = 1.33$. For extreme-thin bodies, the adaptation effect was even stronger, with PSEs decreasing from baseline (M = 25.07, SD = 2.92) to adaptation (M = 22.14, SD = 3.31), $t(33) = 10.74$, $p < .001$, Cohen's $d = 1.84$. Both adaptor types showed significant decreases in PSE from baseline to adaptation, with a larger mean difference in the extreme-thin condition.

To directly test whether the magnitude of adaptation differed between adaptor conditions, we compared PSE change scores (baseline-adaptation) between the close-thin and extreme-thin conditions using a paired-samples t-test. This analysis revealed that the magnitude of adaptation was significantly larger following exposure to the extreme-thin adaptor than to the close-thin adaptor, $t(33) = 5.45$, $p < .001$, 95% CI [0.82, 1.79]. Thus, exposure to extremely thin bodies produced a reliably stronger perceptual aftereffect than exposure to moderately thin bodies.

Furthermore, to directly assess whether adaptation differed between the two thin-body adaptor conditions, we compared post-adaptation PSEs following extreme-thin and close-thin adaptation. A paired-samples t-test revealed significantly smaller PSEs following extreme-thin adaptation compared to close-thin adaptation, $t(33) = 4.65$, $p < .0001$, Cohen's $d = 0.80$, indicating a stronger bias following exposure to extreme-thin bodies.

Relationship between body concern and body size estimation

To examine whether perceptual aftereffects of body size varied as a function of body concern, we tested the relationship between BSQ scores and both baseline body size estimates and adaptation magnitude. Given the continuous nature of the variables and the approximate normality of their distributions, Pearson's r was deemed appropriate (see Fig. 3).

Body concern was positively associated with baseline PSE values in both conditions. Higher BSQ scores were associated with larger baseline PSEs in the close-thin condition ($r = .40$, $p = .018$) and in the extreme-thin condition (r

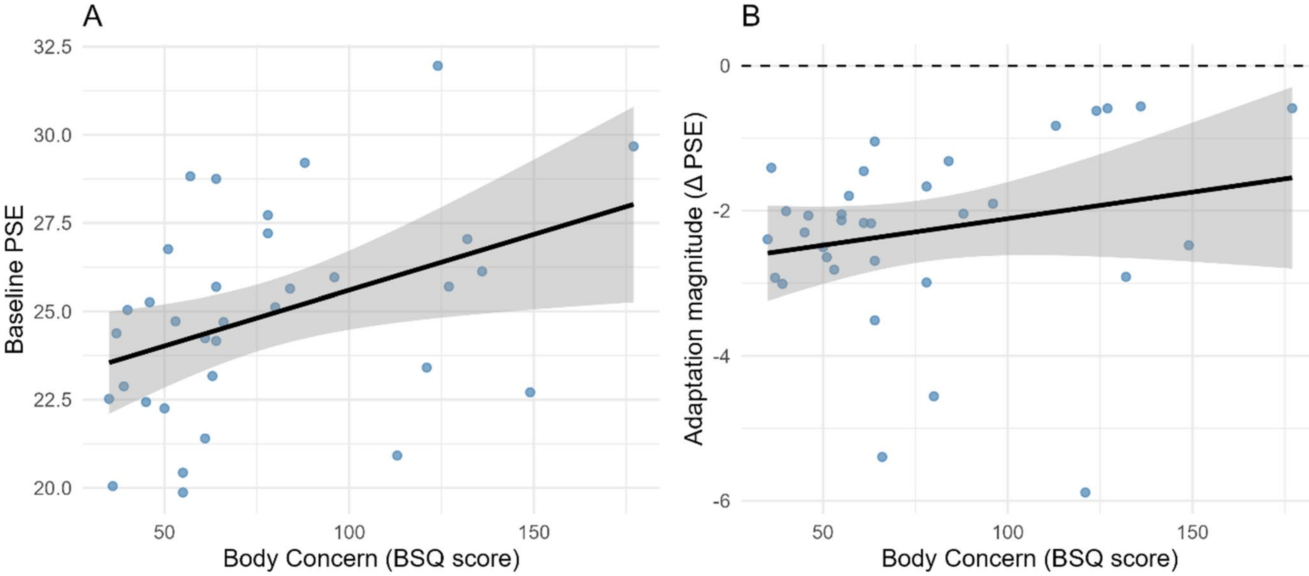

Fig. 3 Relationship between body concern and body size perception. *Note.* (**A**) Association between body concern (BSQ score) and baseline body size estimates (PSE), averaged across adaptor conditions. (**B**) Association between body concern and adaptation magnitude (baseline–post difference scores), averaged across conditions. Solid lines indicate linear regression fits; shaded areas represent 95% confidence intervals

=.38, p =.027). A similar positive association was observed between body concern and the mean PSE across all phases and conditions (r =.43, p =.012), indicating that participants with greater body concern tended to estimate their body size as larger overall.

In contrast, body concern was not significantly correlated with adaptation magnitude (difference scores) in either condition (close-thin: r=−.21, p =.241; extreme-thin: r=−.18, p =.308), indicating that individual differences in body concern did not modulate the strength of visual adaptation effects.

Discussion

We are constantly exposed to unrealistic body ideals through social media, which may alter how we perceive our own bodies and increase body dissatisfaction (De Valle et al., 2021; Rounsefell et al., 2020). A growing body of research has demonstrated that negative body image and body dissatisfaction are associated with systematic biases in how individuals perceive and represent their own bodies. Contemporary work using virtual reality and biometric self-avatars suggests that these distortions are driven primarily by attitudinal and cognitive components of body image rather than by gross impairments in visual body size estimation (Mölbert et al., 2018). At the same time, negative bodily attitudes have been shown to bias body schema and body-related perceptual judgments, even in non-clinical populations (Irvine et al., 2019), contributing to an overestimation of one's own body size.

From this perspective, perceptual mechanisms such as visual adaptation may play a critical role in linking sociocultural exposure to idealized bodies with stable distortions in self-perception. Recent reviews have highlighted the importance of embodiment and perceptual recalibration processes in both the maintenance and potential remediation of body image disturbance (Portingale et al., 2024).

The present study aimed to investigate how two levels of thin-body exposure (extremely thin vs. moderately thin) affect body-size estimation and whether individual differences in body concern modulate these effects. Participants viewed either extremely thin or moderately thin bodies (closer to their own size) before estimating whether a test body appeared thinner or fatter than themselves. We found significant adaptation aftereffects for both conditions: participants showed a shift in PSE consistent with a contrastive aftereffect following exposure to thin adaptors. In the present task, lower PSE values indicate that participants judged thinner bodies as equivalent to their own body size. Consistent with the statistical comparison of adaptation magnitudes, the aftereffect was significantly stronger following exposure to the extreme-thin adaptor than to the close-thin adaptor. Thus, a reduction in PSE reflects a shift toward perceiving the self as larger following adaptation to thin bodies, which is the canonical direction predicted by visual adaptation mechanisms. Although post-adaptation PSEs were not directly compared between adaptor types, the conclusion of stronger adaptation following extreme-thin exposure is supported by the significant time × condition interaction and by the larger within-condition change from baseline to adaptation in the extreme-thin condition, reflected in both mean difference scores and effect sizes.

Notably, this pattern contradicts our initial hypothesis, which predicted stronger aftereffects following exposure to bodies closer to participants' own size. This hypothesis was grounded in a social-comparison perspective, whereby bodies closer to one's own size were expected to elicit greater identification and self-referential processing, potentially amplifying perceptual biases. However, the observed pattern is more consistent with norm-based or opponent coding models, which predict larger adaptation effects for stimuli that deviate strongly from the internal norm (Carbon & Ditye, 2012; Rhodes & Jeffery, 2006).

An alternative, though not mutually exclusive, explanation is contraction bias. According to this account, judgments of body size are biased toward an internal reference point or prior, such that extreme stimuli are perceptually "pulled" toward the center of the distribution. In this framework, exposure to extremely thin bodies could disproportionately influence perceived body size by shifting the reference against which subsequent judgments are made, rather than by recalibrating opponent channels per se (Cornelissen et al., 2015).

Significantly, both opponent coding and contraction bias predict larger apparent shifts following exposure to extreme adaptors, and the present design does not allow these mechanisms to be conclusively disentangled. Future studies could address this by including both extreme-thin and extreme-fat adaptors, or by independently manipulating the distribution of body sizes to assess whether aftereffects reflect changes in perceptual encoding or shifts in internal priors.

This discrepancy highlights the importance of considering alternative models of visual coding. Norm-based and opponent coding models predict disproportionately larger aftereffects for stimuli that deviate strongly from an internal norm (Carbon & Ditye, 2012; Rhodes & Jeffery, 2006). Under these accounts, adaptation to extreme stimuli shifts the perceptual reference point more strongly than adaptation to moderate stimuli, which is consistent with the present findings. Work on facial adaptation has further shown pronounced asymmetries in aftereffects depending on adaptor extremity and experimental context, consistent with norm-based accounts of high-level perception(Carbon, 2014; Carbon & Ditye, 2012; Mueller et al., 2021). This pattern supports the notion that perceptual norms for body size are malleable and can be shaped by exposure to unrealistic body images. Importantly, this conclusion is supported by a direct comparison of adaptation magnitudes using difference scores, which demonstrated a significantly larger aftereffect for the extreme-thin condition. This pattern aligns with predictions from norm-based and opponent coding models, which propose that more extreme deviations from the perceptual norm produce larger recalibration effects.

We observed a significant association between body concern and baseline PSE values: individuals with higher levels of body concern estimated their body size as larger before adaptation in both conditions. In contrast, body concern was not associated with the magnitude of adaptation aftereffects, suggesting that attitudinal factors bias baseline body size representations rather than modulating perceptual recalibration itself. This finding suggests that body image attitudes are linked not only to how people feel about their appearance but also to how they perceive it. While we found no interaction between body concern and adaptation condition, the covariate effect was consistent across conditions, showing a general tendency for people with higher concern to perceive themselves as larger regardless of exposure. This aligns with recent evidence showing that attitudinal factors can bias perceptual judgments of one's own body (Stephen et al., 2018).

From a theoretical perspective, the stronger aftereffects observed for extreme adaptors are consistent with an opponent-coding mechanism in body size representation. Opponent coding predicts larger adaptation shifts for stimuli that deviate strongly from an internal norm, as has been demonstrated in other high-level visual domains, such as facial identity or gender (Pond et al., 2013; Rhodes & Jeffery, 2006). More recent work on facial adaptation has further shown that extreme deviations from the perceptual norm produce disproportionately larger and more persistent aftereffects, supporting norm-based and opponent coding models (Carbon & Ditye, 2012). While our study was not specifically designed to distinguish between opponent and multichannel coding models, previous research suggests that comparing aftereffects produced by moderate versus extreme adaptors can elucidate the underlying mechanisms (Cronin et al., 2017; Rhodes et al., 2013). The observed asymmetry in aftereffects in our study, therefore, supports the idea that body size perception may rely on opponent coding. Future studies could include additional adaptor types (e.g., extreme fat) to test whether symmetrical patterns emerge, further clarifying the neural mechanisms involved.

In our study, participants judged whether test bodies appeared "fatter or thinner than their own body," a task that combines both perceptual impressions and internal criteria for one's own body size. This design raises the possibility that observed aftereffects could result from shifts in internal criteria, that is, participants' internal reference point for judging their own body size, rather than solely from perceptual adaptation. Observers can voluntarily adjust their response criteria without significantly affecting sensitivity, suggesting that changes in perceptual sensitivity may not always accompany such criterion shifts(Morgan et al., 2012). Moreover, a proposed method for measuring perceptual aftereffects that is not confounded by criterion shifts underscores the importance of distinguishing between perceptual changes and shifts in internal standards (Morgan, 2014). Therefore, while our findings show that exposure to thin body images can influence perceptions of body size, it is essential to consider that these effects may also involve adjustments in participants' internal body-size criteria, independent of perceptual adaptation mechanisms.

Regarding limitations, we evaluated only cisgender female participants and used female body stimuli. This choice was motivated by previous evidence showing stronger adaptation aftereffects when observers are exposed to bodies of their own gender (Brooks et al. 2019, 2020a, b). While this design increases internal validity, it limits the generalizability of the findings to other genders.

Our research was not ecological, as it presented 3D computer-generated bodies in a computer task setting. Future research should examine a broader range of body types, including extremely thin, average, and overweight adaptors, to test whether adaptation effects scale linearly with distance from the perceptual norm or show asymmetries predicted by opponent coding models. We would expect more extreme adaptors to produce stronger aftereffects, whereas exposure to more diverse or realistic body types may attenuate or counteract these effects. In addition, using real-life photographs embedded in social media contexts may increase ecological validity and potentially amplify adaptation effects by increasing emotional and self-relevance. In this sense, recent literature has shown that showing more diverse bodies in terms of body size and shape (Ogden et al., 2020; Stewart & Ogden, 2021) could improve its negative effect on body image (Saiphoo & Vahedi, 2019), and this potential positive effect on body image should also be tested by alternating adaptors to test at which rate of exposition is the extreme adaptor turned ineffective.

In conclusion, our results show that even brief exposure to idealized thin bodies can systematically bias perceptual judgments of one's own body size, and that individuals with higher body concerns are especially prone to perceiving themselves as larger. These findings have implications for understanding the perceptual and psychological mechanisms linking social media exposure to body image disturbance.

Author contributions Sofia Abrevaya: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing - Original Draft, Writing - Review & Editing, Visualization, Project administration. Hannah Miell: Investigation, Writing - Review & Editing. Elena Azañón: Formal analysis, Writing - Review & Editing. Verónica Claudia Ramenzoni: Conceptualization, Writing - Review & Editing. Matthew R. Longo: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Writing - Original Draft, Writing - Review & Editing, Visualization, Supervision, Project administration, Funding acquisition.

Data availability Stimuli and raw data are available on the Open Science Framework webpage: [https://osf.io/5avq4/](https://osf.io/5avq4).

Declarations

Ethical approval All procedures involving human participants were approved by the Ethics Committee of the School of Psychological Sciences, Birkbeck, University of London, and were conducted in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments. Informed consent was obtained from all participants. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Public significance Exposure to extremely thin body ideals on social media can subtly distort how people perceive their own bodies. Our findings show that even brief exposure to unrealistic thinness shifts women's judgments of their own body size, and that those with greater body concerns are especially vulnerable to these distortions. Understanding that body perception can be directly altered by visual experience highlights the risks of pervasive thin-ideal imagery and supports interventions promoting healthier, more diverse body representations.

Competing interests The authors declare no competing interests.

References

Ambroziak, K. B., Azañón, E., & Longo, M. R. (2019). Body size adaptation alters perception of test stimuli, not internal body image. *Frontiers in Psychology, 10*, Article 2598.

Ambroziak, K. B., Bofill, M. A., Azañón, E., & Longo, M. R. (2023). Perceptual aftereffects of adiposity transfer from hands to whole bodies. *Experimental Brain Research*, *241*(9), 2371–2379.

Brainard, D. H., & Vision, S. (1997). The psychophysics toolbox. *Spatial Vision, 10*(4), 433–436.

Bratch, A., Chen, Y., Engel, S. A., & Kersten, D. J. (2021). Visual adaptation selective for individual limbs reveals hierarchical human body representation. *Journal of vision*, *21*(5), 18–18.

Brooks, K. R., Baldry, E., Mond, J., Stevenson, R. J., Mitchison, D., & Stephen, I. D. (2019). Gender and the body size aftereffect: Implications for neural processing. *Frontiers in Neuroscience, 13*, Article 1100.

Brooks, K. R., Clifford, C. W., Stevenson, R. J., Mond, J., & Stephen, I. D. (2018). The high-level basis of body adaptation. *Royal Society Open Science, 5*(6), Article 172103.

Brooks, K. R., Keen, E., Sturman, D., Mond, J., Stevenson, R. J., & Stephen, I. D. (2020a). Muscle and fat aftereffects and the role of gender: Implications for body image disturbance. *British Journal of Psychology*, *111*(4), 742–761.

Brooks, K. R., Mond, J., Mitchison, D., Stevenson, R. J., Challinor, K. L., & Stephen, I. D. (2020b). Looking at the figures: Visual adaptation as a mechanism for body-size and-shape misperception. *Perspectives on Psychological Science*, *15*(1), 133–149.

Brooks, K. R., Mond, J. M., Stevenson, R. J., & Stephen, I. D. (2016). Body image distortion and exposure to extreme body types: Contingent adaptation and cross adaptation for self and other. *Frontiers in neuroscience*, *10*, 334.

Carbon, C. C. (2014). Understanding human perception by human-made illusions. *Frontiers in human neuroscience*, *8*, 566.

Carbon, C.-C., & Ditye, T. (2012). Face adaptation effects show strong and long-lasting transfer from lab to more ecological contexts. *Frontiers in Psychology, 3*, Article 3.

Challinor, K. L., Mond, J., Stephen, I. D., Mitchison, D., Stevenson, R. J., Hay, P., & Brooks, K. R. (2017). Body size and shape misperception and visual adaptation: An overview of an emerging research paradigm. *Journal of International Medical Research*, *45*(6), 2001–2008.

Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairbum, C. G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders, 6*(4), 485–494.

Cornelissen, K. K., Bester, A., Cairns, P., Tovée, M. J., & Cornelissen, P. L. (2015). The influence of personal BMI on body size estimations and sensitivity to body size change in anorexia spectrum disorders. *Body image*, *13*, 75–85.

Cornelissen, P. L., Hancock, P. J., Kiviniemi, V., George, H. R., & Tovée, M. J. (2009). Patterns of eye movements when male and female observers judge female attractiveness, body fat and waist-to-hip ratio. *Evolution and Human Behavior*, *30*(6), 417–428.

Cronin, S. L., Spence, M. L., Miller, P. A., & Arnold, D. H. (2017). Bidirectional gender face aftereffects: Evidence against normative facial coding. *Perception, 46*(2), 119–138.

De Valle, M. K., Gallego-García, M., Williamson, P., & Wade, T. D. (2021). Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence. *Body Image, 39*, 276–292.

Evans, C., & Dolan, B. (1993). Body Shape Questionnaire: Derivation of shortened alternate forms. *International Journal of Eating Disorders*, *13*(3), 315–321.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, *39*(2), 175–191.

Festinger, L. (1954). A theory of social comparison processes. *Human relations*, *7*(2), 117–140.

Fox, J., & Weisberg, S. (2019). *Using car functions in other functions*. CRAN R.

Glauert, R., Rhodes, G., Byrne, S., Fink, B., & Grammer, K. (2009). Body dissatisfaction and the effects of perceptual exposure on body norms and ideals. *International Journal of Eating Disorders*, *42*(5), 443–452.

Gorber, S. C., Tremblay, M., Moher, D., & Gorber, B. (2007). A comparison of direct vs. Self-report measures for assessing height, weight and body mass index: A systematic review. *Obesity reviews*, *8*(4), 307–326.

Gould-Fensom, L., Tan, C. B., Brooks, K. R., Mond, J., Stevenson, R. J., & Stephen, I. D. (2019). The thin white line: Adaptation suggests a common neural mechanism for judgments of asian and caucasian body size. *Frontiers in Psychology, 10*, Article 2532.

Grogan, S. (2021). *Body image: Understanding body dissatisfaction in men, women and children*. Routledge.

Health Survey for England. (2003). *National Centre for Social Research and University College London*. Department of Epidemiology and Public Health.

House, T., Stephen, I. D., Penton-Voak, I. S., & Brooks, K. R. (2022). The effect of attention on body size adaptation and body dissatisfaction. *Royal Society Open Science, 9*(2), Article 211718.

Huang, Q., Peng, W., & Ahn, S. (2021). When media become the mirror: A meta-analysis on media and body image. *Media Psychology, 24*(4), 437–489.

Hummel, D., Rudolf, A. K., Untch, K. H., Grabhorn, R., & Mohr, H. M. (2012). Visual adaptation to thin and fat bodies transfers across identity.

Ip, K., Kusyk, N., Stephen, I. D., & Brooks, K. R. (2024). Did you skip leg day? The neural mechanisms of muscle perception for body parts. *Cortex, 171*, 75–89.

Irvine, K. R., McCarty, K., McKenzie, K. J., Pollet, T. V., Cornelissen, K. K., Toveé, M. J., & Cornelissen, P. L. (2019). Distorted body image influences body schema in individuals with negative bodily attitudes. *Neuropsychologia, 122*, 38–50.

Jiotsa, B., Naccache, B., Duval, M., Rocher, B., & Grall-Bronnec, M. (2021). Social media use and body image disorders: Association between frequency of comparing one's own physical appearance to that of people being followed on social media and body dissatisfaction and drive for thinness. *International journal of environmental research and public health*, *18*(6), 2880.

Mölbert, S. C., Thaler, A., Mohler, B. J., Streuber, S., Romero, J., Black, M. J., Zipfel, S., Karnath, H. O., & Giel, K. E. (2018). Assessing body image in anorexia nervosa using biometric self-avatars in virtual reality: Attitudinal components rather than visual body size estimation are distorted. *Psychological medicine*, *48*(4), 642–653.

Mohr, H. M., Rickmeyer, C., Hummel, D., Ernst, M., & Grabhorn, R. (2016). Altered visual adaptation to body shape in eating disorders: Implications for body image distortion. *Perception, 45*(7), 725–738.

Morgan, M. (2014). A bias-free measure of retinotopic tilt adaptation. *Journal of Vision*, *14*(1), 7–7.

Morgan, M., Dillenburger, B., Raphael, S., & Solomon, J. A. (2012). Observers can voluntarily shift their psychometric functions without losing sensitivity. *Attention, Perception, & Psychophysics, 74*(1), 185–193.

Mueller, R., Utz, S., Carbon, C. C., & Strobach, T. (2021). Face adaptation effects on non-configural face information. *Advances in Cognitive Psychology*, *17*(2), 176.

Munro, E., Wells, G., Paciente, R., Wickens, N., Ta, D., Mandzufas, J., Lombardi, K., & Woolard, A. (2024). Diet culture on TikTok: A descriptive content analysis. *Public health nutrition, 27*(1), Article e169.

Myers, T. A., & Crowther, J. H. (2009). Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *Journal of abnormal psychology*, *118*(4), 683.

Myga, K. A., Azañón, E., Ambroziak, K. B., Ferrè, E. R., & Longo, M. R. (2024). Haptic experience of bodies alters body perception. *Perception*, *53*(10), 716–729.

Nazareth, A., Escobar, V. S., & DeCastro, T. G. (2020). Body size judgments at 17 ms: Evidence from perceptual and attitudinal body image indexes. *Frontiers in Psychology, 10*, Article 3018.

Ogden, J., Gosling, C., Hazelwood, M., & Atkins, E. (2020). Exposure to body diversity images as a buffer against the thin-ideal: An experimental study. *Psychology, Health & Medicine, 25*(10), 1165–1178.

Palumbo, R., Laeng, B., & Tommasi, L. (2013). Gender-specific aftereffects following adaptation to silhouettes of human bodies. *Visual Cognition*, *21*(1), 1–12.

Pond, S., Kloth, N., McKone, E., Jeffery, L., Irons, J., & Rhodes, G. (2013). Aftereffects support opponent coding of face gender. *Journal of Vision*, *13*(14), 16–16.

Portingale, J., Krug, I., Liu, H., Kiropoulos, L., & Butler, D. (2024). *Your body, my experience: A systematic review of embodiment illusions as a function of and method to improve body image disturbance*. Science and Practice.

Pryde, S., Kemps, E., & Prichard, I. (2024). You started working out to get a flat stomach and a fat a $": A content analysis of fitspiration videos on TikTok. *Body Image, 51*, Article 101769.

Raiter, N., Husnudinov, R., Mazza, K., & Lamarche, L. (2023). TikTok promotes diet culture and negative body image rhetoric: A content analysis. *Journal of Nutrition Education and Behavior, 55*(10), 755–760.

R Core Team (2025). R: A language and environment for statistical computing. *R Foundation for Statistical Computing*. Vienna, Austria. https://www.R-project.org/

Rhodes, G., & Jeffery, L. (2006). Adaptive norm-based coding of facial identity. *Vision Research, 46*(18), 2977–2987.

Rhodes, G., Jeffery, L., Boeing, A., & Calder, A. J. (2013). Visual coding of human bodies: Perceptual aftereffects reveal norm-based, opponent coding of body identity. *Journal of Experimental Psychology: Human Perception and Performance*, *39*(2), 313.

Rodgers, R. F., McLean, S. A., & Paxton, S. J. (2015). Longitudinal relationships among internalization of the media ideal, peer social comparison, and body dissatisfaction: Implications for the Tripartite Influence Model. *Developmental Psychology, 51*(5), 706.

Rodgers, R. F., Slater, A., Gordon, C. S., McLean, S. A., Jarman, H. K., & Paxton, S. J. (2020). A biopsychosocial model of social media use and body image concerns, disordered eating, and muscle-building behaviors among adolescent girls and boys. *Journal of Youth and Adolescence, 49*(2), 399–409.

Rosen, J. C., Jones, A., Ramirez, E., & Waxman, S. (1996). Body Shape Questionnaire: Studies of validity and reliability. *International Journal of Eating Disorders*, *20*(3), 315–319.

Rounsefell, K., Gibson, S., McLean, S., Blair, M., Molenaar, A., Brennan, L., Truby, H., & McCaffrey, T. A. (2020). Social media, body image and food choices in healthy young adults: A mixed methods systematic review. *Nutrition & Dietetics*, *77*(1), 19–40.

Saiphoo, A. N., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. *Computers in human behavior*, *101*, 259–275.

Sekunova, A., Black, M., Parkinson, L., & Barton, J. J. (2013). Viewpoint and pose in body-form adaptation. *Perception*, *42*(2), 176–186.

Stephen, I. D., Sturman, D., Stevenson, R. J., Mond, J., & Brooks, K. R. (2018). Visual attention mediates the relationship between body satisfaction and susceptibility to the body size adaptation effect. *PloS one, 13*(1), Article e0189855.

Stewart, S. J., & Ogden, J. (2021). The impact of body diversity vs thin-idealistic media messaging on health outcomes: An experimental study. *Psychology Health & Medicine*, *26*(5), 631–643.

Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental psychology*, *38*(5), 669.

Strahan, E. J., Wilson, A. E., Cressman, K. E., & Buote, V. M. (2006). Comparing to perfection: How cultural norms for appearance affect social comparisons and self-image. *Body Image, 3*(3), 211–227.

Sturman, D., Stephen, I. D., Mond, J., Stevenson, R. J., & Brooks, K. R. (2017). Independent aftereffects of fat and muscle: Implications for neural encoding, body space representation, and body image disturbance. *Scientific Reports, 7*(1), Article 40392.

Talbot, C. V., Gavin, J., Van Steen, T., & Morey, Y. (2017). A content analysis of thinspiration, fitspiration, and bonespiration imagery on social media. *Journal of eating disorders*, *5*(1), 40.

Taylor, M. J. (1987). The nature and significance of body image disturbance.

Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science, 10*(5), 181–183.

Tiggemann, M., & Slater, A. (2004). Thin ideals in music television: A source of social comparison and body dissatisfaction. *International Journal of Eating Disorders*, *35*(1), 48–58.

Wardle, J., Haase, A. M., & Steptoe, A. (2006). Body image and weight control in young adults: International comparisons in university students from 22 countries. *International journal of obesity*, *30*(4), 644–651.

Watson, A. B., & Pelli, D. G. (1983). QUEST: A Bayesian adaptive psychometric method. *Perception & psychophysics, 33*(2), 113–120.

Webster, M. A. (2015). Visual adaptation. *Annual review of vision science*, *1*(1), 547–567.

Webster, M. A., & Leonard, D. (2008). Adaptation and perceptual norms in color vision. *Journal of the Optical Society of America A*, *25*(11), 2817–2825.

Wickham, H. (2016). *Getting Started with ggplot2. En Ggplot2: Elegant graphics for data analysis* (pp. 11–31). Springer.

Winkler, C., & Rhodes, G. (2005). Perceptual adaptation affects attractiveness of female bodies. *British Journal of Psychology, 96*(2), 141–154.

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