Body Shape Changes Influence Others' Inference of Personality Traits

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Abstract

Using pictorial materials depicting different body types as stimuli, participants were required to infer personality traits, thereby investigating the influence of dynamic body type changes on personality trait inference. In Experiment 1, with different directions of body type change, we examined participants' personality trait inference results for body types changing from thin to fat and from fat to thin, relative to consistently obese and consistently thin body types; Experiment 2 added a normal body type level, investigating the influence of body type changes with identical direction but different magnitudes on personality trait inference. The results revealed: (1) Personality trait inferences for changing versus stable body types were generally consistent; compared to consistently obese body types, thin-to-fat body types were evaluated more negatively, while compared to consistently thin body types, fat-to-thin body types were evaluated more positively. (2) For both male and female body types, fat-to-thin body types yielded more positive personality trait inference results compared to thin-to-fat body types. (3) Compared to fat-to-thin, fat-to-normal body types yielded more positive personality trait inference results; compared to thin-to-fat, thin-to-normal body types yielded more positive personality trait inference results. (4) Participants' own BMI and gender were important factors influencing the inference of others' personality traits.

Full Text

Does Body Shape Change Affect Personality Trait Inferences?

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Abstract

People tend to infer others' personality traits based on their appearance, a phenomenon known as "judging a book by its cover." Body shape, as a crucial aspect of physical appearance, plays a significant role in shaping impressions of others. Numerous studies have demonstrated that body shape indeed affects personality trait inferences and subsequent impression management, with widespread stereotypes of "fat-negative" and "thin-positive." People generally hold negative views toward obesity while attributing positive qualities to thinness. However, most previous research has focused on inferences about static body shapes, leaving unanswered whether the *process* of body shape change alters previously formed personality trait judgments. Does the dynamic process of becoming fat or thin, relative to stable states of obesity or thinness, influence trait inference outcomes?

This study focused on the dynamic process of body shape change and conducted two experiments to investigate whether changes in different directions and to different degrees affect personality trait inferences. Experiment 1 examined trait inferences when body shape changed from thin to fat and from fat to thin, compared with stable obese and thin body shapes. Since Experiment 1 focused on extreme body shapes, Experiment 2 added normal body shape images to investigate whether different degrees of change along the same direction would produce different trait inference outcomes when body shape varied across three levels (obese, normal, and thin).

Results showed that: (1) Trait inferences for changing versus stable body shapes were generally consistent. Compared with consistently obese body shapes, thin-to-fat changes elicited more negative inferences; compared with consistently thin body shapes, fat-to-thin changes elicited more positive inferences. (2) Regardless of whether the body shape was male or female, fat-to-thin changes produced more positive trait inferences than thin-to-fat changes. (3) Fat-to-normal changes elicited more positive inferences than fat-to-thin changes, and thin-to-normal changes elicited more positive inferences than thin-to-fat changes. (4) Participants'own BMI and gender were important factors influencing personality trait inferences about others.

Keywords: body shape change; trait inference; three-dimensional body shape; Big Five personality

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1. Introduction

People habitually infer others' personality traits based on their physical appearance, a phenomenon that essentially constitutes "judging people by their looks." Research has found that people infer work status or criminal culpability from facial appearance (Efran, 1974), and sometimes even assess suitability for political or management positions based on looks (Todorov, Mandisodza,

Goren, & Hall, 2005). In early 19th-century Western society, the pseudoscience of phrenology even gained considerable popularity. Among physical attributes, body shape is particularly salient for making such inferences, with fatness or thinness significantly affecting judgments about personality traits.

Previous research indicates that people generally hold negative views toward obesity, perceiving obese individuals as mean, unintelligent (Puhl & Brownell, 2003), ugly (Crandall, 1994), unfortunate, and isolated (Gapinski & Brownell, 2003), while also viewing them as incompetent, lazy, lacking self-control, and undisciplined (Puhl & Brownell, 2001). Obese individuals face discrimination in workplace contexts, being perceived as less conscientious, more introverted, melancholy, careless, and lacking good work habits compared to average-weight individuals (Roehling, 2008). Even elementary school children view obese classmates as ugly, selfish, lazy, and stupid (Wardle, Volz, & Golding, 1995). Domestic research has reached similar conclusions. Zhou Li and colleagues used the Eysenck Personality Questionnaire (EPQ) to compare obese and normal-weight adolescents, consistently finding that obese students were more introverted and showed higher psychoticism scores than their normal-weight peers.

In contrast, thin individuals receive more positive evaluations. People prefer to associate positive personality traits with thinness (Sun Lining, 2006), believing thin people have many friends and are happy (Davison & Birch, 2004). In most Western industrialized regions, slim body shapes are associated with health, beauty, intelligence, youth, wealth, attractiveness, elegance, self-discipline, and kindness (Brewis, 2011).

What defines fat or thin? Previous research commonly uses Body Mass Index (BMI), calculated as weight (kg) divided by height (m) squared. The World Health Organization (WHO) standard considers $18.5 \leq \text{BMI} < 25$ as normal, with lower values indicating thinness and higher values indicating obesity. BMI' s advantage lies in the easy collection of height and weight data, which are common in social science databases, making BMI a widely adopted measure in social science literature (Burkhauser & Cawley, 2008).

However, BMI represents a very crude index of body shape. Using BMI to measure and characterize fatness has a significant limitation: it cannot display an individual' s specific three-dimensional state, largely ignoring people' s perception of three-dimensional body shape characteristics (Wells, Treleaven, & Cole, 2007). Numerical values cannot clearly and intuitively express a person' s three-dimensional body attributes or specific measurements, and most people are relatively insensitive to the practical meaning of these numbers. To more vividly, intuitively, and accurately simulate real body shapes encountered in daily life, a more effective and complete body shape model is needed to help people make genuine personality trait inferences.

Sheldon (1954) proposed classifying human physique into three basic types: mesomorphic (muscular, broad-shouldered, small-waisted), ectomorphic (tall and thin but appearing fragile), and endomorphic (rounded body shape, short thick

neck). Sheldon created three-dimensional male body models and corresponding illustrations, providing more complete and quantifiable concrete images for related research. Some researchers used Sheldon' s somatotype models to study trait inferences elicited by different body types, finding that mesomorphic bodies were perceived as energetic and desirable, ectomorphic bodies as neurotic and quiet, and endomorphic bodies as lazy, dependent, and undesirable (Brodsky, 1954).

Sheldon' s work was pioneering. Subsequent researchers revised his human body models, weakening other features while retaining only fatness/thinness characteristics, then had participants observe and infer typical traits. They discovered body shape stereotypes: obese, non-curvy body models were perceived as undisciplined, lazy, careless, disorganized, and introverted, while slender, well-proportioned, lighter-weight body models were seen as careful, cautious, self-disciplined, reliable, calm, and extroverted (Ying Hu et al., 2018).

In summary, existing research demonstrates that body shape indeed influences personality trait inferences and impression management. However, most past studies have focused on trait inferences about static body shapes, with little research examining whether the *process* of body shape change alters previously formed personality trait judgments. Therefore, this study focuses on the dynamic process of body shape change, using two experiments to investigate whether changes in different directions and degrees affect personality trait inferences. Body shape materials used full-size three-dimensional models of different genders created by Ying Hu et al. (2018), who used correspondence analysis to establish multivariate spaces for male and female three-dimensional body models and their associated characteristics to explore the social evaluation structure of body shapes. Results indicated that personality trait inferences are based on quantifiable physical features of body shapes.

Experiment 1 aimed to compare trait inferences for changing versus stable body shapes, examining the effects of two different change directions (thin-to-fat and fat-to-thin) on personality trait inferences, while also observing how body shape gender, participant gender, and participant BMI influence trait inferences. Experiment 1 used extreme body shapes, while Experiment 2 added a normal body shape condition, investigating whether trait inferences differed when change direction was the same but degree varied across three levels (thin, normal, obese).

2. Experiment 1: Effects of Different Body Shape Change Directions on Personality Trait Inferences

Different directions of body shape change refer to the effects of two distinct change trajectories—thin-to-fat (compared to consistently fat) and fat-to-thin (compared to consistently thin)—on personality trait inferences.

2.1.1 Participants

Sixty-eight university students were randomly selected (23 males, 45 females), including 6 overweight or obese participants (BMI $\geq$ 24) and 13 underweight participants (BMI $\leq$ 18). All participants were right-handed, had normal or corrected-to-normal vision, and had no prior experience with similar experiments.

2.1.2 Materials

(1) Three-dimensional body shape model images: We used three-dimensional body shape models of different genders created by Ying Hu et al. (2018). Sixty-five university students were randomly recruited to rate different body shape images by gender, selecting typical images of obese and thin body shapes for each gender. This yielded 8 images across four categories: obese-to-thin, thin-to-obese, consistently thin, and consistently obese.

(2) Big Five personality derivative vocabulary list: The list comprised 5 dimensions, each with 6 words (3 positive, 3 negative). Vocabulary materials were derived from Ying Hu et al. (2018), with the most frequently used Chinese translations selected and matched for relative meaning according to the Xinhua Dictionary. Participants made forced-choice selections.

2.1.3 Apparatus and Procedure

The experiment was conducted in a dimly lit, private room equipped with a computer. E-prime 2.0 software presented stimuli, recorded responses, and collected all data. Participants sat facing a 17-inch monitor (resolution 1366$\times$768) approximately 55 cm from the screen and responded using keyboard keys (“1” and “2”).

Experiment 1 used a 4 (body shape: thin-to-obese, obese-to-thin, consistently thin, consistently obese) $\times$ 2 (body shape gender: male, female) $\times$ 2 (participant gender: male, female) within-subjects design. The dependent variable was the number of positive and negative traits selected by participants.

The experiment included 120 trials, preceded by 4 practice trials. Participants were presented with images showing a person’ s different body shapes from past to present, along with random pairs of personality words from the Big Five derivative vocabulary list. Based on the current body shape, participants pressed keys (“1” or “2”) to select the word that best described the body shape. The specific experimental procedure is shown in Figure 2 [Figure 2: see original paper]. Body shape gender and type were randomized across trials. After the experiment, participants’ height and weight were measured to calculate BMI, and demographic questionnaires were completed.

2.2 Results

2.2.1 Judgments of Male and Female Images: Obese-to-Thin vs. Consistently Thin McNemar' s test examined whether personality word choices differed significantly between obese-to-thin and consistently thin body shape images across genders. For male images, significant differences emerged for self-disciplined vs. lazy ($p < 0.001$, Cramer' s v = 0.72), careful vs. careless ($p < 0.001$, Cramer' s v = 0.74), curious vs. conventional ($p < 0.001$, Cramer' s v = 0.57), open-minded vs. rigid ($p < 0.001$, Cramer' s v = 0.48), and intelligent vs. simple-minded ($p < 0.001$, Cramer' s v = 0.76).

For female images, participants showed significant differences for self-disciplined vs. lazy ($p < 0.001$, Cramer' s v = 0.79), careful vs. careless ($p < 0.001$, Cramer' s v = 0.81), calm vs. irritable ($p < 0.001$, Cramer' s v = 0.61), curious vs. conventional ($p < 0.001$, Cramer' s v = 0.61), open-minded vs. rigid ($p < 0.001$, Cramer' s v = 0.68), and intelligent vs. simple-minded ($p < 0.001$, Cramer' s v = 0.73).

2.2.2 Judgments of Male and Female Images: Thin-to-Obese vs. Consistently Obese McNemar' s test examined differences in judgments between thin-to-obese and consistently obese images. For male images, significant differences emerged for extroverted vs. reserved ($p < 0.001$, Cramer' s v = 0.72), careful vs. careless ($p = 0.005$, Cramer' s v = 0.34), self-disciplined vs. lazy ($p = 0.002$, Cramer' s v = 0.38), dominant vs. shy ($p < 0.001$, Cramer' s v = 0.44), reliable vs. stubborn ($p = 0.001$, Cramer' s v = 0.42), and agreeable vs. emotional ($p = 0.017$, Cramer' s v = 0.29).

For female images, participants showed significant differences for cooperative vs. critical ($p = 0.001$, Cramer' s v = 0.4), warm-hearted vs. quarrelsome ($p = 0.001$, Cramer' s v = 0.39), reliable vs. stubborn ($p = 0.004$, Cramer' s v = 0.35), and self-disciplined vs. lazy ($p < 0.001$, Cramer' s v = 0.46).

2.2.3 Judgments of Male and Female Images: Thin-to-Obese vs. Obese-to-Thin McNemar' s test examined differences between thin-to-obese and obese-to-thin images. For male images, significant differences emerged for extroverted vs. reserved ($p = 0.03$, Cramer' s v = 0.25), self-disciplined vs. lazy ($p = 0.00$, Cramer' s v = 0.88), trustworthy vs. disorganized ($p = 0.00$, Cramer' s v = 0.93), careful vs. careless ($p = 0.00$, Cramer' s v = 0.88), calm vs. irritable ($p = 0.00$, Cramer' s v = 0.81), anxious vs. confident ($p = 0.03$, Cramer' s v = 0.56), curious vs. conventional ($p = 0.003$, Cramer' s v = 0.37), open-minded vs. rigid ($p = 0.00$, Cramer' s v = 0.45), and intelligent vs. simple-minded ($p = 0.00$, Cramer' s v = 0.71).

For female images, significant differences emerged for self-disciplined vs. lazy ($p = 0.00$, Cramer' s v = 0.73), trustworthy vs. disorganized ($p = 0.00$, Cramer' s v = 0.88), careful vs. careless ($p = 0.00$, Cramer' s v = 0.82), calm vs. irritable ($p = 0.00$, Cramer' s v = 0.80), agreeable vs. emotional ($p = 0.02$, Cramer'

s v = 0.29), anxious vs. confident (p = 0.00, Cramer' s v = 0.51), curious vs. conventional (p = 0.003, Cramer' s v = 0.52), open-minded vs. rigid (p = 0.00, Cramer' s v = 0.59), and intelligent vs. simple-minded (p = 0.00, Cramer' s v = 0.77).

2.2.4 Effects of Participant Gender and BMI on Judgments of Different Body Shape Images For male thin-to-obese images, male and female participants differed significantly in their judgments of cooperative vs. critical (^{2}(1, N = 68) = 4.847, p = 0.029, Cramer' s V = 0.325). For female thin-to-obese images, gender differences emerged for open-minded vs. rigid (^{2}(1, N = 68) = 5.827, p = 0.023, Cramer' s V = 0.346). For female obese-to-thin images, gender differences appeared for extroverted vs. reserved (^{2}(1, N = 68) = 7.097, p = 0.017, Cramer' s V = 0.393) and dominant vs. shy (^{2}(1, N = 68) = 5.66, p = 0.036, Cramer' s V = 0.351).

Participants' own BMI only significantly affected judgments of female thin-to-obese images for careful vs. careless (^{2}(1, N = 13) = 6.806, p = 0.019, Cramer' s V = 0.583).

2.3 Discussion

2.3.1 Trait Inferences for Changing vs. Stable Body Shapes For male body shapes, the primary difference between obese-to-thin and consistently thin was that participants perceived the obese-to-thin individual as more self-disciplined, careful, curious, open-minded, and intelligent, but also more anxious. Overall, obese-to-thin changes created a more positive impression. The difference between thin-to-obese and consistently obese was that participants viewed consistently obese individuals as more shy, reliable, and agreeable, while thin-to-obese individuals were seen as more extroverted, lazy, and careless. Thin-to-obese changes elicited more negative inferences than consistently obese body shapes. These findings align with Li Yanping et al. (2005), who found that obese adolescents were perceived as honest, easygoing, and sociable—our study confirms that consistently obese individuals are seen as more reliable and agreeable.

For female body shapes, compared to thin-to-obese changes, consistently obese individuals were perceived as more cooperative, warm-hearted, and reliable, while thin-to-obese changes were seen as lazier. Overall, thin-to-obese changes elicited more negative inferences. Compared to consistently thin, obese-to-thin individuals were perceived as more self-disciplined, careful, curious, intelligent, and open-minded—consistent with Hu et al. (2018), who found that thin body shapes were perceived as careful, cautious, self-disciplined, reliable, and calm.

Overall, compared to consistently obese body shapes, thin-to-obese changes elicited more negative inferences; compared to consistently thin body shapes, obese-to-thin changes elicited more positive inferences. Additionally, comparisons between changing and stable body shapes revealed more non-significant

differences in personality traits, suggesting that people' s evaluations of current body shapes are generally consistent regardless of whether the shape changed or remained stable.

2.3.2 Trait Inferences for Obese-to-Thin vs. Thin-to-Obese Across Genders For males, when body shape changed from thin to overweight or obese, personality inferences became more negative. Regarding Big Five conscientiousness, such individuals were seen as more careless, disorganized, and lazy; regarding neuroticism, more irritable and anxious; regarding openness, more rigid, conventional, and simple-minded. No significant differences emerged for negative aspects of extraversion and agreeableness. Conversely, when males changed from overweight/obese to thin, inferences became more positive, particularly for extraversion (seen as more extroverted).

For females, results were similar but with more negative traits. When thin females became overweight or obese, inferences were more negative with no positive traits: they were seen as lazier, more disorganized and careless (conscientiousness), more irritable (neuroticism), and more rigid, conventional, and simple-minded (openness). However, when overweight/obese females became thin, they were perceived more positively without negative trait inferences: more agreeable and confident (neuroticism).

2.3.3 Effects of Participant Gender on Trait Inferences for Different Body Shapes Participant gender influenced judgments of image materials. Comparing male and female perspectives on same-gender body shape changes revealed differences. For thin-to-obese male images, male participants made negative inferences (seen as more critical) while female participants made positive inferences (seen as more cooperative). For thin-to-obese female images, male participants again made negative inferences (seen as more rigid) while female participants chose the positive term "open-minded." For obese-to-thin female images, male participants viewed changes negatively (more reserved and shy) while female participants viewed them positively (more extroverted and dominant). Regardless of change direction or body shape gender, male participants tended toward negative judgments while female participants viewed changes positively, suggesting women are more tolerant of body shape changes while men are more critical.

2.3.4 Effects of Participants' Own BMI on Trait Inferences For the same body shapes, participants' BMI significantly affected trait inference content. For thin-to-obese female images regarding Big Five conscientiousness, underweight participants viewed them as careless while overweight/obese participants viewed them as careful. This pattern only emerged for female body shapes becoming obese, suggesting stronger stereotypes and deeper prejudice against overweight/obese women, or that society pays more attention to female body shape changes.

Experiment 1 demonstrated that trait inferences for changing versus stable body shapes were generally consistent, but change direction mattered: fat-to-thin changes elicited more positive inferences than thin-to-fat changes. Experiment 2 added a normal body shape dimension to further investigate whether different degrees of change along the same direction produce different trait inferences.

3. Experiment 2: Effects of Different Degrees of Body Shape Change on Personality Trait Inferences

3.1.1 Participants

Three hundred twelve university students were randomly selected (114 males, 186 females). Twelve participants with clearly non-standard responses were excluded. The sample included 54 underweight (BMI $<$ 18.5), 201 normal-weight (18.5 $\leq$ BMI $\leq$ 23.9), 39 overweight (24 $\leq$ BMI $\leq$ 28), and 6 obese (BMI $\geq$ 28) individuals. All were right-handed with normal or corrected vision, no prior experience with similar experiments, and were unaware of the research purpose.

3.1.2 Materials

(1) Three-dimensional body shape model images: Using models from Ying Hu et al. (2018), 65 university students rated images by gender, selecting typical examples of obese, normal, and thin body shapes for each gender. This yielded 6 images across three categories (obese, normal, thin) for use in Experiment 2. Example: male normal body shape shown in Figure 3 [Figure 3: see original paper].

(2) Big Five personality derivative vocabulary list: Same as Experiment 1.

3.1.3 Design and Procedure

Experiment 2 used a 4 (body shape change: thin-to-obese, thin-to-normal, obese-to-thin, obese-to-normal) $\times$ 2 (body shape gender: male, female) $\times$ 2 (participant gender: male, female) within-subjects design. The dependent variable was participants' ratings on each personality trait dimension.

The procedure was similar to Experiment 1, with one key difference: instead of forced-choice between trait pairs, participants rated each trait word individually on a 5-point Likert scale (1 = very uncharacteristic, 5 = very characteristic).

3.2 Results

3.2.1 Trait Inferences for Obese-to-Thin vs. Obese-to-Normal Male and Female Body Shapes Repeated measures ANOVA compared trait inferences for obese-to-thin versus obese-to-normal changes. For male body shapes, significant differences emerged for dominant (p = 0.000, partial ^{2} = 0.054),

stubborn (p = 0.000, partial ^{2} = 0.043), rigid (p = 0.001, partial ^{2} = 0.04), simple-minded (p = 0.000, partial ^{2} = 0.045), warm-hearted (p = 0.008, partial ^{2} = 0.023), reliable (p = 0.025, partial ^{2} = 0.017), and critical (p = 0.007, partial ^{2} = 0.024). Specifically, compared to obese-to-normal, obese-to-thin males were seen as more dominant (M = 3.04, SD = 0.072), rigid (M = 3.16, SD = 0.067), simple-minded (M = 3.24, SD = 0.067), critical (M = 3.06, SD = 0.072), and warm-hearted (M = 3.24, SD = 0.063), while obese-to-normal males were seen as more stubborn (M = 3.13, SD = 0.068) and reliable (M = 3.05, SD = 0.067).

For female body shapes, obese-to-thin versus obese-to-normal changes differed significantly on extroverted (p = 0.000, partial ^{2} = 0.156), shy (p = 0.000, partial ^{2} = 0.056), confident (p = 0.000, partial ^{2} = 0.062), cooperative (p = 0.037, partial ^{2} = 0.014), and trustworthy (p = 0.027, partial ^{2} = 0.016). Compared to obese-to-thin, obese-to-normal females were seen as more extroverted (M = 3.44, SD = 1.06), confident (M = 3.13, SD = 1.072), and cooperative (M = 3.35, SD = 1.062), while obese-to-thin females were seen as more shy (M = 3.33, SD = 1.067) and trustworthy (M = 3.26, SD = 1.065).

3.2.2 Trait Inferences for Thin-to-Obese vs. Thin-to-Normal Male and Female Body Shapes Repeated measures ANOVA compared thin-to-obese versus thin-to-normal changes. For male body shapes, significant differences emerged for gentle (p = 0.000, partial ^{2} = 0.045), warm-hearted (p = 0.000, partial ^{2} = 0.047), critical (p = 0.000, partial ^{2} = 0.082), careful (p = 0.000, partial ^{2} = 0.061), calm (p = 0.000, partial ^{2} = 0.043), curious (p = 0.000, partial ^{2} = 0.044), open-minded (p = 0.000, partial ^{2} = 0.122), cooperative (p = 0.005, partial ^{2} = 0.026), and irritable (p = 0.007, partial ^{2} = 0.024). Compared to thin-to-normal, thin-to-obese males were seen as more careful (M = 3.26, SD = 0.065), curious (M = 3.29, SD = 0.062), and open-minded (M = 3.58, SD = 0.065), while thin-to-normal males were seen as more critical (M = 3.34, SD = 0.071), gentle (M = 3.18, SD = 0.064), warm-hearted (M = 3.23, SD = 0.066), calm (M = 3.03, SD = 0.074), cooperative (M = 3.17, SD = 0.064), and irritable (M = 3.14, SD = 0.064).

For female body shapes, thin-to-obese versus thin-to-normal changes differed significantly on trustworthy (p = 0.000, partial ^{2} = 0.096) and simple-minded (p = 0.000, partial ^{2} = 0.04). Compared to thin-to-obese, thin-to-normal females were seen as more trustworthy (M = 3.52, SD = 1.062), while thin-to-obese females were seen as more simple-minded (M = 3.1, SD = 1.076).

3.2.3 Correlation Analysis Between Participant BMI and Trait Inferences for Body Shape Changes 3.2.3.1 Correlations with male body shape changes: Pearson correlation analysis between participants' BMI and trait inferences for obese-to-thin male body shapes revealed significant positive correlations with warm-hearted (p = 0.000, r = 0.205), quarrelsome (p = 0.000, r = 0.389), disorganized (p = 0.000, r = 0.205), calm (p = 0.000, r =

0.287), agreeable (p = 0.006, r = 0.158), confident (p = 0.015, r = 0.14), and simple-minded (p = 0.003, r = 0.171), and significant negative correlations with warm-hearted (p = 0.00, r = -0.25), critical (p = 0.02, r = -0.145), stubborn (p = 0.000, r = -0.287), and emotional (p = 0.001, r = -0.188).

For thin-to-obese male changes, participant BMI correlated positively with dominant (p = 0.000, r = 0.299), shy (p = 0.001, r = 0.186), warm-hearted (p = 0.000, r = 0.256), stubborn (p = 0.014, r = 0.142), lazy (p = 0.017, r = 0.138), irritable (p = 0.005, r = 0.162), and rigid (p = 0.005, r = 0.237), and negatively with warm-hearted (p = 0.003, r = -0.174), cooperative (p = 0.03, r = -0.125), self-disciplined (p = 0.002, r = -0.175), disorganized (p = 0.00, r = -0.22), calm (p = 0.001, r = -0.186), and agreeable (p = 0.002, r = -0.174).

For obese-to-normal male changes, participant BMI correlated positively with warm-hearted (p = 0.000, r = 0.238), trustworthy (p = 0.001, r = 0.19), agreeable (p = 0.042, r = 0.117), confident (p = 0.000, r = 0.33), emotional (p = 0.004, r = 0.167), and intelligent (p = 0.003, r = 0.173), and negatively with dominant (p = 0.005, r = -0.16), shy (p = 0.00, r = -0.207), cooperative (p = 0.002, r = -0.183), critical (p = 0.00, r = -0.314), and rigid (p = 0.004, r = -0.166).

For thin-to-normal male changes, participant BMI correlated positively with dominant (p = 0.007, r = 0.156), warm-hearted (p = 0.002, r = 0.175), lazy (p = 0.002, r = 0.18), confident (p = 0.009, r = 0.15), irritable (p = 0.000, r = 0.233), and simple-minded (p = 0.001, r = 0.191), and negatively with cooperative (p = 0.000, r = -0.214), anxious (p = 0.000, r = -0.355), curious (p = 0.002, r = -0.179), and intelligent (p = 0.013, r = -0.144).

3.2.3.2 Correlations with female body shape changes: For thin-to-obese female changes, participant BMI correlated positively with dominant (p = 0.002, r = 0.174), gentle (p = 0.00, r = 0.222), critical (p = 0.00, r = 0.371), stubborn (p = 0.00, r = 0.242), lazy (p = 0.026, r = 0.129), curious (p = 0.00, r = 0.239), conventional (p = 0.00, r = 0.221), and rigid (p = 0.00, r = 0.272), and negatively with cooperative (p = 0.00, r = -0.225), trustworthy (p = 0.00, r = -0.235), intelligent (p = 0.00, r = -0.294), and simple-minded (p = 0.002, r = -0.181).

For obese-to-thin female changes, participant BMI correlated positively with warm-hearted (p = 0.001, r = 0.191), cooperative (p = 0.003, r = 0.174), self-disciplined (p = 0.00, r = 0.264), intelligent (p = 0.001, r = 0.194), and rigid (p = 0.00, r = 0.314), and negatively with extroverted (p = 0.003, r = -0.173), emotional (p = 0.00, r = -0.232), and conventional (p = 0.00, r = -0.217).

For obese-to-normal female changes, participant BMI correlated positively with extroverted (p = 0.011, r = 0.147), gentle (p = 0.008, r = 0.152), shy (p = 0.036, r = 0.121), reliable (p = 0.00, r = 0.377), confident (p = 0.002, r = 0.182), and curious (p = 0.00, r = 0.273), and negatively with trustworthy (p = 0.019, r = -0.135) and conventional (p = 0.002, r = -0.175).

For thin-to-normal female changes, participant BMI correlated positively with dominant (p = 0.00, r = 0.204), reserved (p = 0.00, r = 0.347), warm-hearted (p = 0.00, r = 0.337), trustworthy (p = 0.002, r = 0.179), irritable (p = 0.001, r = 0.193), and conventional (p = 0.001, r = 0.19), and negatively with curious (p = 0.00, r = -0.312).

3.2.4 Effects of Participant Gender on Trait Inferences for Changing Male Body Shapes Independent samples t-tests examined effects of participant gender on trait inferences for male body shapes. For obese-to-thin changes, male participants rated males significantly higher on extroverted (M = 3.08, SD = 1.161, t(298) = 0.943, p = 0.004) and gentle (M = 3.87, SD = 1.1143, t(298) = 6.42, p = 0.00). For thin-to-obese changes, male participants rated significantly higher on open-minded (M = 4.03, SD = 0.781, t(298) = 5.64, p = 0.000), while female participants rated significantly higher on anxious (M = 2.98, SD = 1.267, t(298) = -0.814, p = 0.019). For obese-to-normal changes, male participants rated significantly higher on agreeable (M = 3.21, SD = 0.897, t(298) = 1.955, p = 0.00). For thin-to-normal changes, female participants rated significantly higher on trustworthy (M = 3.47, SD = 0.885, t(298) = 2.46, p = 0.00) and stubborn (M = 3.32, SD = 0.953, t(298) = 1.317, p = 0.012).

3.2.5 Effects of Participant Gender on Trait Inferences for Changing Female Body Shapes For obese-to-thin female changes, male participants rated significantly higher on extroverted/reserved (M = 3.45, SD = 0.913, t(298) = 3.198, p = 0.000) and cooperative (M = 3.53, SD = 1.048, t(298) = 4.687, p = 0.018). For thin-to-obese changes, male participants rated significantly higher on agreeable (M = 3.63, SD = 0.989, t(298) = 3.316, p = 0.000) and confident (M = 3.29, SD = 0.914, t(298) = 2.716, p = 0.000), while female participants rated significantly higher on cooperative (M = 3.19, SD = 1.246, t(298) = -2.482, p = 0.007). For thin-to-normal changes, male participants rated significantly higher on warm-hearted (M = 3.13, SD = 0.983, t(298) = 0.857, p = 0.000).

3.3 Discussion

3.3.1 Trait Inferences for Obese-to-Thin vs. Obese-to-Normal Males For males becoming thinner, does greater thinness produce more positive impressions? Results showed that greater weight loss (obese-to-thin) had positive aspects for extraversion (seen as more dominant and warm-hearted) but negative aspects for openness (rigid, simple-minded) and agreeableness (critical). Obese-to-normal changes had negative aspects (stubbornness) but positive aspects (reliability). The results suggest that extreme thinness is not universally beneficial—compared to normal body shape, being too thin can elicit negative inferences of rigidity, simplicity, and criticalness. When changing from obese to normal, although seen as stubborn, the number of negative traits was fewer than for extreme thinness.

3.3.2 Trait Inferences for Thin-to-Obese vs. Thin-to-Normal Males Compared to thin-to-normal changes, despite greater weight gain, thin-to-obese males were perceived as having positive traits (careful, curious, open-minded) without any negative traits. In contrast, the smaller change of thin-to-normal elicited positive inferences (gentle, warm-hearted, calm) but also negative inferences (irritable). This suggests that when males gain weight, trait inferences become more positive. Compared to thin-to-normal changes, the greater magnitude of thin-to-obese changes did not produce negative inferences. Cui Xinqi (2014) used Implicit Association Tests to investigate implicit body shape stereotypes in work contexts, finding that participants more easily associated work-related positive words with medium body shapes compared to obese shapes. While that study showed preference for medium body shapes, our results suggest that the dynamic process of body shape change alters impression formation, with greater change magnitude producing more positive changes.

3.3.3 Trait Inferences for Obese-to-Thin vs. Obese-to-Normal Females Under societal pressure to be thin and widespread media promotion, many women relentlessly pursue perfect body shapes, making weight loss a lifelong endeavor. But is thinner always better? Results show that obese-to-normal females were perceived positively (extroverted, confident, cooperative), while obese-to-thin females, though seen as trustworthy, were also perceived as shy and negative. Cui Xinqi (2014) similarly found that normal-weight females were more likely to be hired than obese or thin females. Singh (1994) studied the relationship between waist-to-hip ratio and attractiveness in women, finding that thin individuals were neither considered attractive nor endowed with desirable personal traits—only normal-weight women with smaller waist-to-hip ratios were seen as both attractive and possessing excellent traits. Thus, even under demanding beauty standards for women, thinner is not always better; normal body shapes are more positive, healthy, and socially accepted.

3.3.4 Trait Inferences for Thin-to-Obese vs. Thin-to-Normal Females With increasing advocacy for thinness and beauty, does this mean weight gain is unacceptable? If allowed, how much weight gain is socially acceptable and positive? Results show that thin-to-normal females were perceived positively (trustworthy), while thin-to-obese females were seen as simple-minded and negative. This indicates that weight gain is acceptable when within normal ranges, leaving positive impressions, but exceeding normal ranges leads to negative personality trait inferences.

3.3.5 Effects of Participants' Own BMI on Trait Inferences Does one' s own body shape affect trait inferences about others? Results show that when inferring traits based on others' body shape changes, participants are influenced by their own body shape, making their own BMI an important factor. For both male and female body shapes under weight gain conditions, higher BMI correlated negatively with many positive traits (trustworthy, intelligent, curious) re-

garding extraversion and openness. Weight gain directly causes suspicion about unchangeable personal traits, creating negative impacts. However, some encouraging results emerged at different change magnitudes: for thin-to-obese female changes, participant BMI correlated negatively with trustworthiness, but for thin-to-normal changes, BMI correlated positively with trustworthiness. Similarly, for thin-to-normal male changes, participants perceived greater confidence compared to thin-to-obese changes. Although weight gain brings negative trait inferences, smaller weight gains produce positive changes in trait inferences. Meanwhile, weight loss correlated positively with many negative traits (critical, disorganized), suggesting that people with higher BMI view weight loss as not entirely positive. For obese-to-normal male changes, participant BMI correlated negatively with emotional instability, but for obese-to-thin changes, BMI correlated positively with emotional instability—greater weight loss produced more negative trait inferences. Whether gaining or losing weight, higher BMI correlated with many positive traits, suggesting that people with higher BMI are more likely to believe body shape changes are positive, especially regarding confidence—regardless of weight gain or loss, higher BMI participants viewed changes as increasing confidence.

3.3.6 Effects of Participant Gender on Trait Inferences for Body Shape Changes Gender differences significantly influenced trait inferences about target individuals. For male body shapes changing from obese to thin, male participants viewed them as more extroverted and gentle; for obese-to-normal changes, male participants viewed them as more agreeable without negative inferences. Female participants were more sensitive to male weight gain: for thin-to-obese changes, they viewed males as more anxious; for thin-to-normal changes, they viewed them as trustworthy but also stubborn.

For female body shapes changing from obese to thin, male participants viewed them as extroverted and cooperative but also reserved; for obese-to-normal changes, no significant gender differences emerged. For thin-to-obese changes, male participants viewed females as agreeable and confident, while female participants viewed them as cooperative; for thin-to-normal changes, male participants viewed females as warm-hearted. Thus, for females gaining weight, both male and female participants made positive trait inferences regardless of magnitude.

4. General Discussion

With improved living standards and decreasing physical labor, China' s obesity rate reached 12% in 2019, with the largest obese population in the world. However, contemporary society promotes "thin is beautiful," with mass media featuring thin celebrities and influencers and pervasive weight-loss products, creating a contradiction with reality. Many overweight or obese individuals resort to unscientific weight-loss methods like purging, starvation diets, and excessive exercise, causing physical and psychological harm. This study investigated whether body shape changes affect personality trait inferences.

4.1 Effects of Body Shape Change Direction on Trait Inferences

In social life, body shape influences impression formation. The public generally stigmatizes obesity, viewing obese individuals as lazy, noncompliant, unintelligent, weak-willed, dishonest, and lacking self-control (Brewis, 2014). Greenleaf et al. (2006) found that adolescents associated positive stereotypes with thin peers and negative stereotypes with fat peers, viewing thin peers as confident, happy, attractive, friendly, and intelligent. Thus, people infer personality traits from body shape, linking fatness with negativity and thinness with positivity. Can body shape change alter these established impressions? Our results confirm that body shape change does modify others' impressions. Experiment 1 found that compared to consistently thin, fat-to-thin changes elicited more positive trait inferences, possibly because participants associated weight loss with exercise and fitness, forming positive impressions. Compared to consistently obese, thin-to-fat changes elicited more negative inferences. These patterns were similar across genders, but more negative traits emerged for female weight gain. The experiments reaffirmed the "fat-negative" and "thin-positive" stereotypes, with body shape changes strengthening these associations. This may result from negative attributions for weight gain. Waller et al. (2012) used Implicit Association Tests with nutrition students and physical training students who regularly worked with obese populations, finding that frequent contact barely changed negative views, as they attributed obesity to lack of self-control, laziness, and emotional problems. Research also shows that the public considers weight discrimination justified, viewing obesity as self-caused by poor lifestyle habits, making obese individuals undeserving of sympathy (Gollust, Eboh, & Barry, 2012). Deep-rooted negative obesity beliefs cause people to ignore other causes of weight gain, linking the process to laziness and poor self-control. More negative evaluations of female weight gain suggest stricter societal standards for women's bodies. Since ancient times, Chinese culture has valued slender women ("gentle and graceful"), with descriptions like "tall and elegant" more often associated with beautiful women, making obesity a flaw. Western research similarly finds that obese women face more discrimination than obese men (Roehling et al., 2007; Puhl & Brownell, 2001; Fikkan & Rothblum, 2012). Agell and Rothblum (1991) argue that attitudes toward obese women are more negative because modern society values slimness.

Participants' own BMI also influenced trait inferences. Underweight participants made negative inferences about fat-to-thin body shapes regarding conscientiousness, while overweight/obese participants made positive inferences. This partially aligns with but also differs from previous research. According to social identity theory, individuals categorize themselves into groups and develop group identity, comparing their in-group with out-groups to enhance self-esteem and in-group status by derogating out-groups (Zhang Yingrui & Zuo Bin, 2006). For underweight participants, thin-to-obese changes represent departure from the thin in-group into the obese out-group, prompting negative inferences due to in-group protection. Alternatively, underweight participants may be more sensitive

to obesity and unable to accept weight gain, reacting negatively to thin-to-obese changes. However, our finding that higher-BMI participants viewed weight gain positively differs from Wang Chencheng (2012), who found that both underweight and obese individuals rejected obesity, and Teachman et al. (2003), who found that obese individuals showed similar aversion to overweight people as average-weight individuals, without in-group protection. This discrepancy may be explained by weight status moderating beliefs about obesity controllability (Allison, Basile, & Yuker, 1991). Overweight/obese participants may have personal weight-loss experience, gaining firsthand understanding of the uncontrollability of body shape changes, thereby altering negative views of weight gain. Compared to static obesity, the process of gaining weight elicits different attributions, producing different trait inferences.

Gender differences also emerged in trait inferences for body shape changes. Overall, male participants showed more negative attitudes toward body shape changes regardless of direction, while female participants were more positive. Men appear less accepting of body shape changes, evaluating both thin and obese body shapes negatively. This male negativity seems contradictory to the overall finding that fat-to-thin changes elicit positive inferences, but closer analysis reveals that male negativity is relative to female participants, not overturning the main conclusion. Research on thin body shapes is limited, but regarding obesity, Hebl et al. (2008) found that female participants were more 宽容 toward obese individuals while males held more negative attitudes. Domestic researcher Wang Chencheng (2012) similarly found that males showed stronger weight discrimination. Our study demonstrates this difference also applies to thin-to-obese changes. For fat-to-thin changes, male negativity may stem from our use of extremely thin images—past research found that college students associated not only obesity but also extreme thinness with negative traits like stupidity, unfriendliness, and disgust (Greenleaf et al., 2004). Since people evaluate both extreme fatness and extreme thinness negatively, negative attitudes toward changes between extremes are understandable.

Experiment 1 proved that body shape change can alter established trait inferences, but only examined different change directions. Experiment 2 further divided body shape into three levels (obese, normal, thin) to investigate whether different degrees of change produce different trait inferences.

For female body shapes, obese-to-normal changes elicited more positive attitudes than obese-to-thin changes, and thin-to-normal changes were more positive than thin-to-obese changes. For male body shapes, participants preferred obese-to-normal over obese-to-thin changes. These results reaffirm negative attitudes toward extreme body shapes, with changes from extreme to normal being most favored. Different BMI groups also showed preference for normal body shapes. Xue Xinqi (2014) found that compared to medium body shapes, people showed clear negative implicit stereotypes toward both thin and obese body shapes, with similar intensity but different content. Normal or medium body shapes are more associated with health and thus carry more positive connota-

tions. When body shape changes from extreme to normal, people perceive this as a positive, health-improving process, eliciting positive trait inferences.

However, contrasting with Experiment 1 where thin-to-obese males elicited some negative traits, Experiment 2 found that compared to thin-to-normal males, thin-to-obese males did not receive negative inferences despite greater weight gain. Instead, the smaller change of thin-to-normal produced positive inferences but also irritability. This may be because the comparison with normal body shape as an intermediate made the thin-to-obese change seem too large, leading participants to consider uncontrollable factors like illness, reducing negative attitudes. Puhl, Schwartz, and Brownell (2005) found that conveying biological, genetic, and uncontrollable factors about obesity improved attitudes, while emphasizing internal, controllable factors worsened stigma. For thin-to-normal changes, participants may have considered controllable causes like laziness and overeating, producing negative inferences. Female body shapes did not show this pattern, reaffirming more negative societal views of obese women and lower tolerance for female body shape changes. Research shows that obese women experience more discrimination than obese men in employment settings, with higher obesity associated with greater perceived discrimination (Roehling, Roehling, & Pichler, 2007). Notably, male participants in Experiment 2 did not show more negative views of obesity, instead being relatively 宽容 toward both weight gain and loss, possibly due to fatigue from numerous trials affecting judgments.

5. Conclusion

Two experiments revealed that: (1) Trait inferences for changing versus stable body shapes were generally consistent, with thin-to-obese changes more negative than consistently obese, and obese-to-thin changes more positive than consistently thin. (2) Regardless of body shape gender, obese-to-thin changes elicited more positive inferences than thin-to-obese changes. (3) Obese-to-normal changes were more positive than obese-to-thin changes, and thin-to-normal changes were more positive than thin-to-obese changes. (4) Participants' own BMI and gender were important factors influencing personality trait inferences about others.

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Note: Figure translations are in progress. See original paper for figures.