



Dad and Mom Bods? Inferences of Parenting Ability from Bodily Cues

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Abstract

Though much research has explored how facial and bodily features connote heritable fitness, particularly in the context of short-term mating, such cues similarly may influence perceptions of potential parenting ability. The current study explored how body fat variation and breast size in female targets and body fat and muscularity variation in male targets influence men's and women's perceptions of targets' positive (e.g., nurturance) and negative (e.g., hostility) parenting capacities. Participants viewed 4 female targets orthogonally manipulated along dimensions of adiposity (high vs. low) and breast size (small vs. large), and 4 male targets orthogonally manipulated along similar adiposity dimensions and muscularity (small vs. large) before indicating targets' inferred parenting ability. High-fat female targets were perceived to have more positive and less negative parenting abilities relative to low-fat female targets, an effect that was most pronounced among women; breast size did not influence perceptions of female parenting ability. For male targets, high fat and small muscles were perceived as more indicative of positive parenting abilities and less indicative toward negative abilities; the low body fat/high muscle male target was perceived to have especially negative parenting abilities. These results suggest body cues often associated with good genes and short-term mating success also systematically influence perceptions of parenting ability.

Keywords Body · Parenting perceptions · Body fat · Breast size · Muscularity

When identifying a potential mate most capable of satisfying reproductive goals, it is crucial to recognize whether such individuals possess the requisite heritable fitness to produce healthy offspring. Heritable fitness can be readily inferred through various facial and bodily features, with the presence of such heritable fitness cues becoming the basis of short-term mate selection (Jones et al. 2018; Lassek and Gaulin 2019), given the premium individual's place on physical attractiveness in such mating domains (Li et al. 2013). These preferences are indeed rooted in perceptions of prospective mates as appearing healthy and ultimately more desirable in short-term mating contexts (Brown and Sacco 2018). Despite this selection for attractiveness being largely in the service of identifying optimal short-term mates, it could be possible that the signal value of some good gene cues can be co-opted for

individuals to infer another's long-term mate value, particularly their abilities to parent offspring.

Highly sex-typical features (e.g., muscularity, large breasts) are deemed particularly attractive and especially desirable in short-term mating contexts. However, despite the contextual benefits of good genes for several features, the presence of these features may implicate prospective mates as costly in certain domains, including men's muscularity (Frederick and Haselton 2007). That is, the sexiness of muscularity coincides with perceptions of interpersonal dominance, which could ultimately be detrimental for a long-term mate, critical in providing parental care. Additionally, other features typically deemed unattractive may possess their own signal value specific to one's overall parenting abilities. One such unattractive feature could include high levels of adiposity (Tinlin et al. 2013), which could implicate someone as possessing the requisite resources and parental interest to invest in offspring despite the cost of not exhibiting the heritable fitness requisite for short-term mating (Hill et al. 2013b; McPherson et al. 2018). The current manuscript presents an investigation into identifying the inferred social value of various bodily features typically considered in short-term contexts to determine the concomitant signal value of them in parenting domains. Specifically, we focus on highly sex-typical body features in

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terms of muscularity for men and breast size for women, as well as considering the potential interactive effects such features would have with adiposity.

Inferences of Parental Investment

Compared to most species, and even other primates, human infants are born highly underdeveloped and require an extensive post-natal developmental period to reach psychosocial, physical, and reproductive maturity (Trivers 1972). Because human infants require significant commitment and resources to facilitate their future reproductive potential, it has been convincingly argued that humans evolved pair-bonding, whether monogamous or serially monogamous, to facilitate biparental investment in offspring (e.g., Quinlan and Quinlan 2007). Although female offspring investment is obvious in mammals, such as through pregnancy and lactation, there is also evidence that nonhuman and, to a greater extent, human males engage in both indirect care, such as resource provisioning and defense toward their offspring, and direct care, such as carrying and grooming (Kleiman and Malcolm 1981). Biparental investment not only increases offspring survivability, but men's investment in offspring can reduce the energetic investment burden of women, which may have played a role in shortening female interbirth intervals, thereby increasing human's overall reproductive success (Gettler 2010).

The import of biparental investment thus necessitated the identification of mates most capable of providing optimal parental care. Such capability is most apparent through altruistic behaviors, themselves predictive of lifetime reproductive success (Arnocky et al. 2017). Indeed, signals of prosociality connote paternal ability and are deemed especially attractive in long-term mating (Barclay 2010; Farrelly 2013). This inference of long-term mate quality through ostensibly prosocial behavior additionally elicits a downstream inference of a prospective mate's interest in the monogamy necessary for biparental investment, thus solving a critical reproductive problem for men and women (Brown and Sacco 2019). For women, men's connoted interest in monogamy implicates them as unlikely to divert resources away from their mates and offspring, whereas women's interest would heighten paternal certainty for men to encourage their continued resource provisioning to offspring.

Inferred Social Value of Male and Female Features

Along with inferences of parental abilities through individuals' behavioral repertoire could be inferences of specific physical features, namely through bodily and facial cues, from

which one can infer another's social affordances to determine whether conspecifics are capable of satisfying reproductive needs (Pirlott and Cook 2018). A preponderance of evidence has identified various physical features associated with general attractiveness that are predictive of producing healthy offspring. For example, women's waist-to-hip ratio veridically connotes their overall nubility, which predicts greater likelihood of conception (Lassek and Gaulin 2019). Additionally, muscular men are deemed especially sexy and regarded as possessing good genes in their own right (Frederick and Haselton 2007); in fact, men's muscularity and fat free mass are both highly predictive of their reproductive success (Lassek and Gaulin 2009). Despite considerable understanding of the communicative properties of these physical features in health domains, comparatively less is known about how such physical cues influence downstream perceptions of other aspects of reproductive value. Part of this reproductive value includes an understanding of how good gene cues may be indicative of a prospective mate's parental qualities. Given the importance of biparental investment in facilitating offspring survivability, men and women would have benefited from evolved tendencies to infer a prospective mate's parental capacity from these cues in addition to inferring one's capability of producing healthy offspring.

Men and women are indeed capable of inferring parental abilities from certain physical cues. For example, men are perceived as having the best paternal ability when they have a full beard compared to when they have only stubble or are clean-shaven male, an inference ostensibly tied to perceptions of them as being more capable of protecting, and investing in offspring (Dixson and Brooks 2013; Dixson et al. 2019). Women with higher resource concerns further prefer facial masculinity, which may be associated with masculine men's ability to obtain and protect resources (Lee et al. 2012). Given that masculinized facial structures are indicative of men's muscularity (Holzleitner and Perrett 2016; Sell et al. 2009), it could be possible that the muscularity deemed attractive for mating may also generate inferences of parenting ability (Frederick and Haselton 2007). Nonetheless, it remains less clear how inferences of heritable fitness could be consistent or inconsistent with inferences of parenting ability. The attractive dominance of muscularity could coincide with inferences of greater capability to protect one's family, and therefore generate perceptions of muscular men as being better parents (Snyder et al. 2011); this would suggest an overlap in the signal value of good genes and parental ability. Conversely, the interpersonal dominance associated with muscularity may similarly implicate muscular men as engaging in more hostile parenting behaviors, suggesting women's selection of muscularity could represent a trade-off for selecting good genes relative to paternal ability (i.e., short-term vs. long-term mating considerations; Buss and Schmitt 1993).

Interestingly, women's cues to heritable fitness seem more veridically indicative of maternal ability and interest. Women with feminized facial structures report a desire to have more children (Smith et al. 2012), suggesting that attraction to physical features indicative of estrogen may dually connote maternal interest (Little et al. 2014). This signal value of femininity could potentially correspond with other attractive bodily features in women implicating them as optimum parents. One such feature could include women's breasts, with larger breasts being perceived as especially attractive and nurturing toward one's offspring (Dixon et al. 2015), with firm breasts being indicative of women's fecundity (Havlicek et al. 2017). Coinciding with the selection of an optimal breast size is the selection of a narrow waist, out of which the preference for greater adiposity in the hips was ostensibly borne (Brooks et al. 2015). Greater adiposity in women is associated with greater access to metabolic resources, which heightens their attractiveness to men motivated by resources acquisition (Hill et al. 2013a). This attractiveness may implicate such women as possessing access to resources required for parental investment, therefore indicating women with greater adiposity as capable of better parental abilities. Additionally, individuals typically recognize the so-called dad bod as indicative of greater paternal investment (McPherson et al. 2018), thereby implicating a degree of adiposity as desirable for childcare.

Conversely, greater body mass may lead to perceptions of both men and women as overly permissive, given prevailing anti-fat stereotypes of adiposity connoting poor impulse control. Indeed, some evidence suggests that for both men and women, higher body fat percentage is associated with greater sensitivity to food reward delay (Rasmussen et al. 2010b), and obese persons report greater urgency, lack of perseverance, and sensitivity to reward in the context of dispositional self-regulatory capacity (Mobbs et al. 2010). Higher body fat may be veridically associated with poorer self-regulation, resulting in reduced perceptions of parenting capacity in both male and female targets.

Current Research

The current study sought to clarify potential competing predictions for how bodily features connoting heritable fitness may or may not dually connote parental ability. Specifically, we considered adiposity and sexually dimorphic bodily traits wherein variations track perceptions of physical attractiveness, as indexed by muscularity in male bodies and breast size in female bodies. If physical cues of good genes are also indicators of parenting ability, then individuals should associate low body fat and more muscular male bodies with greater positive parenting ability and reduced negative parenting ability, and associate low female body fat and large breasts with greater positive parenting ability and reduced negative parenting ability. Additionally, participant sex should moderate these

findings such that opposite sex parenting evaluations should be more pronounced than same sex parenting abilities. Data and materials are available at osf.io/45tpg.

Method

Participants

We recruited a sample of 844 students at a public university in Southeastern USA in exchange for course credit. Because the consideration of sex differences was critical to our analyses, we excluded 13 participants identifying as neither male nor female, resulting in a final sample of 831 participants (637 women, 194 men; $M_{Age} = 20.14$ years, $SD = 4.13$; 56.5% White). A sensitivity analysis indicated we were sufficiently powered to detect small effects (Cohen's $f = 0.04$, $\beta = 0.80$). However, our stop rule was to collect data until the end of the university semester when the participant pool closed.

Materials and Procedure

Target Body Content Participants viewed four male and four female computer-generated target bodies that systematically varied in bodily dimensions from the UCLA Body Matrices (Gray and Frederick 2012). Both matrices had eight levels of body fat, with the male bodies possessing four levels of muscularity and the female bodies possessing four levels of breast size. For both sexes, we identified a central body in the matrix that represented the ideal male or female body and selected bodies 2 units away for each dimension to ensure a high-fat and low-fat body target for both sexes that had either small or large muscles or breasts (see Fig. 1). Faces were obscured to prevent biasing. Participants evaluated each target in a randomized and counterbalanced order.

Parental Perceptions We assessed perceptions of each target's parental qualities using a composite measure of 36 items derived from several self-report measures of parental qualities that were modified to assess other reports (e.g., Buckels et al. 2015; Lovejoy et al. 1999), as well as several ad hoc items. We standardized each item along 7-point Likert-type scales (1 = disagree strongly; 7 = agree strongly), with higher scores reflecting greater agreement with a statement describing the target's parental quality. Aspects of parental ability were further considered along dimensions of positive and negative parental behaviors. Positive dimensions included items pertaining to nurturance (e.g., "A newborn baby would curl its hand around this person's finger"), protection ("This person would feel compelled to punish anyone who tried to harm a child"), caring ("Babies melt this person's heart"),

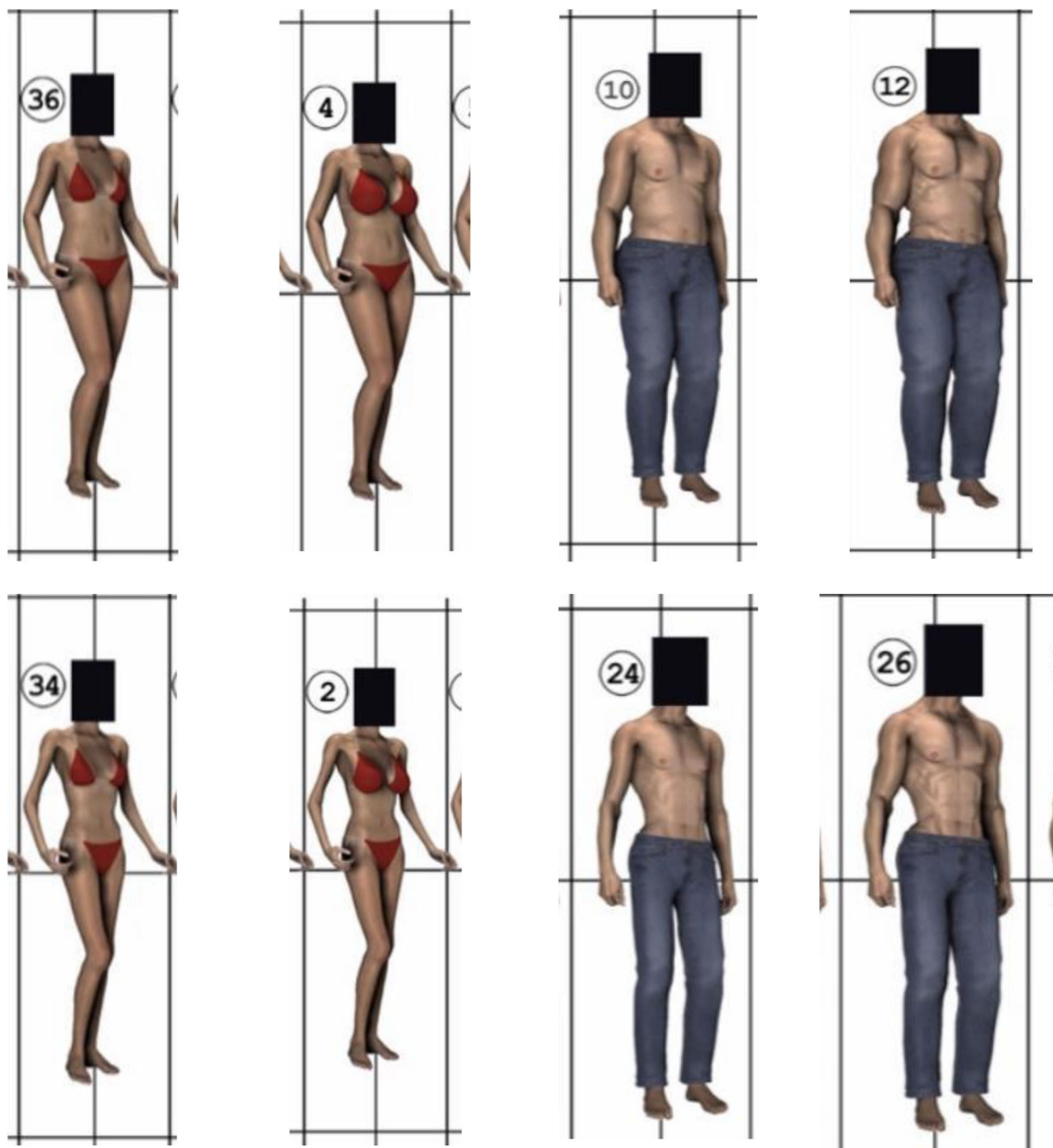


Fig. 1 Social targets varying in low (top row) and low body fat (bottom row), with small (left column) and large breasts (right column) for female

targets and small (left column) and large muscles (right column) for male targets

supportiveness (“This person tries to teach their child new things”), and general positivity (“This person seems like they would help their child with homework”). Negative dimensions included hostility (“This person grabs or handles their child roughly”), dislike (“This person thinks kids are annoying”), and general negativity (“This person seems like they would accept a call during their child’s game or recital”).

Though we initially considered analyzing each positive and negative dimension separately, this was not statistically warranted. All but 3 correlations between individual positive and individual negative subscales exceeded $r = 0.40$, with more than half exceeding $r = 0.50$. Furthermore, across targets, reliability among

positive and negative parenting dimensions was high (all $\alpha_s > 0.79$). We therefore aggregated both parenting dimensions into separate composite perceptions of positive and negative qualities for parenting for each target, where higher values indicated more positive/negative perceptions.

Consenting participants were instructed to evaluate a series of images in terms of the extent to which they appeared to typify a specific parenting behavior, with the UCLA Matrices as the targets they evaluated, resulting in eight unique trials. Presentation of stimuli was randomized and counterbalanced on a between-subjects basis. This was followed by demographics provision and debriefing.

Results

Given the asymmetry in physical features for which men and women are selected (i.e., the breasts for women, muscularity for men), we conducted separate analyses for both sexes. Additionally, because of the added complexity with the negative and positive qualities of parenting in a single omnibus model, we further found it prudent to conduct separate analyses for such qualities, thus resulting in four omnibus analyses.

Positive Parenting Perceptions of Female Targets

We conducted a 2 (Participant Sex: Male vs. Female) \times 2 (Target Body Fat: Low vs. High) \times 2 (Target Breast Size: Small vs. Large) mixed-model ANOVA with repeated measures over the latter two factors. A main effect of Body Fat indicated that participants perceived high-fat targets as possessing more positive parenting qualities ($M = 4.73$, $SD = 0.81$) than low-fat targets ($M = 4.32$, $SD = 0.89$), $F(1,829) = 87.37$, $p < 0.001$, $\eta^2_p = 0.095$). Effects were further qualified by a Participant Sex \times Body Fat interaction ($F(1,829) = 4.31$, $p = 0.038$, $\eta^2_p = .005$). Post hoc independent samples t tests indicated no difference emerged in perceptions of low-fat targets between women ($M = 4.32$, $SD = .91$) and men ($M = 4.32$, $SD = .85$), $t(829) = 0.09$, $p = 0.924$, $d < 0.01$). Conversely, women reported more positive perceptions of high-fat targets ($M = 4.76$, $SD = 0.83$) than did men ($M = 4.61$, $SD = 0.74$), $t(829) = 2.34$, $p = 0.020$, $d = 0.19$). No other effects emerged for positive parenting perceptions. No other main effects or interactions emerged ($F_s < 1.65$, $p_s > 0.200$).

Negative Parenting Perceptions of Female Targets

We conducted a 2 (Participant Sex: Male vs. Female) \times 2 (Target Body Fat: Low vs. High) \times 2 (Target Breast Size: Small vs. Large) mixed-model ANOVA with repeated measures over the latter two factors. A main effect of Body Fat indicated that participants had more negative parenting perceptions of low-fat targets ($M = 4.19$, $SD = 0.85$) than high-fat targets ($M = 3.80$, $SD = .80$), $F(1,829) = 83.51$, $p < 0.001$, $\eta^2_p = 0.092$). No other significant effects or interactions emerged for negative parenting ($F_s < 1.93$, $p_s > 0.165$).

Positive Parenting Perceptions of Male Targets

We conducted a 2 (Participant Sex: Male vs. Female) \times 2 (Target Body Fat: Low vs. High) \times 2 (Target Muscularity: High vs. Low) mixed-model ANOVA with repeated measures over the latter two factors. A main effect of Body Fat indicated that high-fat targets were perceived as having more positive qualities ($M = 4.44$, $SD = 0.78$) than low-fat targets ($M = 4.32$, $SD = 0.77$), $F(1,829) = 8.18$, $p = 0.004$, $\eta^2_p = 0.010$

such that participants had more positive parenting perceptions. An additional main effect of muscularity indicated that low-muscularity targets were perceived as having more positive qualities ($M = 4.45$, $SD = 0.70$) than high-muscularity targets ($M = 4.31$, $SD = 0.74$), $F(1,829) = 15.84$, $p < 0.001$, $\eta^2_p = 0.019$). No other effects emerged ($F_s < 1.91$, $p_s > 0.167$).

Negative Parenting Perceptions of Male Targets

We conducted a 2 (Participant Sex: Male vs. Female) \times 2 (Target Body Fat: Low vs. High) \times 2 (Target Muscularity: High vs. Low) mixed-model ANOVA with repeated measures over the latter two factors. A main effect of Body Fat indicated that participants perceived low-fat targets as having more negative parenting qualities ($M = 4.18$, $SD = .79$) than high-fat targets ($M = 4.02$, $SD = .78$), $F(1,829) = 10.62$, $p = 0.001$, $\eta^2_p = 0.013$). Another main effect of Target Muscularity indicated that high-muscularity targets were perceived as having more negative qualities ($M = 4.19$, $SD = 0.75$) than low muscularity male targets ($M = 4.01$, $SD = 0.70$), $F(1,829) = 28.07$, $p < 0.001$, $\eta^2_p = 0.033$). Effects were further qualified by a Body Fat \times Muscularity interaction ($F(1,829) = 6.92$, $p = 0.009$, $\eta^2_p = 0.008$). Post hoc paired samples t tests indicated that the low-fat/high-muscularity target was perceived as possessing more negative qualities ($M = 4.31$, $SD = 0.98$) than the high-fat/high-muscularity target ($M = 4.07$, $SD = 0.97$), $t(830) = 5.35$, $p < 0.001$, $d = 0.24$). The low-fat/low-muscularity target was similarly perceived as having more negative qualities compared with the high-fat/low-muscularity target, albeit at a substantially reduced magnitude compared with the former ($t(830) = 1.97$, $p = 0.049$, $d = 0.08$).

Discussion

The current study provides evidence that bodily cues to physical health elicit systematic perceptions of parenting ability in both male and female targets. Specifically, this evidence was consonant with a trade-off hypothesis, such that cues previously demonstrated to be associated with good genes were indicative of reduced parenting ability. With male targets, these perceptions emerged for those low in adiposity and high in muscularity, with both features independently associated with lower perceptions of positive parenting ability and additively associated with greater perceptions of negative parenting ability. Such results are consistent with previous evidence that women historically solved problems with reproduction in multiple ways (i.e., strategic pluralism), in this case preferring one set of bodily features for offspring production and another set of features for offspring care (Gangestad and Simpson 2000). Indeed, previous findings implicating muscularity as particularly sexy in women suggests such body dimensions connote higher levels of dominance that could implicate them

as being not possessing the requisite warmth for parenting (Frederick and Haselton 2007). Additionally, such interpersonally dominant men prefer pluralistic mating strategies that could undermine perceptions of them being interested in providing resources toward their partners and offspring (Lassek and Gaulin 2009; Lukaszewski et al. 2014).

Interestingly, for both male and female targets, as well as men and women's perceptions in our sample, this study obtained consistent evidence that high body fat elicited perceptions of positive parenting ability and lower perceptions of negative parenting ability. Although high body fat and obesity are associated with reduced self-regulatory capacity (Mobbs et al. 2010; Rasmussen et al. 2010a), suggesting participants might consequently view such targets as too permissive with children and thus produce lower perceptions of parenting ability, the opposite was true in our sample, which aligns with the trade-off logic. The most likely explanation for this finding is the fact that in order to maintain high body fat composition, one must have access to significant resources, and such resource access itself may lead to perceptions that high body fat targets would have more resources to commit to potential offspring, thus producing positive parenting perceptions of such targets (Hill et al. 2013a). Indeed, past research shows that when made to feel economically poor or physiologically hungry, men prefer heavier women, suggesting that when resources are scarce, men prefer women whose bodies communicate greater resource access (Nelson and Morrison 2005). Though these researchers did not assess men's perceptions of heavier female targets' parental ability, our results nonetheless are consistent with the idea that body weight communicates access to resources, which acts as a cue to parental ability.

Though few differences emerged for men and women's perceptions, we did find that women were especially likely to associate female body fat with positive parenting perceptions. Given women's historically greater investment requirements in offspring, as outlined in Parental Investment Theory (Trivers 1972), women may simply be more sensitive to cues indicating parenting ability, including female body weight. Recognition of such parental ability could be in the service of identifying other prospective mothers' propensity to engage in alloparenting, which would increase the survival of their own offspring (Bentley & Mace, 2012). Although men's recognition of maternal ability in prospective mates would prove advantageous for identifying reproductive opportunities, reproductive asymmetries faced by women could heighten their sensitivity toward cues that would assist in identifying parental allies.

Limitations and Future Directions

Although our findings remain consonant with previous findings, the current study is not without its own limitations. One

weakness is the lack of a true control condition. In essence, we used targets that were two units above and below the ideal value for body weight, breast size, and muscularity, respectively, based on previous research in which these stimuli were borrowed from (Gray and Frederick 2012). Future research would benefit from including these ideal targets as to determine the directionality of parenting perception effects more readily. Such consideration would more clearly allow for a determination of whether high body fat produces more positive parenting perceptions, low body fat produces less positive parenting perceptions, or a combination of both. Additionally, our sample was predominantly college-age students ($M_{Age} = 20$ years), thus limiting our generalizability of findings to developmental stages more concerned about parental investment (e.g., Krems et al. 2017). It is unlikely that our sample was comprised of many individuals who had children. A broader age range sample might yield differing results based on whether participants have or do not have children, given the fact that parenthood heightens individuals' proclivity toward adopting precautionary attitudes (Kerry and Murray 2019). Alternatively, future studies could temporally activate parenting motives through priming, as such procedures downregulate the salience of short-term mating motives and may heighten acuity toward parental cues specifically (Beall and Schaller 2019).

Future research could further determine why female breast size was unrelated to parenting ability in our sample. For example, past research finds that nurses perceive obese women with large breasts to experience more difficulty with breastfeeding, which might suggest that the high body fat/large breast female in our sample might be perceived as less capable of providing nurturance (Katz et al. 2010). Furthermore, past research demonstrates a relationship between resource scarcity and breast size preferences in men, such that men manipulated to experience resource scarcity via a hunger manipulation preferred larger female targets with larger breasts than did satiated men, as breast size is associated with fat reserves, which may be particularly desirable to resource-deprived men as a cue to female offspring investment capacity (Swami and Tovée 2013). Given these findings, perhaps men's perceptions of parenting ability as they relate to breast size (and perhaps even body weight) might be particularly impacted by manipulations of resource scarcity.

Future research could consider additional physical features indicative of relationship value. This could include identifying how facial structures connoting personality connote parental ability, given the fact that personality is associated with preferred mating strategies. For example, highly agreeable individuals prefer monogamous mating strategies with sociosexually restricted individuals (i.e., those dispositionally interested in monogamy) and prefer facial structures veridically connoting agreeableness (Brown et al. 2019; Schmitt and Shackelford 2008). It would seem sensible to predict

structures connoting agreeableness would be inferred as highly parental and therefore capable of investing in offspring. Conversely, extraversion is associated with greater interest in promiscuity, with such structures being preferred by those utilizing promiscuous mating strategies (Brown and Sacco 2017), which implicates extraverted individuals as less interested in investing parentally. Additionally, extraversion's association with physical strength in men could implicate extraverted men as being particularly aggressive in parental domains (von Borell et al. 2019). Extraverted faces would be perceived as being less capable of parenting.

Conclusion

Given the significant value of biparental investment for human offspring survival, humans should be especially sensitive to cues in others that may communicate parenting ability. Consistent with this logic, we found that men and women demonstrated systematic perceptions of target parenting ability based on physical features. Specifically, men and women viewed high body fat male and female targets as having more positive and less negative parenting ability. Low adiposity and high muscle male targets were perceived to have more negative parenting abilities. The extent these perceptions are veridical should be elucidated in future research.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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