The effect of personal grooming on self-perceived body image

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Synopsis

Objective: Grooming behaviours, including application of fragranced products, are thought to reflect a means of managing social impressions and self-image. While application of deodorants has previously been shown to make individuals appear more confident to others, few studies have specifically examined the psychological effects of such rituals on the wearer. Here we investigated how grooming behaviours affect self-perceived body image, a central component of an individual's self-image.

Methods: In two separate experiments, using a psychophysical forced choice task, male and female participants with a normal body mass index (BMI) indicated whether projected life-size images of their own body were bigger or smaller than their actual size. In the experimental condition participants applied a fragranced deodorant before performing the task, while in the control condition no product was applied. Our dependent measures were the Point of Subjective Equality (PSE), the size at which participants report their body is subjectively equal to their actual body size, and the Difference Limen (DL), the amount of change in body size distortion necessary for it to be reliably detected. These measurements provide an index of attitudinal and perceptual components of body image respectively.

Results: Both male and female participants who, at baseline, over-estimated their body size, made significantly more accurate judgments about their body size, as measured by the PSE, following application of a fragranced deodorant or antiperspirant than they did in the control condition. This effect was seen in the absence of differences in perceptual sensitivity to changes in body size (DL) across groups and conditions. People who underestimated their body size did not show this effect. Of note, both male and female over-estimators had a significantly larger BMI than under-estimators.

Conclusion: These results demonstrate that the attitudinal component of body image is malleable and can be influenced by everyday grooming routines, suggesting such behaviours have psychological benefits for both genders, beyond their basic hygiene function. However there are individual differences in people's susceptibility to these effects, perhaps reflecting variability in self-esteem.

Keywords: grooming; deodorant; fragrance; body-image; self-esteem.

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Introduction

Self-grooming such as applying make-up, lotions or creams, perfume and deodorants forms a common everyday activity. However, surprisingly little research has been done to investigate people's motivations for engaging in this behaviour, or indeed the psychological effects of grooming. From an evolutionary point of view, grooming has a predominantly social function: primates, for example, use grooming to form and maintain relationships with other group members [1], and spend much more time grooming others than would be expected based on hygiene function alone.

In humans, self-grooming occurs as a form of impression management to improve one's physical appearance and social perception. For example, Daly *et al* [2] studied grooming (defined as grooming one's hair, straightening one's clothes, and gazing at oneself in the mirror) in people dining in a restaurant. They demonstrated that grooming occurred significantly more often in members of a couple in the early stages of dating compared to married or close friend couples, and couples who were established daters. There was an inverse relationship between time spent on grooming and length of the relationship, so that people who were hoping to meet new people spent the most time, while married couples spent the least amount of time grooming. Furthermore, self-grooming related to hygiene, especially the use of products that influence odour, such a body spray, deodorants, aftershave, and shower gels, appears to play a role in securing sex and relationships by creating a self-image that is believed to be attractive to the opposite sex [3].

Odours have previously been shown to bias perceptual processing [4]. For example, when people were unconsciously exposed to a citrus-scented cleaning product they responded faster to cleaning-related words in a lexical decision task, planned more

cleaning-related activities, and increased their incidental cleaning behaviour [5]. Ambient odours can have a remarkable effect on the way an individual is perceived by and respond to others in a social setting. For example, people tend to rate others more positively in the context of a pleasant odour [6]; attractiveness ratings for male faces were positively correlated with sexiness of body odour rated by an independent group of women [7] and male faces were judged as less attractive by women when associated with an unpleasant odour [8]. Furthermore, fragranced grooming products such as perfumes and deodorants have also been shown to influence behaviour of the wearer, making individuals appear more confident or attractive after application [9, 10].

The aforementioned studies have focused on the direct effect of a pleasant odour on perceived attractiveness by others. However, a question perhaps more relevant to daily life is how the act of applying a fragranced grooming product influences self-concept, self-confidence, and self-perceived attractiveness of the individual applying it. In the current study we have focused on the way grooming affects self-perceived body image, as this has previously been identified as a major factor in self-construct [11], and because body size and shape play a key role in sexual attractiveness [12]. Of particular relevance to the current study, perceived body image can have a profound influence on an individual's attitude towards themselves [13]. A negative view of one's body was shown to be associated with lower social self-esteem and greater social anxiety [14]. Hence perceived body size can have a dramatic impact on social interactions by influencing an individual's social confidence. As far as we are aware, there are no studies that have investigated the effects of the use of a fragranced grooming product on body image.

Body image is viewed as a multidimensional construct [15, 16]. Although there

are variations in existing models that conceptualize body image, these generally comprise a perceptual component that refers to an individual's accuracy in judging their size and shape [17, 18, 19]; and an attitudinal component that addresses feelings towards, satisfaction with, or investment in, body image [15, 17, 20, 21]. Several studies have demonstrated that perceptual aspects of body representation are malleable and can be altered by environmental stimuli [22]. For example, participants reported a feeling of shrinkage of their waist following a perceptual illusion [23], which suggests that the idea of body size itself is malleable.

The aim of the current study is to examine whether the act of grooming using an everyday consumer product is able to influence perceptual and attitudinal aspects of body image. Using a classical psychophysical technique, which permits the subjective measurement of attitudinal and perceptual components within a single task [24, 25], we investigate whether applying a fragranced deodorant or antiperspirant selectively facilitates body-image perception, where the discrepancies between actual and perceived body image are reduced. Of particular interest, we examine the effects of one aspect of grooming, the use or non-use of deodorant, on body image in men and women. It has previously been reported that women have a more negative body image than men, invest more in their appearance, and experience more dissatisfaction with their physical appearance than men [26, 27]. There is also evidence that women have a greater focus on body states, as expressed by greater brain activity in the extrastriate body area in women who viewed bodies, as compared to men [28]. Additionally, they have been reported to over-estimate body size to a greater extent than men [29]. However, it is unknown whether women will be more sensitive to the possible ameliorating effects of grooming.

Materials and methods

Design

The study employed a within-subjects design comparing performance on a body image task in a grooming (G) condition in which participants sprayed on a deodorant body spray with a non-grooming (NG) condition where no product was used. The order in which participants performed the G and NG conditions was counterbalanced across participants.

Experiment I

Participants

Twenty-four British men (mean age 22.8 ± 4.0 years; age range 18-34 years) took part in the experiment. Mean Body Mass Index (BMI – calculated by dividing body weight (kg) by squared height (m^2) was 23.0 ± 3.2 (range 18-28). Inclusion criteria were male gender, British nationality or permanent residency, aged between 18-35 years, normal sense of smell, and normal or corrected to normal vision and hearing. Nationality or permanent residency in Britain was imperative to ensure a similar socio-cultural background among participants. Participants were excluded if they were allergic to any of the ingredients of the deodorant, were taking medication that affected their reaction speed or sense of smell, had a BMI score below 18 (underweight) or above 30 (obese), suffered from migraines or severe headaches, and had a current or past affective or psychiatric disorder, or an eating disorder. Participants were students and residents from the local community (Bangor, UK) and were recruited through a participant panel, (a list of people who have previously agreed to be contacted about future psychology studies) as well as through advertisements in university buildings and on the university

intranet. All participants gave written informed consent prior to participation and were paid for their participation. The study was approved by the Ethics Committee of the School of Psychology, Bangor University, UK, as well as by Unilever Research & Development, Port Sunlight, UK.

Materials

The product used in the current study was a Lynx deodorant body spray formulation containing a novel fragrance, supplied by Unilever Research & Development, Port Sunlight, UK, that was provided in a 150 mL spray can. Black cotton T-shirts were handed out to participants to wear on the day of testing. Photographs of each participant in tight black clothing (black T-shirt, black thermal trousers, black socks) were taken with a Canon PowerShot S50 digital camera. Photographs were modified to fit on a white background, and the face was obscured, using Adobe Photoshop version 7.0. Stimuli were presented with specialised software to measure body size distortion [30], using a Toshiba Satellite Pro A200 laptop attached to an Optoma EP758 projector.

Measures

Medical History Questionnaire: A questionnaire was designed to confirm that participants had not had adverse reactions to medication or personal care products in the past, and to ensure participants met our inclusion / exclusion criteria.

Olfactory Screening Test: participants were presented with one of 12 ‘Sniffin’ Sticks’ [31]. Each stick was waved under their nose four times, and participants were asked to select from a list of four verbal descriptors the one that best fits their perception of the

odour. Participants who failed to correctly identify 8 or more of the 12 odours were excluded from the study. This test was used as a cut-off measure and the data were not analysed further.

Body Image Measurement:

Software developed by Gardner and Boice [30] was used to measure participants' body image. Two psychophysical tasks were used.

Method of Adjustment (MOA): This task employs a commonly used procedure for measuring the accuracy of body size estimations, using an image of the participant in tight-fitting black clothing that is projected life size on a screen. The projected image is initially between ± 20% and ± 30% too wide or too thin, never representing participants' actual size. Participants were asked to adjust the image until they believed it was a true representation of their actual body size, using the left and right mouse buttons. The software then records the percentage of over- or underestimation for each trial. Participants completed ten trials, with half beginning with images that were too thin and half with images that were too wide. Scores obtained on this task were used to classify a participant as either an 'under-estimator' (i.e. someone who underestimates their actual body size) if the score was less than 0, or an 'over-estimator (i.e. someone who overestimates their actual body size) if the score was larger than 0.

Adaptive Probit Estimation (APE) task: APE is an advanced psychophysical technique that allows measurement of the percentage of distortion in body size estimation as well as the amount of change necessary for a participant to reliably detect a change in their body size. Specific details about this technique are beyond the scope of this paper and can be found in Gardner and Boice [30]. Participants were presented with

320 size distorted static video images of their body and were asked to judge whether each image was "too wide" or "too thin", using buttons on the computer mouse to make their response. Estimates of how accurately a participant judged their body size is found by a measure called the point of subjective equality (PSE). The PSE represents the level of distortion whereby the participant reports that the depicted body size is subjectively equal to their own. Being a measure of subjective size, it is reflective of non-sensory, affective and attitudinal factors.

In addition to the PSE, the difference threshold or difference limen (DL), sometimes called a just noticeable difference, is also measured. This is the amount of change in body size distortion necessary for the participant to detect a change in body size 50 percent of the time. This measures how sensitive the participant is to detecting changes in their body size, and represents the sensory component of body size estimation. In psychophysics, these two factors are largely independent of one another. That is, a subject may subjectively judge his body size as larger than it actually is and yet be sensitive to detecting changes in his body size, or vice versa.

In sum, the MOA task and the difference limen may be viewed as perceptual aspects of body image that remain stable over time and in different circumstances. The PSE task, on the other hand, depends on affective components of body image. Therefore, the outcome score on the PSE task may fluctuate in different situations, and may be dependent on a variety of factors, e.g. whether the person feels sweaty or not.

Procedure

Participants were invited to attend three sessions that were always separated by 3-4 days. The first screening session was the same for all participants; they gave informed

consent, filled in the Medical History Questionnaire, performed the Olfactory Screening Test and had their photograph taken while they wore tight-fitting black clothing. At the end of the session they received a can of deodorant and a clean black cotton T-shirt and were instructed to use this product instead of their usual deodorant for the duration of the experiment.

The next two sessions were the G and NG conditions, the order of which was counterbalanced across participants. In preparation for both of these sessions, participants were asked to come in wearing the black cotton T-shirt, but NOT apply any deodorant before attending the laboratory that day. All testing took place in the afternoon to ensure that participants had been wearing the T-shirt and been without underarm fragrance for some time.

In the G condition, upon arrival at the laboratory participants were asked to change into a clean black cotton T-shirt before they completed the APE task. In this condition participants applied the deodorant when they changed.

In the NG session only, participants performed the Method of Adjustment task upon arrival, before changing into a clean black cotton T-shirt then completing the APE task. In this condition participants did NOT apply the deodorant when they changed.

Experiment II

Participants

Twenty-four women participated in the second part of the experiment (mean age 36.4 ± 6.0 years, age range 26-48 years). Their mean Body Mass Index (BMI) was 24.4 ± 3.0 (range 19-29). Inclusion and exclusion criteria were as described for Experiment I. The female participants were recruited through the Unilever Consumer Studies Centre in

Port Sunlight and were local residents. All participants gave written informed consent and were paid for their participation. The study was approved by the Ethics Board of Unilever Research & Development, Port Sunlight, UK.

Materials

The fragrance used in Experiment II was a commercially available spray-on antiperspirant ('Dove Go Fresh', supplied by Unilever Research, Port Sunlight, UK) that was provided in a 150 mL spray can. Cotton T-shirts were handed out to participants to wear on the day of testing. Photographs of each participant in tight black clothing (black fitted T-shirt, black leggings, black socks) against a white background were taken with an Olympus C-310 digital camera. As in Experiment I, stimuli were presented with specialised software to measure body size distortion [30], using a Dell D610 laptop attached to a Projection design F2 data projector to produce a life size image.

Measures and procedure

The measures and procedure in Experiment II were identical to those described under Experiment I.

Results

Experiment I

MOA task

Using one measure of body size distortion, the Method of Adjustment task, the male participants were classified as either an under-estimator (if their score was below 0) or an over-estimator (if their score was greater than 0). Fifteen men under-estimated their body size (mean MOA score -3.6% ± 3.2, range: -0.2 to -8.8), while the remaining nine men over-estimated their body size (mean MOA score 5.9 ± 6.3, range: 0.5 to 20.5). The classification as an over- or under-estimator was used as a between subjects factor in subsequent analyses. To assess whether accuracy in estimation of body size differed between over- and under-estimators, MOA scores were corrected to absolute values and entered into an independent samples *t*-test. We found no differences in accuracy with regards to estimating body size between male over- and under-estimators ($t(22)=1.207$, $p=.240$).

Interestingly, a one-sided independent samples *t*-test showed that the over-estimators had a significantly greater BMI compared to the under-estimators (mean BMI over-estimators: 24.5±3.1; mean BMI under-estimators: 22.1±2.9; $t(22)=1.951$, $p=.032$).

Difference Limen

A 2 by 2 ANOVA with Grooming Condition (G, NG) as a within-subjects factor and Type Estimator (under-estimator, over-estimator) as a between-subjects factor showed no significant main effects or interactions in DL scores (see Figure 1). This indicates that the ability to detect changes in perceived body size remains stable across

conditions.

PSE task

We then examined the experimental outcome measure: the PSE value or attitudinal component of body image. Raw PSE scores were corrected to absolute values so that the mean score for each group of estimators correctly reflected the amount of perceived body size distortion from zero (the true body size). The absolute PSE scores were again entered into a 2 by 2 ANOVA using Grooming Condition (G, NG) as a within-subjects factor and Type Estimator (under-estimator, over-estimator) as a between-subjects factor. Results showed a significant interaction between Grooming Condition and Type Estimator ($F(1,22)=5.528$, $p=.028$). Follow-up paired t-tests showed that this interaction was driven by a significantly more accurate PSE score in the Grooming compared to the Non-grooming sessions in the over-estimator group ($t(8)=-2.776$, $p=.024$), whereas no differences in PSE scores were observed between sessions in the under-estimator group ($t(14)=.959$, $p=.354$, n.s.). Figure 2 illustrates these findings.

--- insert Figures 1 and 2 about here

We also observed a main effect of Grooming Condition ($F(1,22)=10.780$, $p=.003$), which reflected a more accurate (i.e. closer to zero – their true body size) overall PSE score during grooming sessions (mean score 3.64% ± 2.40) than during non-grooming sessions(mean score 6.16 ± 2.62). There was also a main effect of Type Estimator ($F(1,22)=19.818$, $p<.001$), with under-estimators (mean overall PSE score 3.33 ± 1.64) judging their body size more accurately than over-estimators (mean overall PSE score

6.47 ± 1.73).

A one sample *t*-test carried out over each group separately showed that the amount of distortion (as expressed by the mean overall corrected PSE score) in both over- and under-estimators was significantly different from zero (under-estimators: $t(14)=7.882$, $p<.001$; over-estimators: $t(8)=11.234$, $p<.001$.

Experiment II

MOA task

As in Experiment I, the female participants were also classified as either an under- or over-estimator based on their MOA score. Ten women under-estimated the size of their body (mean MOA score -4.8 ± 5.5, range: -0.3 to -17.9) while fourteen women over-estimated their body size (mean MOA score 5.5 ± 5.0, range 0.7 to 16.9). We again assessed accuracy in body size estimation between over- and under-estimators. MOA scores were corrected to absolute values and entered into an independent samples *t*-test. Similar to Experiment I, there were no differences in body size estimation between female over- and under-estimators ($t(22)=.328$, $p=.746$).

Again, using a one-sided independent samples *t*-test, we found that the female over-estimators had a significantly greater BMI compared to the under-estimators (mean BMI over-estimators: 25.3±2.8; mean BMI under-estimators: 23.2±2.9; $t(22)=1.783$, $p=.044$).

Difference Limen

As in Experiment I, a 2 by 2 ANOVA with Grooming Condition (G, NG) as a within-

subjects factor and Type Estimator (under-estimator, over-estimator) as a between-subjects factor yielded no significant main effects or interactions in DL scores, again supporting the idea that the ability to detect changes in body size remains stable across conditions and over time (see figure 1).

PSE task

Absolute PSE scores for G and NG sessions were entered into a 2 by 2 ANOVA with Grooming Condition (G, NG) as a within-subjects factor and Type Estimator (under-estimator, over-estimator) as a between-subjects factor. The analysis showed a main effect of Grooming Condition ($F(1,22)=5.328$, $p=.031$), caused by a more accurate estimation of body size in the Grooming (mean corrected PSE score 6.51±5.69) than in the Non-grooming (mean corrected PSE score 10.05±5.59) sessions. No other main effects or interactions were found.

As a post-hoc *t*-test in Experiment I revealed that the effects of grooming on body image were mainly driven by the over-estimator group, we also carried out a follow-up paired samples *t*-test in Experiment II to explore whether the same pattern would occur in the female sample. Indeed, the women who over-estimated their body size showed significantly more accurate PSE scores in the Grooming compared to the Non-grooming sessions ($t(13)=2.848$, $p=.014$), as opposed to the female under-estimators who showed no difference in PSE scores between Grooming and Non-grooming sessions ($t(9)=.979$, $p=.353$, n.s.) (See Fig. 2).

Discussion

Taken together, our results show that everyday grooming behaviours can influence the attitudinal component of body image, improving accuracy of body size judgments, irrespective of gender. In both males and females, the observed effect was more pronounced in those participants who overestimated their body size in the baseline condition. Our findings are consistent with Cash's multidimensional model of body image, which highlights the importance of appearance management behaviours as a means of manipulating thoughts and feelings about one's body [18]. Clothing, hair style and cosmetics have all previously been shown to impact on an individual's self reported attitude to their body [18, 32]. However, the present study has, we believe, provided the first behavioural demonstration that use of a deodorant can selectively influence the accuracy of an individual's body size estimations without altering their visual appearance.

A significant benefit of the APE task used in the present study is its ability to provide statistically robust independent measures of both perceptual and attitudinal components of body image in a single task [30]. The idea of multiple components within one's body image is illustrated by a variety of perceptual illusions that have been shown to generate transient changes in perceived body part size [22, 23]. Additionally, the phantom limb pain experienced following amputation further demonstrates that perceptual and attitudinal components of body image can operate independently [33]; while the patient knows full well that the limb is absent, pain is perceived to originate from it [34]. In contrast to these examples where *beliefs* are accurate and *perception* is mistaken, in the present study we have demonstrated the opposite effect, namely that the

attitudinal component of body image is malleable, independently of the perceptual component.

BMI

Although the participants in both our studies were of healthy weight, over-estimators did have a significantly higher BMI than under-estimators. Given that, in Western Society, slenderness is the body shape ideal, we can speculate that the over-estimators had a more negative self-image than under-estimators and thus were more sensitive to an intervention that boosts their self-esteem [36]. However, further research is needed to determine the psychological underpinnings and cultural specificity of this effect.

Gender differences

Behaviourally, women appear to invest more time in their appearance than men [35]. Indeed, in contrast to the findings of the present study, some previous studies report gender differences in attitudes towards [27] and judgments of body size [29], with women tending to be more negative, and less accurate than men. While previous work has consistently indicated that women are poor at judging their body size, showing a tendency to overestimate which is independent of their actual BMI, the literature on men is more limited and less consistent [see 36 for review]. It has been speculated that inconsistency in findings relating to male body image may be due to the practice of averaging responses across a population where ideal body size can either be larger (more muscular) or leaner than actual size [27, 36]. In contrast, women, on the whole appear to display a linear relationship between body weight and body image evaluation [27]. The present study overcame these potential differences by looking at accuracy

independently in over- and under-estimators. However, in both genders it was specifically those individuals who overestimated their body size in the baseline condition who showed significantly greater accuracy following the grooming intervention.

Gender differences in body image also seem likely to vary across age. A meta-analysis conducted by Feingold and Mazzella [26] reported that while males were on average more satisfied with their body image than females, the difference between the two genders appears to increase with age. It has been proposed that from mid adolescence into early adulthood body image is very salient for both genders due to the significant physical and psychological changes which occur during this period. Thus perhaps the effect of grooming on the body image of the men in our study is a consequence of their age (mean age 23 years). It is possible that the same effects of improved accuracy would not be observed in an older cohort, for whom the social pressures of early adulthood have decreased [26]. Conversely, perhaps for women societal norms mean body image is relatively salient throughout life, since levels of body image satisfaction appear to remain stable across their life span [37]. However, since the majority of research to date investigating body image in both genders has focused on samples aged between 18 and 25 [36], there is a need for future studies to investigate the stability of the observed effects in both genders, across age groups.

Fragrance and grooming behaviour

The fact that we observed the same benefit of grooming in both males and females may be a consequence of the grooming behaviour we chose, which is equally typical of both genders. Consistent with this hypothesis, Muth and Cash [27] point out that men and

women appear to differ more in behavioural aspects of body image investment than in cognitive (attitudinal) aspects. Thus, by selecting a specific grooming behaviour that both genders engage in equally frequently, we observed the same cognitive effect. Additionally, it may be that gender differences in the perceived social acceptability of body image engagement impact on self report measures, which form the majority of the existing literature. On the contrary, we believe the psychophysical tasks used in the present study to be more sensitive to implicit cognitions.

Baron [38] proposed that the use of personal fragrance products is an important part of one's image management routine. Consistent with this assertion, and in line with previous experimental studies which have shown that fragrance application can impact self-reported ratings of mood and confidence [9, 10], the present study found that both male and female body image can be manipulated without any change in an individual's visual appearance. The present study explored the impact of the grooming behaviour in general rather than the impact of fragrance specifically. Thus further work is necessary to determine the specificity of the observed effects to the associated olfactory cues. However, given the known ability of odours to modulate perception [4], mood [6], and behavior [5], as well as the common neural substrates in the processing of olfactory and affective stimuli [39], it seems possible that fragrance containing personal care products may be particularly efficacious in mediating the psychological benefits of self-grooming behaviours, through acquired associations [40]. This hypothesis could be tested directly by comparing the effects of fragranced and un-fragranced deodorants in a replication of the present study.

Conclusions

In conclusion, body image, which is considered a central construct in an individual's self-concept, appears to fluctuate as a consequence of mood, context and social interactions, and thus has significant implications for psychological wellbeing across the population [41, 42]. The results of the present study highlight the ability of simple real-world interventions such as using a deodorant as part of everyday grooming behaviours to modulate self-image. Importantly, our results showed that both men and women who over-estimated their size were most sensitive to these effects, given this groups' larger BMI we can speculate our findings may reflect individual differences in self-esteem.

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Figure 1 **–** The DL (difference limen), or just noticeable difference, which reflects how much distortion in body image size was necessary before participants detected a change. There were no differences between grooming and non-grooming sessions in the amount of distortion needed to detect a change, supporting the idea that the ability to detect changes in body size remains stable across conditions and over time. Error bars represent the standard error of the mean.

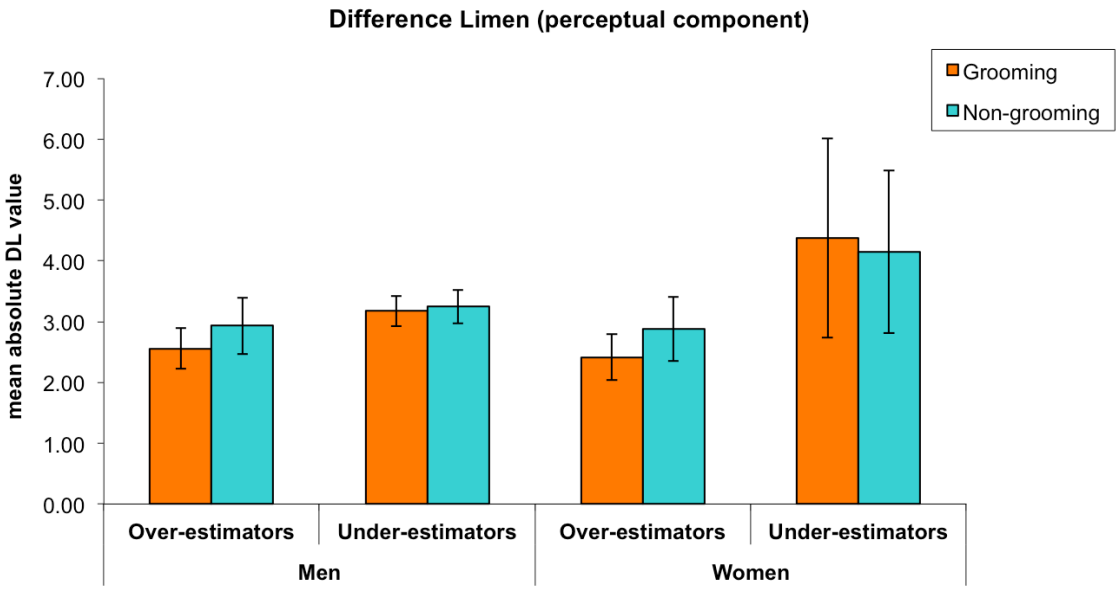

Figure 2 **–** Bar graphs show the mean amount of absolute distortion that was needed in men and women to arrive at the point of subjective equality in estimating their true body size in the grooming and non-grooming sessions. While both male and female over-estimators become significantly more accurate when wearing the product, no differences between grooming conditions occurred in participants who under-estimated their body size. Error bars represent the standard error of the mean. The asterisk indicates statistically significant differences at $p<.05$.