

Exposure to 'ideal' facial images reduces facial satisfaction: an experimental study

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Abstract – *Objective:* Psychological research has suggested that exposure to media images of 'ideal' female models has a negative impact on women's perception of their body image. The present study examined the effects of exposure to images of faces rated as high in attractiveness upon facial satisfaction, compared with exposure to 'neutral' stimuli. Methods: Participants comprised three groups of women: 24 women undergoing orthodontic treatment, 22 patients undergoing orthognathic treatment, and 20 women receiving no current dental treatment. All completed measures of facial and body image satisfaction after viewing images of houses or faces as follows: The Body Satisfaction Scale, The Revised Body Image Scale of Secord and Jourard and a Visual Analogue Scale measuring satisfaction with Facial Appearance. A repeated-measures design was adopted with a 4-6-week period between experimental conditions. All participants were randomly assigned to one of the two orders (Houses-Faces or Faces-Houses). The findings were analysed using general linear modelling analysis of variance. Results: Exposure to idealized images of faces resulted in a significant decrease in facial satisfaction when compared with the control condition (mean facial satisfaction for all participants in Faces condition, Body Satisfaction Scale-Head Scale = 22.2, SD = 7.81; Revised Body Image Scale-Facial Subscale = 25.5, SD = 4.57; VAS = 7.8, SD = 2.47; Mean facial satisfaction for all participants in Houses condition, Body Satisfaction Scale-Head scale = 19.5, SD = 6.81; Revised Body Image Scale-Facial Subscale = 26.8, SD = 4.87; VAS = 6.2, SD = 2.72). Conclusions: Media may exert a negative influence on self-perception, particularly amongst individuals who, for one reason or another, are sensitive to the appearance of their face. The findings of the present study have implications for the demand for orthodontic treatment for aesthetic enhancement at a time when resources are limited. Interventions are discussed to help individuals question their acceptance of such media messages.

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The face is a key feature in the determination of human physical attractiveness (1, 2). Yet facial attractiveness is difficult to quantify and there is no one set of rules governing facial harmony (3). Despite this, there is evidence to suggest that the general public demonstrates remarkable agreement in the judgement of facial attractiveness (4–7). The standards by which the public judge a face to be attractive may change over time and across cultures (8).

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Most recent studies suggest that aesthetic perception is a major motivational determinant for orthodontic treatment (9). In the US, it has been estimated that of those seeking orthodontic treatment, 80% do so for aesthetic reasons rather than for health or function (10).

Similarly, aesthetic concerns or a desire to improve appearance have been cited as motives for 41–89% of orthognathic patients (11). More recent work in the US reported on patients' own reasons for undergoing orthognathic surgery. Improvement in physical appearance was a motive given by 71% of the sample. Improved functional ability was a motive for 47% of the sample. No age or gender differences were found; i.e. males and females, young and old, were equally likely to express greater concerns for aesthetic improvement (12).

One factor contributing to the overwhelming desire for facial change, may be society's strong emphasis on physical attractiveness. In western culture, facial beauty is prized and there is a premium on physical attributes as well as a strong pressure to conform to prevailing trends (13).

Psychological research into body satisfaction has suggested that media stereotypes play a central role in creating and exacerbating dissatisfaction. It is proposed that comparisons between the 'self' and media ideals create dissatisfaction and 'shame' (14, 15). In one study (16) young females reported comparing themselves with the images of idealized females in the media. These comparisons led the females to be less satisfied with their own appearance. Discussions with the female subjects revealed that the comparisons were salient and seem to be an ongoing consequence of viewing advertizements with beautiful female models. Comparisons described by the subjects were both general and specific. The initial general reaction, which was spontaneously mentioned by nearly all subjects, was that they envied the models because of their beauty. The specific comparisons that followed seemed mandated by current fashions, i.e. females who were particularly dissatisfied with one of their body parts said that they focus on that part of the model's body. Research in the field of eating disorders has found evidence positively associating exposure to thin media models and eating disorder-related symptoms (17). Acute exposure to idealized media images has also been shown to increase body size distortion in anorexic and bulimic subjects, when compared with neutral images (18, 19). Body size estimation is a diagnostic feature of eating disorders; greater body size estimation is associated with a poorer outcome for the treatment of eating disorders. There was no similar effect for noneating disordered females as a whole, but there was an association between the degree of abnormal eating attitudes and the level of sensitivity to fashion photographs in this group. In other words, the females whose body image was affected by the fashion images were those who already had reasons to be sensitive to their body size (eating disordered and noneating disordered with unhealthy eating patterns).

Idealized media images cannot be assumed to be initial antecedents for body image dissatisfaction. However, they may be potent maintaining factors in such dissatisfaction. Particular groups are vulnerable such as adolescents, a time where 'self' monitoring is greater (20), pregnant women (21) and those with eating disorders (22).

To date, no study has examined the effects of mass media on facial image satisfaction. The present study attempts to investigate the effects of acute exposure to idealized media images of faces on facial satisfaction in the orthodontic/ orthognathic population. It would be predicted that these individuals form a vulnerable group who may already be sensitized to aspects of their facial image and that therefore exposure to idealized images would reduce their expressed facial satisfaction.

Methods

The study described here was approved by the Research Ethics Committee and Research and Development Directorate of the King's College Hospital, London.

Participants

Enrolment was limited to women between the ages of 16 and 30 years. Enrolment took place in three groups:

- **1** Women who were about to start or had recently started orthodontic treatment.
- **2** Women who were about to start or who had recently started the pre-surgical phase of orthognathic treatment.
- **3** Women who had no history of orthodontic or orthognathic treatment.

Participants in groups 1 and 2 were consecutive patients in the Orthodontic Department, King's College Dental Hospital who met the inclusion criteria. All orthodontic and orthognathic treatment provided at the Dental Hospital is free at the point of delivery. Participants in groups 1 and 2 were identified as individuals who had perceived treatment need, and therefore were hypothesized to differ from group 3 in terms of facial satisfaction and awareness of facial aesthetics. The participants in group 3 were volunteers who responded to a poster specifying the inclusion criteria. The group included students of King's College London, members of

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staff of the college and King's College Hospital, and relatives of patients attending the hospital.

Participants were informed that they were participating in a study exploring differences in facial perception between groups attending for treatment and those not attending for treatment. This deception was adopted to mask the study hypothesis from participants. The Research Ethics Committee approved the wording of the patient information including this deception. All participants were debriefed as to the true purpose of the research at the conclusion of their second testing.

Study design

The design of the study was a mixed experimental design, with one repeated-measures factor (experimental condition: idealized facial images versus neutral images consisting of photographs of rooms, this variable will be referred to as 'Image Type'). Each individual completed a set of measures of facial and body satisfaction on two occasions, once after exposure to idealized facial images and once after exposure to the neutral images. Participants were randomly assigned to an order of conditions by the toss of a coin: Heads = Faces then Rooms; Tails = Rooms then Faces. The time interval between the two conditions was between 4 and 6 weeks. Between-subject variables were: treatment group (orthognathic, orthodontic, untreated), age and ethnicity.

A single researcher (GM) administered all the images and questionnaires. Participants in each group were asked to examine 20 pictures. In order to focus their attention onto the stimuli, they were asked to rate each picture using a numerical Visual Analogue Scale (VAS). For the facial images, they were asked to rate the aesthetic attractiveness of the smile so as to focus them on this area. For the neutral images (rooms) they were asked to rate the aesthetics of the room portrayed. Both scales were anchored with the statements 'very aesthetic' at the 0-cm mark and 'not at all aesthetic' at the 10-cm mark.

Facial images

Subjects were exposed to a set of 20 photographs of approximately A5 size taken from the contemporary UK editions (2002) of a mass-circulation international magazine with a focus on female fashion and a largely female readership. Photographs were eligible for inclusion provided that they portrayed individual women smiling with exposure of teeth. The first 20 pictures fulfilling these criteria were selected for use in the study. Twenty-five per cent of the images were of Afro-Caribbean models.

The selected pictures were all standardized so that only the head and neck region was visible. This was to limit any extraneous information being processed by the subjects. Standardization was carried out by scanning each picture to the area of interest, undertaking magnification if necessary.

The pictures were validated as representing an aesthetically pleasing ideal face by 10 experienced orthodontists, using the same VAS as presented to participants (0 = very aesthetic and 10 = not at all aesthetic). The average rating given to the images by the orthodontist group was 3.34 (SD = 0.96).

Neutral images

Twenty photographs of approximately A5 size were selected at random from the contemporary issue (2002) of a magazine dedicated to 'beautiful' homes. They portrayed individual rooms. Photographs which featured people in the room were excluded. These images were believed to be neutral with regard to facial aesthetics.

Measures

The following measures were completed following exposure to the neutral or idealized facial images.

Revised Body Image Scale of Secord and Jourard

A revised version (23, 24) of Secord and Jourard's Body Cathexis Scale (25) was used. The revised version includes more body parts than the original scale (27 items) and has a specific section regarding satisfaction with facial features (eight items). The facial image sub-scale has been found to be internally consistent in previous studies with orthognathic patients (23, 24, 26).

Each respondent was asked to rate their satisfaction with each body part on a five-point response scale. These are: 1, 'I have strong feelings about this aspect of my appearance, I wish I could change it'; 2, 'I don't like it but I can put up with it'; 3, 'I have no particular feelings one way or the other'; 4, 'I am satisfied with this aspect of my appearance'; 5, 'I consider myself very fortunate'.

Subjects were asked to complete the whole scale as to how they were feeling at that precise moment in time. Statistical analysis was conducted for the 'facial body image' sub-scale as a measure of body dissatisfaction. In addition, a 'general body image' score was obtained for all 27 items. Higher scores on both scale indicate higher satisfaction.

Body Satisfaction Scale

This is a simple self-report scale (27), which is based on the Body Cathexis Scale (25). It comprises a list of 16 body parts. Subjects were asked to rate their satisfaction/dissatisfaction with each of these body parts on a seven-point scale with markers: 1, very satisfied; 2, moderately satisfied; 3, slightly satisfied; 4, undecided; 5, slightly unsatisfied; 6, moderately unsatisfied; 7, very unsatisfied. The Body Satisfaction Scale can be scored as a 'general' scale (all 16 items), or as two empirically derived subscales - the 'head' subscale (seven items) and the 'body' subscale (seven items). The two subscales were derived by factor analysis of the full scale, two items (ears and feet) did not load on either subscale and so are omitted from the subscales. The Body Satisfaction Scale has been used previously in an orthognathic population (28). For the purposes of this study, subjects were asked to complete the full scale but statistical analysis was limited to the 'Body' and 'Head' subscales. Higher scores on both subscales indicate greater dissatisfaction.

VAS of facial satisfaction

Participants were asked to rate how they felt about the appearance of their face at that precise moment in time on a 100-mm VAS with anchors of 'very happy' at the 0-mm mark and 'not happy' at the 100-mm mark (26). The participants' mark was assigned a score from 1 to 11 according to the number of centimetres it was from the left-hand marker. Thus a tick on the left-hand extreme was given a score of 1, one on the right-hand extreme a score of 11. Marks between 1-cm gradations were assigned to the nearest centimetre.

Data analysis

The data analysis was conducted in three phases. First, a descriptive analysis of the sociodemographic characteristics of the respondents was performed. Within the three patient groups, a comparison of age and ethnicity of participants was made by crosstabulating patient group with age (dichotomized around the median) and ethnicity (comparing the majority ethnicity, White, with all minority ethnic groups). Secondly, the validity of the experimental manipulation was checked by analysing the rating of attractiveness assigned by participants to the facial images. Analyses of the impact of group membership (orthodontic, orthognathic, no treatment), age and ethnicity on ratings of the Facial images were conducted by computing ANOVA models comparing the mean ratings given by participants. Finally for each of the outcome variables: Revised Body Image Scale of Secord and Jourard-Facial subscale; Revised Body Image Scale of Secord and Jourard-Total scale; Body Satisfaction Scale-Head score; Body Satisfaction Scale-Body score, a full-factorial ANOVA model was calculated with the following between-group variables: Patient Group (Orthodontic; Orthognathic, No Treatment); order of presentation (Faces-Rooms versus Rooms-Faces); Ethnicity (dichotomized as White versus Non-White); Age (dichotomized according to the median age of the total sample, 18 years), a single repeated-measures factor, Image Type (Faces versus Rooms) was included in the analysis. All ANOVA models were calculated using the general linear modelling program in SPSS v.11.0. The significance of the highest order interaction was analysed first and, if significant, interpreted, followed by the lower level interactions and, finally, main effects were analysed.

Findings

Characteristics of participants

A total of 66 female participants were enroled. The age range of the entire sample was from 16 to 30 years (mean 20.5 years, SD = 4.71). Group 1 (the orthodontic patients) comprised 24 women aged 16–27 years (mean 18.5 years, SD = 2.93). Group 2 (orthognathic patients) contained 22 women aged 16–30 years (mean 20.4 years, SD = 5.20). The third group consisted of volunteers who had not had orthodontic or orthognathic treatment, 20 female participants aged 16–30 years (mean 23.1 years, SD = 4.71 years) were enroled in this group. A one-way ANOVA revealed a significant difference between groups in age [F(2,65) = 5.89, P < 0.005]. The ethnic profile for all subjects is shown in Table 1.

Validation of idealized facial images

The mean rating for all 20 photographs of idealized facial images by 10 experienced consultants over two occasions was 3.22 (SD = 0.94, possible range 1–11, lower scores indicate higher attractiveness).

The mean rating of facial attractiveness for all pictures by the participants was 4.22 (SD = 1.32, possible range 1–11, lower scores indicate higher attractiveness). An ANOVA model was calculated with patient group, age (dichotomized along the median age for all participants, 18 years) and ethnicity (dichotomized as White versus non-White) as between-group factors. For the rating of

Table 1.	Ethnic	profile o	f partici	pants s	shown	by	treatment	group
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	Orthodontic patients	Orthognathic patients	No. treatment controls	Total
Caucasian British	11	17	12	40
Caucasian Other	2	2	1	5
Afro-Caribbean	11	1	2	14
Indian	0	1	3	4
Chinese	0	1	0	1
Other	0	0	2	2
Total	24	22	20	66

Table 2. Participants' ratings of the attractiveness of the idealized facial images (mean, SD)

	п	All images [mean (SD)]	Images of Afro-Caribbean models [mean (SD)]
Patient group			
Orthodontic	24	3.80 a (1.28)	3.78 (1.68)
Orthognathic	22	4.08 a, b (1.11)	4.09 (1.43)
Controls	20	4.87 b (1.40)	4.55 (1.74)
Ethnicity			
White	40	4.29 c (1.49)	4.36 (1.86)
Non-White	26	4.10 d (1.05)	3.75 (1.10)
Age (years)			
16–18	35	4.46 (1.25)	4.28 (1.59)
≥19	31	3.95 (1.37)	3.94 (1.66)
Total	66	4.22 (1.32)	4.22 (1.32)

a b Groups with different alphabets are significantly different at the 0.05 level (*post hoc* Tukey B test). c d Groups with different alphabets are significantly different at the 0.05 level.

all 20 photographs, none of the interaction terms was significant (F < 1.0 in all cases). There was a significant difference between the three patient groups in their mean ratings [F(2,54) = 6.43,P < 0.01]. Post hoc analysis (Tukey B) revealed the difference to lie between the orthodontic group and the untreated control group. There was also a significant main effect of age [F(1,54) = 6.64], P < 0.05], older participants rating the images as more attractive. Table 2 reveals the mean, standard deviations (SD) and standard error (SE) for ratings of facial attractiveness across the patient groups, ethnic groups and age groups. The mean rating of facial attractiveness for the five photographs of Afro-Caribbean models was also compared across all participants using the same analytical approach. There were no significant interaction terms or main effects in this model $[F_{patient group}(2.54) = 2.20 \text{ ns};$ $F_{\text{ethnicity}}(1,54) = 2.23 \text{ ns};$ $F_{age}(1,54) = 3.91 \text{ ns};$ $F_{\text{ethnicity} \times \text{age}}(1.54) =$ $F_{\text{group} \times \text{age}}(2,54) = 2.46 \text{ ns};$ 5.00 ns; for all other interactions F < 1.0].

Impact of experimental exposure on the Revised Body Image Scale of Secord and Jourard-Facial subscale

Table 3 shows the mean scores of the participants on the facial component of the Revised Body Image Scale. Values on this subscale have a possible range from 8 to 40, with higher scores indicating greater facial body image satisfaction. The ANOVA model revealed significant main effects of Image Type [Faces versus Rooms: F(1,44) = 5.56, P < 0.05] and of Treatment Group [F(2,44) = 6.76, P < 0.01]. All other main effects and interaction terms were not significant [$F_{image type \times patient group}(2,44) = 1.63$ ns; $_{type \times order}(1,44) = 2.45 \text{ ns};$ Fimage Fimage type× patient group×age(2,44) = 1.06 ns; F_{image} type×patient $group \times age \times ethnicity(1,44) = 1.09$ ns; $F_{\text{ethnicity}}(1,44) =$ 1.42 ns; $F_{patient group \times order \times age}(2,44) = 1.16$ ns; $F_{patient}$ $group \times ethnicity(2,44) = 2.34 \text{ ns}; F_{order \times age \times ethnicity}(1,44)$ = 1.11 ns; all other interactions and main effect F < 1.0]. Viewing idealized facial images resulted in decreased facial satisfaction, although the absolute magnitude of the effect was small. Participants with no history of seeking orthodontic or orthognathic treatment had the highest levels of facial satisfaction, whereas orthognathic patients had the lowest levels. Orthodontic patients were intermediate between the two.

Impact of experimental exposure on the Revised Body Image Scale of Secord and Jourard-Total scale

Table 3 shows the mean scores of the participants on the total scale of the Revised Body Image Scale. Values on this subscale have a possible range from 27 to 135, with higher scores indicate greater body image satisfaction. Only the main effect of ethnicity was significant [F(1,44) = 5.78, P < 0.05]. White participants had lower satisfaction scores than non-White participants (Table 3). All other main effects and interaction terms were not significant [F_{patient group}(1,44) = 1.39 ns; F_{image type}

	Revised Body Image Scale		Body Satisfactior	Visual Analogue		
	Face subscale	Total scale	Head subscale	Body subscale	Scale	
Image						
Rooms	26.8 (4.83)	84.4 (14.99)	19.5 (6.84)	20.7 (7.24)	6.2 (2.72)	
Faces	25.5 (4.57)	86.2 (13.99)	22.2 (7.81)	21.8 (2.40)	7.8 (2.47)	
Group						
Orthodontic patients	26.5 (3.92)	90.2 (12.71)	19.7 (5.69)	18.8 (6.58)	7.3 (2.23)	
Orthognathic patients	23.5 (3.92)	77.9 (12.73)	26.4 (5.69)	22.6 (6.59)	8.2 (2.23)	
No treatment controls	28.6 (3.93)	86.8 (12.73)	16.3 (5.70)	22.9 (6.59)	5.3 (2.24)	
Order						
Faces – Rooms	26.3 (3.91)	87.0 (12.70)	20.2 (5.68)	20.9 (6.57)	7.0 (2.23)	
Rooms – Faces	26.2 (3.92)	83.0 (12.71)	21.4 (5.70)	21.9 (6.58)	6.9 (2.23)	
Ethnicity						
White	25.3 (4.59)	81.6 (14.73)	21.1 (6.61)	22.1 (7.72)	7.0 (2.74)	
Non-White	27.5 (4.81)	90.6 (15.46)	20.0 (6.93)	20.5 (8.09)	7.3 (2.88)	
Age						
16–18 years	22.3 (5.10)	86.0 (16.39)	21.5 (7.35)	22.2 (8.57)	7.4 (3.05)	
≥19 years	26.5 (4.33)	86.2 (13.9)	19.4 (6.24)	20.3 (7.28)	6.8 (2.59)	

Table 3. Mean scores (SD) for participants on measures of facial and body satisfaction shown by experimental conditions, group membership, order of presentation, ethnicity and age

(1,44) = 2.63 ns; all other main effects and interactions F < 3.5].

Impact of experimental exposure on the Body Satisfaction Scale–Head subscale

Values on this subscale have a possible range from 7 to 149, higher scores indicate greater body image dissatisfaction. The mean scores of the participants on this scale can be found in Table 3. There were significant main effects of Image Type and Treatment Group $[F_{image type}(1,44) = 12.53, P < 0.001;$ $F_{patient group}(2,44) = 9.06, P < 0.001]$. Exposure to idealized facial images resulted in greater dissatisfaction with the appearance of the participants' own face. Patients attending for orthognathic treatment had the highest levels of facial dissatisfaction on this measure, whereas participants with no history of seeking either orthodontic treatment or orthognathic treatment had the lowest levels. Patients attending for orthodontic treatment were intermediate between the other two groups. The interaction of Image Type and Order of presentation approached significance [F(1,44) = 3.43, P =0.71], as did the interaction of Ethnicity and Age, suggesting that White participants aged \geq 19 years were most satisfied with the appearance of their face $[F_{\text{ethnicity} \times \text{age}}(1,44) = 3.74, P = 0.061]$. All other main effects and interaction terms were not significant (in all cases F < 1.5).

Impact of experimental exposure on the Body Satisfaction Scale–Body subscale

Scores on the Body subscale of the Body Satisfaction Scale have a possible range from 7 to 49, where

higher scores indicate higher body image dissatisfaction. The mean scores for the groups defined by the within group and between group factors are summarized in Table 3. The interaction of Image Type, order of presentation and ethnicity was significant [F(1,44) = 8.22, P < 0.01]. Inspection of the estimated marginal means for this interaction suggested that White participants who viewed the Faces on the second occasion of testing rated their body satisfaction as lower than other groups. Two other interaction terms were significant [Fimage type×patient group(2,44) = 3.40, P < 0.05; and F_{image} $_{type\times order}(1,44) = 5.07, P < 0.05$]. Participants seeking clinical treatment tended to rate their body dissatisfaction as lower after viewing the Faces than participants with no history of seeking orthodontic or orthognathic treatment. The impact of the Faces images on body satisfaction was greater if the Faces were viewed on the second occasion of testing. There were no significant main effects in the ANOVA for this variable $[F_{image} type(1,44) = 0.46 ns;$ $F_{\text{patient group}}(2,44) = 0.95 \text{ ns}; F_{\text{order}}(1,44) = 0.29 \text{ ns};$ $F_{age}(1,44) = 1.44$ ns; $F_{ethnicity}(1,44) = 1.68$ ns]. One other interaction term approached statistical significance $[F_{age \times ethnicity}(1,44) = 3.71 \quad P = 0.61]$. The remaining interaction terms were all not significant F < 2.5.

Impact of experimental exposure on the VAS The mean scores for the participants on the VAS are shown in Table 3. Scores on the VAS could range from 1 to 11, higher scores indicating greater dissatisfaction with dental appearance. The main effect of Image Type was significant $[F_{image type}(1,44) = 43.96, P < 0.001]$. The main effect of patient group approached significance $[F_{patient group}(2,44) = 3.13, P = 0.05]$. All other main effects and interaction terms were not significant (F < 1.5 in all cases). As previously found, exposure to idealized facial images resulted in greater dissatisfaction with the appearance of the participants' own face. Orthognathic patients had the highest levels of facial dissatisfaction on this measure, whereas participants with no history of seeking either orthodontic treatment or orthognathic treatment had the lowest levels. Patients seeking orthodontic treatment were intermediate between the other two groups.

Discussion and conclusions

The present study sought to determine the impact of acute exposure to media images of 'ideal' female faces on the facial image satisfaction of women. Across three measures of facial satisfaction a consistent effect was noted, viewing 'ideal' facial images results in decreased satisfaction with the participants' own faces. Furthermore, this effect is specific to the face - no effect was found of viewing ideal facial images on self-rated Body Satisfaction on the Body subscale of the Body Satisfaction Scale or the Total scale score for the Revised Body Image Scale. This would support the suggestion that such impacts occur through a process of comparison of the self with the 'ideal', and not through more general effects such as lowering self-esteem (19, 20, 29).

The findings for measures of satisfaction with the Body were complex. For one measure of Body Satisfaction (The Revised Body Image Scale of Secord and Jourard) there were significant differences between the groups. Given that this was not found with the Body Satisfaction Scale-Body subscale, the difference should be interpreted with caution. The lower level of body satisfaction expressed on this scale may reflect a floor effect in the Facial subscale whereby participants wishing to express greater facial satisfaction generalize their dissatsfaction across items in the same scale (26). There were also some significant interaction terms in the models concerned with body satisfaction but again these were not replicated across measures.

A check of the experimental manipulation (attractiveness of facial image) found that both the participants and an independent group of Orthodontists rated the experimental stimuli as highly attractive. There was a significant difference between the three participant groups in their rating of the attractiveness of the stimuli. These differences lay between the scores of the orthodontic patients and those of the no treatment participants. There was also a significant effect of age on ratings of the facial images, older participants rating the facial images as more attractive. These differences in rating of the images are theoretically important as it suggests that despite the independent variable being standardized by the researchers (that is every participant was shown the same images), the impact of the independent variable may vary according to characteristics of the individual, possibly through differences in the processing of the images by different social and demographic groups. It can be hypothesized that younger people and those seeking treatment for perceived orthodontic anomalies are more aware of facial features and so may appraise the stimuli more closely.

The findings should be considered in the light of the limitations of the study. The impact of viewing media images on facial satisfaction is likely to vary according to the socio-demographic characteristics of participants, including age, gender and ethnicity. Whilst the repeated measures design controlled for these effects when comparing exposure to the two types of images, for the between groups variable of patient group differences in sociodemographic variables may be important. The three participant groups differed in age and ethnicity. It proved difficult to control for age and ethnicity in selecting the participants, though generally patients attending for orthognathic treatment would be older than patients attending for orthodontic treatment. The ANOVA model sought to control for differences in age and ethnicity in the analysis of the data, but such an approach can not be relied on to remove all bias. Further research with a more homogenous sample is required. Treatment characteristics are also likely to exert an impact on the effect of mass media exposure on facial satisfaction. In the present study there was a consistent finding that orthognathic patients had the lowest levels of facial satisfaction. Similar findings have been reported previously (24).

The method of exposing participants to the images may also be open to criticism. In this study participants were asked to focus on the images by making ratings of them. This method has been adopted previously in studies of body dissatisfaction (18, 19) but this may have low ecological validity as patients do not frequently rate the many

'ideal' faces they are exposed to. There is research to suggest that some young women study advertizements with attractive models very carefully to get ideas of the way they should look, an activity that may approximate the duration of the controlled study environment (16). Subliminal exposure has been employed previously with female students exposed to the thin beauty 'ideal' on measures of mood, self-esteem and eating behaviour (30) and further research into facial satisfaction might employ a similar method. The reported findings resulted after viewing twenty images. In everyday life individuals are likely to experience pervasive but subtle exposure in a variety of popular media. If acute exposure to media images of stereotypical attractiveness can cause deterioration in facial image satisfaction, it is possible that chronic exposure is in part responsible for the increase in demand for aesthetic treatment in western cultures. This may be one reason for the increasing demand for orthodontic and orthognathic treatments. The present study asked participants to rate their facial satisfaction immediately following exposure to the images, the durability of dissatisfaction produced is unknown. The effects found here may be temporary.

The findings have implications for the development of oral health policy. Media images of beauty and ideals of appearance are likely to produce dissatisfaction in certain individuals in the population and create a demand for dental treatment. Similar effects may also occur for other aspects of oro-facial appearance. There is also likely to be an element of 'supplier-induced demand'. As dental researchers develop new cosmetic techniques which are adopted by individuals in high profile media occupations, images incorporating the benefits of these techniques will create dissatisfaction in the general population and a demand for those services. In order to minimize such demand policy makers may consider two approaches to controlling the impact of media images on satisfaction with facial appearance, either controlling the display of such images or developing the personal skills of individuals to protect themselves from such effects. Interventions could be developed involving the explicit use of media messages both to improve body satisfaction and explore the nature by which such images have such an immediate effect on the way subjects perceive their body image. Therefore, rather than eradicating media messages they could be utilized as a tool for clinical practice (31). The most feasible method of intervention may be a psychoeducational approach. If the impact of the media on dissatisfaction with body image is dependent on the use of these images for social comparison individuals should be discouraged from making such comparisons (32), by educators encouraging adolescents and adults to question their acceptance of these images.

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