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BRUNO MIGUEL MENDO MIGUEZ BARROSO

AFINAL, O QUE ATRAI AS MULHERES? UMA REVISÃO META-ANALÍTICA DAS PREFERÊNCIAS DAS MULHERES POR CARACTERÍSTICAS FÍSICAS NOS HOMENS

AFTER ALL, WHAT ARE WOMEN ATTRACTED TO? A META-ANALYTIC REVIEW OF WOMEN'S PREFERENCES FOR MEN'S PHYSICAL TRAITS

Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Psicologia da Saúde e da Reabilitação Neuropsicológica, realizada sob orientação científica da Doutora Isabel Maria Barbas dos Santos, Professora Auxiliar, e coorientação do Doutor Pedro João Bem-Haja Gabriel Ferreira, Investigador, do Departamento de Educação e Psicologia da Universidade de Aveiro.

“To truth only a brief celebration of victory is allowed between the two long periods during which it is condemned as paradoxical, or disparaged as trivial.”

Arthut Schopenhauer

o júri

presidente

Prof.ª Doutora Anabela Maria Sousa Pereira
professora associada com agregação do Departamento de Educação e Psicologia da Universidade de Aveiro

Doutora Mariana de Lurdes Carrito
investigadora de pós-doutoramento da Faculdade de Psicologia e Ciências da Educação da Universidade do Porto

Prof.ª Doutora Isabel Maria Barbas dos Santos
professora auxiliar do Departamento de Educação e Psicologia da Universidade de Aveiro

agradecimentos

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Aos meus pais, que tiveram a ideia de me ter, e fizeram (e fazem) muito mais do que aquilo que a responsabilidade pede. Sou um sortudo.

palavras-chave

Atratividade masculina, preferências das mulheres, atratividade facial, atratividade corporal, seleção sexual, escolha de parceiro

resumo

Segundo a teoria da seleção natural, a perceção de atratividade é uma adaptação sexual evolutiva da espécie humana para garantir a seleção de parceiros de alta qualidade genética. Consequentemente, julgamentos de atratividade feitos por indivíduos do sexo oposto deveriam ser consistentes, e mais elevados para determinadas caraterísticas (que fossem exibidas por indivíduos de alta qualidade genética). No entanto, especificamente na literatura relativa aos julgamentos sobre a atratividade masculina, existe uma grande variedade nos resultados. Com a intenção de clarificar aquilo que atualmente se sabe sobre as preferências das mulheres por características físicas nos homens, explorámos oito características físicas particularmente relevantes para a perceção de atratividade masculina relativamente à face – 'cara média', simetria, dimorfismo sexual da forma, cor e distribuição de pêlo – e ao corpo – tipo (incluindo musculatura e rácios relevantes), distribuição de pêlo e altura relativa. Através de uma revisão meta-analítica, verificámos que: 1) a 'cara média', simetria facial, rácio cintura-peito e altura aparentam ser importantes preditores de atratividade masculina; 2) resultados inconclusivos foram encontrados para o papel do dimorfismo sexual na forma da face; 3) a cor da pele da face e a distribuição de pêlo facial são características aparentemente relevantes para a atratividade e requerem estudo futuro; 4) a distribuição de pêlo no corpo parece ser menos relevante que outras características. Por fim, apresentamos uma discussão sobre a grande variabilidade da literatura neste campo à luz da teoria evolutiva e descobertas recentes da genética, e propomos que a atratividade física nos homens poderá ser secundária a aspetos comportamentais.

keywords

male attractiveness, women’s preferences, facial attractiveness, bodily attractiveness, sexual selection, mate-choice

abstract

The perception of attractiveness is an evolutionary sexual adaptation of the human species to ensure the selection of high genetic quality mates, in light of sexual selection theory. Thus, opposite-sex judgements of attractiveness should be fairly consistent, and higher for certain characteristics (displayed by high-quality individuals). However, specifically in the case of male physical attractiveness literature, there seems to be great variability in the results. With the aim of providing a clearer picture of what is presently known about women’s physical preferences in men, we explored eight particularly relevant traits of male physical attractiveness: facial averageness, symmetry, sexual dimorphism of shape, colour and facial hair; body type (including muscularity and relevant ratios), hair and relative height. Through a meta-analytic review, we found that: 1) facial averageness and symmetry, waist-to-chest ratio, and height were important predictors of male attractiveness; 2) inconclusive results were found for sexual dimorphism of shape; 3) skin colour and facial hair are relevant factors in attractiveness and need future research; and 4) body hair seems less relevant than other traits. We then present a discussion about the noticeable variability of the literature in the light of evolutionary theory and recent genetics research, and propose that male physical attractiveness may be secondary to behavioural aspects in judgements of attractiveness.

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List of abbreviations

2afc – 2 alternative forced choice

ABR – Arm-to-Body Ratio

CWR - Chest-to-Waist Ratio

FA – Facial Asymmetry

HCR – High conception risk (phase of the menstrual cycle)

LBR – Leg-to-Body Ratio

LCR – Low conception risk (phase of the menstrual cycle)

LT – Long-term

SDS – Sexual Dimorphism in Stature

SHR - Shoulder-to-Hip Ratio

SOI – Sociosexual Orientation Inventory

ST – Short-term

SWR – Shoulder-to-waist Ratio

WCR – Waist-to-Chest Ratio

WSR - Waist-to-Shoulder Ratio

Introduction

Parallel to physiological and anatomical adaptation, psychological changes may be a by-product of the natural selection process proposed by Darwin (Buss, 2005; Nairne & Pandeirada, 2008; Nairne, Pandeirada, Gregory, & Van Arsdall, 2009), being the choice of a mate – *mating* – an example (Lloyd, 1979). By definition, mate-choice is a process leading members of one sex to mate with members of the opposite sex that display a certain, non-random, trait, or set of traits (Heisler et al., 1987). According to evolutionary psychology these traits should signal mate quality and, to ensure their selection, the perception of attractiveness developed/arose as a sexual adaptation of the human species (Fink & Penton-Voak, 2002; Rhodes & Zebrowitz, 2002; Thornhill & Gangestad, 1999b). Therefore, the traits displayed by each sex today will have been partly determined by the opposite sex finding them attractive through the course of time (Darwin, 1871). As such, at least to some degree, men and women will respond to different attractiveness traits, i.e. different traits, or different levels of the same traits will be attractive for women and men (Braun & Bryan, 2006a; Stulp, Buunk, & Pollet, 2013). Certainly, this framework cannot explain everything, as there seems to be a missing link for homosexual relationships, but it provides an understanding for the heterosexual behaviour responsible for our evolution as a species – which is the target of the study of evolutionary psychologists. To understand what characteristics make up a good mate, and simultaneously hoping to unveil the hidden rules behind sexual behaviour and mate choice, scientists focused on the study of attractiveness, i.e. what individuals find attractive in others. The bulk of this scientific work is about physical attractiveness (Barber, 1995) and it is noteworthy to mention here that attractiveness is often treated as a synonym of beauty (Fan, Dai, Liu, & Wu, 2005; Hönn & Göz, 2007) – something that may only partially represent the concept it tries to operationalize.

In the human species the face is one of the most important elements of people perception, being subject to 'special' processing (Robbins & McKone, 2007). Also, it is through the face that much of our communication is made – be it in the sound shaped by movements of the mouth (speech), in expressions (non-verbal communication; Ekman, 2006), and in specific traits that communicate our health status and our value as mates. Indeed an attractive facial appearance is of the utmost importance for social interactions (Mesaros et al., 2015), and facial attractiveness has proven an important part of physical attractiveness – sometimes the most influential in overall judgements of attractiveness (Peters, Rhodes, & Simmons, 2007). Facial symmetry (Mealey, Bridgstock, & Townsend, 1999; Perrett et al., 1999; Rhodes, Proffitt, Grady, & Sumich, 1998), averageness (Deffenbacher, Vetter, Johanson, & O'Toole, 1998; Rhodes & Tremewan, 1996) and sexual dimorphism (Gangestad & Thornhill, 2003a; Thornhill & Gangestad, 2006) are some of the widely studied facial characteristics in the literature, for they are suspected of being decisive factors in driving assessments of facial attractiveness. It is almost impossible to pick a facial trait that hasn't been investigated regarding attractiveness. There are, however, two other characteristics to which we dedicated larger attention: the colour of the skin and facial hair.

No matter how important it may be, facial attractiveness is just a part of a physical attractiveness gestalt that is only complete when characteristics of the body are taken into consideration. Somatotype – defined as the division of an individual's physique according to muscularity (mesomorphy), fatness (endomorphy) and leanness (ectomorphy) (Carter & Heath, 1990; Dixson, Dixson, Li, & Anderson, 2007) – muscularity (Frederick & Haselton, 2007), height (Pawlowski & Jasienska, 2005) and proportions between hips, waist, chest, shoulders or limbs

(Coy, Green, & Price, 2014; Horvath, 1981; Sorokowski & Sorokowska, 2012) have been some extensively studied bodily attractiveness characteristics as a whole. We will use 'Body Type' as an umbrella term for all these characteristics, with the exception of height and leg-to-body ratio, which will be treated together under 'height'. The presence of hair in the body and its effect on attractiveness judgements has also received some attention (Dixson, Rantala, & Brooks, 2019).

Three main observations emerged when exploring the literature:

1) Since this field concerns the area of mate choice, the most relevant judgements are those of potential (biologically opposite-sex) suitors, nonetheless in many studies there is no separation between sex of participants making the judgements of attractiveness (Rhodes et al., 2007; Fink, Neave, Manning & Grammer, 2006), and yet in others no separation of sex of stimuli (ex.: presenting male or female faces; Pereira et al., 2019; Zaidel, Aarde & Baig, 2005) – this may be a consequence of the aforementioned association between attractiveness and beauty. A third situation is when no statistical differences between the sexes is found, and the subsequent analysis is done jointly (DeBruine, Jones, Smith & Little, 2010; Sorokowski & Pawlowski, 2008)– this happens commonly, for example, in studies of averageness. The danger of this is that a sum of apparently non-significant differences in each study, may hide a significant difference that would only be noticeable if data from different studies were combined.

2) For some characteristics there is no agreement as to which stimuli receive higher attractiveness ratings, as there are some studies pointing in one direction and apparently as many others pointing the opposite way. That is the case with sexual dimorphism of male faces where, for example, some studies show that more masculinised male facial stimuli are judged as more attractive (Foo, Simmons, & Rhodes, 2017; Holzleitner & Perrett, 2017) and others claim the contrary (Little, Debruine, & Jones, 2014; Marcinkowska et al., 2018), i.e., the more attractive stimuli are feminized – this decade-long debate is still heated. This may be a consequence of the use of different independent variables in different studies (e.g. relationship context, pathogen disgust sensitivity, phase of ovulatory cycle, ethnicity, etc.; Geniole & McCormick, 2013; Gangestad, Thornhill, & Garver-Apgar, 2010; Lee & Zietsch, 2015) in addition to characteristic being studied, or a consequence of a confounding (or mediator) variable that hasn't yet been identified.

3) according to the Parental Investment Theory, since mating requires a bigger investment from women (both biologically and behaviourally, during gestation and posterior early infancy, e.g. lactation), they should be more selective in choosing a mate (Buss, 2005). Additionally, unlike men (Lassek & Gaulin, 2019), women can't reliably assess a men's reproductive status by physical traits (Li & Meltzer, 2015) – this suggests that their preferences for physical traits may be more complex than for a man.

With the intention of finding out which conclusions had been reached so far about male physical attractiveness (attempting to clarify the third observation), we felt the need to take a step back, and make a picture of what is presently known regarding this subject. One common and effective way of synthesizing scientific information is through a systematic review. As a way of aggregating separate results into an overall effect, a meta-analysis could also help to facilitate the understanding of the male physical attractiveness literature, as well as to clean-up the ambiguity surrounding it. Accordingly, we committed to conducting a systematic review with meta-analysis of the empirical literature related to (mate-choice-related) male physical attractiveness. In doing so, we made an effort to overcome also observations one and two.

Method

Considering that we wanted to provide an overall view of the literature of male physical attractiveness, we decided to analyse not one, but an array of documented traits. Hence, this work provides a series of systematic reviews, i.e., one for each of the selected characteristics, and, where inclusion criteria allowed (see below), a meta-analysis was conducted.

Inclusion Criteria

Prior to conducting the literature review, we defined a set of general criteria that studies would have to meet for inclusion in each of the systematic reviews:

1. Studies had to involve measurement or manipulation of the physical characteristic selected for that review;
2. One of the dependent variables had to be a measure of perceived attractiveness, independently of the judgement task used (ex.: forced choice, ratings, altering stimuli until most attractive);
3. Attractiveness judgements had to be made by opposite sex individuals, more specifically, women judging men. Studies were only considered for analysis when data of women judging men were independently presented;
4. Women making the judgements of attractiveness had to be heterosexual, or, at least, not identify in a stronger manner with any other sexual orientation (nonetheless, we accepted studies that omitted this information);

For the meta-analyses, we narrowed the set of criteria, including some specific to the characteristic being analysed (mentioned when the characteristic is presented ahead):

5. In the light of problem 2) referred before in the introduction, we only selected the studies that measured the effect of the characteristic being analysed (ex.: sexual dimorphism) directly on attractiveness ratings – and excluded the ones that presented this information mediated by other independent variables (e.g., relationship context, fertility phase of menstrual cycle phase of cycle, etc.). An example would be that of Little, Connely, Feinberg, Jones, & Roberts, (2011) where women rate men's facial attractiveness for a long-term and/or short-term relationship context – for that, it was excluded from meta-analysis.
6. Only when three or more studies respected the previous five criteria did we run a meta-analysis.

In total, we completed systematic reviews on eight traits, which we subdivided into two categories: facial attractiveness and bodily attractiveness. For facial attractiveness, we provide reviews for averageness, symmetry, sexual dimorphism, facial hair and skin colour. For bodily attractiveness, we present reviews for body type (which includes the elements described in the introduction), height (and related LBR – leg-to-body ratio – proportion) and body hair.

Literature Search Strategy

Our literature search strategy was primarily that of database searching – we used two different databases: Scopus and Web of Science, both with institutional access. On a second instance, we reviewed the references of selected papers following the same criteria in search of more related literature.

We conducted a separate search for each of the characteristics we identified as relevant in our initial perusal. Those characteristics were Shoulder-to-Hip Ratio (SHR), Waist-to-Shoulder Ratio (WSR), Chest-to-Waist Ratio (CWR), Somatotype, Penis size, Height, Body Hair, Facial Hair, Sexual Dimorphism, Averageness, Skin-colour, and Symmetry. To better calibrate our keywords and thus make sure we would get all important studies, we started the database search with general terms – using only the expression "attractiveness", accompanied by the most common expressions used to describe each of the characteristics (e.g. "height", "symmetry", "sexual dimorphism"). Then, gathering some relevant studies from each characteristic (in the midst of many unrelated to our purpose), we refined our search terms based on the analysis of the terminology used in them, designing our final query expressions. We first looked for review papers, preferably with meta-analysis, and found relevant work for some characteristics: Rhodes (2006) conducted a review with meta-analysis on averageness, symmetry and sexual dimorphism of face shape; and Pierce (1996) did the same with height. For these characteristics, we limited our database search (since they had used database search as well) to results after the year of 2004 and 1994 *(in order to recover all works published after the referred reviews, considering an approximately 2-year gap between database search and publication of the papers) and included the studies featured in these works that respected our criteria*. Nonetheless, we still reviewed the references of important studies in search for work that might have not showed up in these authors' inquiries. Penis Size was excluded because we made a conceptual choice of including only the characteristics that could potentially be perceptible when two strangers meet.

Overall, out of 1643 articles and the analysis of relevant bibliography, 430 articles passed the initial title, keyword and abstract revision[1]. The reason for selecting such a small number of works is related to our strict inclusion criteria – e.g. a lot of results had to do with female attractiveness, something that did not fit our purposes. Two hundred and sixty studies passed the initial set of criteria, thus entering systematic reviews, and 38 passed the second and narrower set of criteria, hence entering meta-analyses (see figure 1 below; also, a Prisma flow for each of the eight characteristics, as well as the search query utilized can be found in the supplemental materials).

The search began in March of 2019 and stopped on the 31st of July of the same year.

[1] Because of our criteria regarding the separation of sexes, in many cases we had to read the methodology and/or the statistical analysis of the studies in this first selection phase.

All Traits

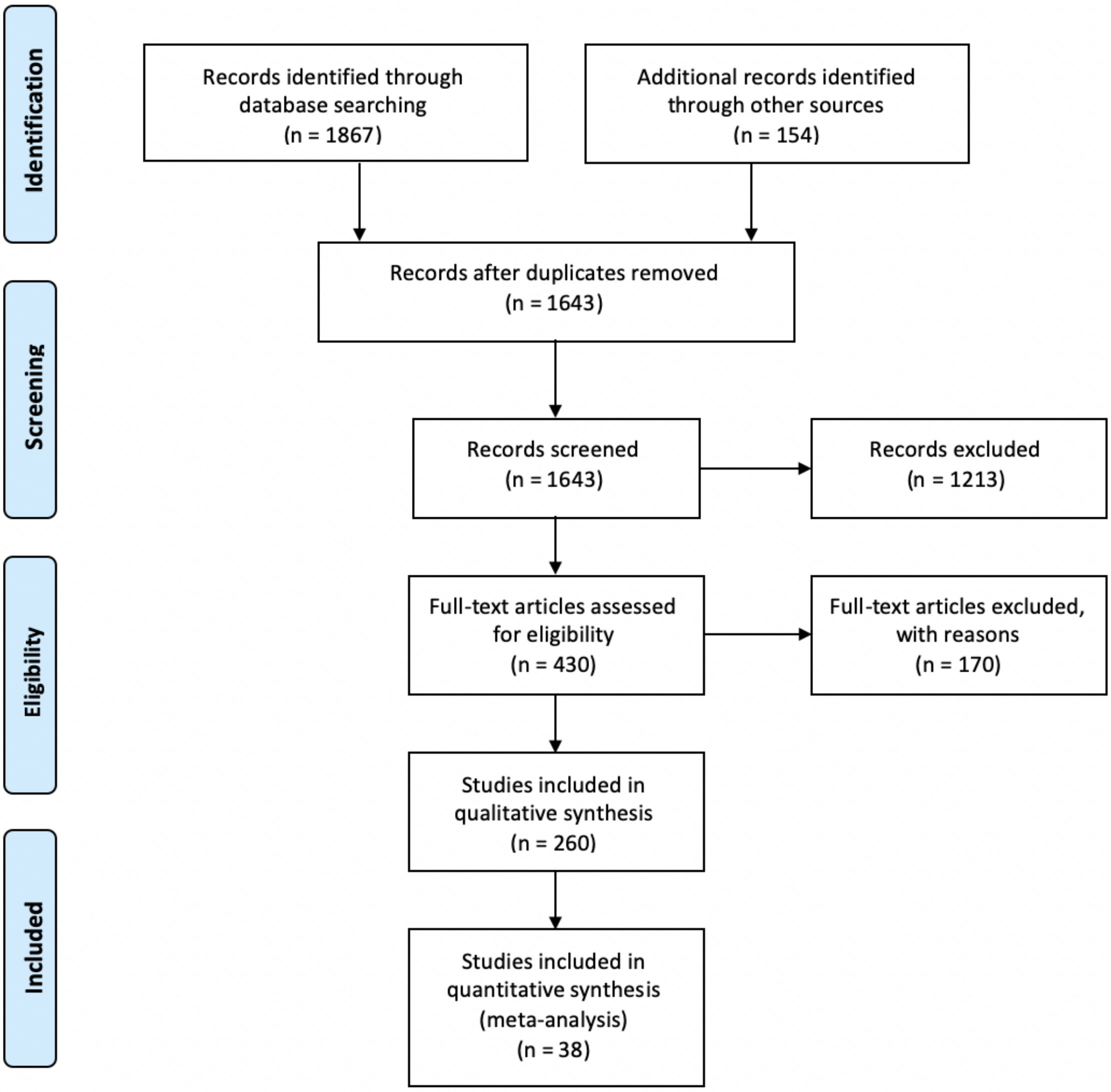


Fig. 1. Prisma Flow for all characteristics

Effect size Measures

We extracted different types of effect sizes, depending on the characteristic and the most common experimental design used to study it. For symmetry, averageness and waist-to-chest ratio we retrieved the correlation coefficients (r) presented in the studies, and run a numerical correlation analysis (‘NumCorr’). Also, since in some characteristics opted for meta-analysis based on the standard error (SE), we extracted, or calculated, its value where necessary. For sexual dimorphism in face shape we used the proportion of times where the most masculine stimulus was selected as more attractive, and when it was not reported, we calculated SE using the *t* statistic, using the formula ($\frac{\bar{x}-\mu}{t}$). The same method of calculating SE was used for symmetry when the studies presented the degree of preference, expressed through a *t*-test against chance

(=3.5 on a scale from 1 to 7; see Symmetry in the results section below). Lastly, in sexual dimorphism in stature, we used the corrected mean and, where needed, calculated the standard deviation (sd), and after transformed it into SE, using the formula ($\frac{sd}{\sqrt{n}}$). Where the absence of descriptive statistics made it impossible to calculate the missing SEs, the studies were excluded from meta-analysis. All meta-analysis where computed using the *MetaXL* free software extension for *Microsoft Excel*.

Results

Averageness

As can be seen in figure 2, our meta-analysis indicates a significant positive relationship between averageness and attractiveness (IC 95% 0.02, 0.38, Chi2 p<0.01, I^2= 83%). Even though there was no significative difference between subgroups (the CIs overlap), it is noteworthy to mention that the study of Grammer & Thornhill (1994) altered the overall CI, bringing the lower limit close to zero (0.01), and therefore close to a lack of statistical significance. It is hard to explain the results obtained in this study and, especially, their magnitude. The authors mention the reduced size of the sample several times, and this may be one of the reasons for the results obtained, alongside the fact that some characteristics correlated with increased dominance (and that may be considered more attractive) are less average. Yet another reason may be that the standardization of the facial size of the stimuli based on the vertical distance between the midline of eyes and midline of mouth (instead of hairline and chin). As can be observed, we did not include the results of Vingilis-Jaremko et al. (2014) in the meta-analysis, since the age of the participants reflects that they were probably pre-pubescent (Persson et al., 1999) and, according to our framework, that might influence the perception of attractiveness.

Analysing the systematic review (see table 1 of the Systematic Reviews section in supplemental materials) we identified another negative relationship between attractiveness and averageness in the work of Peters, Rhodes, and Simmons (2008). However, not having reached significance and being amongst the only two studies presenting this negative relationship, we made the choice of not dedicating further attention to it. Then, considering all the studies, we plotted the different methods used for gathering the attractiveness judgements, and their respective prevalence (see figure 3 in the appendices). Ratings were the main method utilized, followed by two-alternative forced choice (2afc) and ordering of images. Also, we identified the four main variables that were measured/manipulated alongside averageness and the number of studies in which they appeared (see figure 4 in the appendices). These were Sexual Dimorphism of (face) Shape, Symmetry, Ethnicity and Skin Color (of Face). Finally, we plotted the results of all the studies (see figure 24 at the end of results) and, from this analysis, we confirmed the positive relationship between averageness and attractiveness.

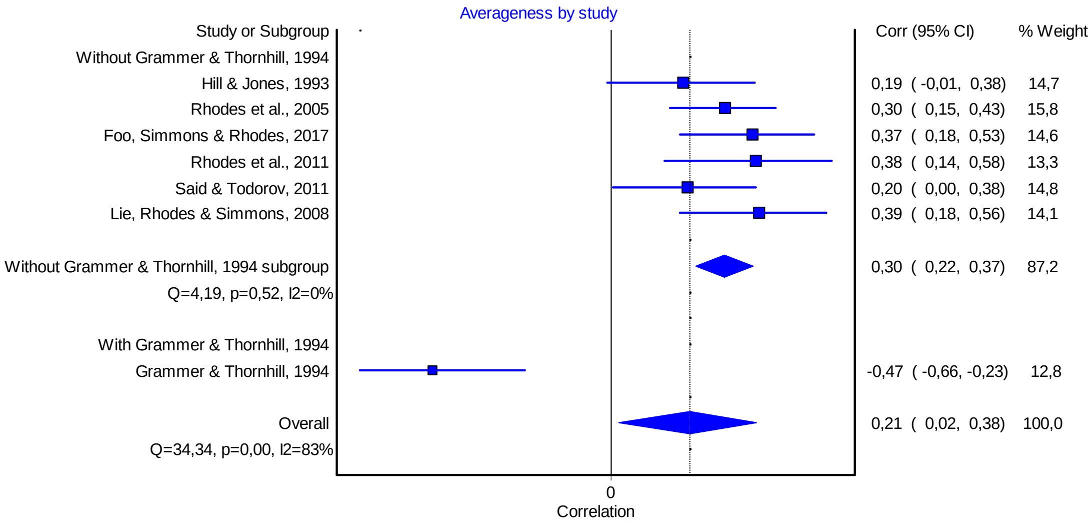


Fig. 2. Meta-analysis on averageness based on correlations between averageness and attractiveness.

Symmetry

Part of the studies that passed all the inclusion criteria used correlations as the effect size, while others used a rating – this made it pertinent to conduct two separate meta-analyses (one with each effect size [ES]) . Therefore, in fig. 5 we present a meta-analysis based on correlations as the ES, and in fig. 6 we present another with the overall rating, in which 3.5 would be the value of chance, i.e, no relationship between symmetry and attractiveness, (and values > 3.5 represent a preference for symmetric faces).

Regarding the meta-analysis displayed in fig. 5, the effect shows that the preference for symmetry is significant (IC 95% 3.59, 3.80, Chi2 p=0.01, I^2= 80%). In the meta-analysis of fig. 6 the combined effect allows us to conclude that the relationship is globally significant (IC 95% 0.28 -0.41, Chi2 p=0.01, I^2=49%). Due to methodological heterogeneity we separated the studies in three groups and, for each one, positive and significant correlations were found. In the “Measured symmetry” subgroup there was a statistically significant heterogeneity (I^2=65%, p=0.01); however all the studies in this group presented positive correlations.
Analyzing the systematic review (see table 2 of the Systematic Reviews section in supplemental materials) we identified the different methods used for gathering the attractiveness judgements, stimuli, and their respective prevalence. In roughly half of the studies the symmetry of the stimulus faces was measured or rated, and in the other half it was manipulated. Some of the studies in our analysis measured FA instead of symmetry (Hume & Montgomerie, 2001; Penton-Voak et al., 2001; Rikowski & Grammer, 1999). Fluctuating asymmetry (FA) is a measure of deviations from perfect bilateral symmetry that is strongly and negatively related with developmental stability (Møller, 1990). Therefore, it was treated as the converse of symmetry, and we used the same values, but with opposite directions, to represent symmetry.

We made two interesting observations: 1) studies that did not find relationships between attractiveness and symmetry, used measured, instead of rated symmetry; and 2) in the study reporting that asymmetrical stimuli (original stimuli) were preferred, symmetry was manipulated (Hromatko et al., 2006), however, in other studies, the same kind of manipulation did not yield that effect (Little, Jones, DeBruine, & Feinberg, 2008).

Attractiveness measurements were predominantly made through ratings and 2afc (see figure 7 in the appendices). Also, we noticed that Sexual Dimorphism of Shape, Fertility phase of menstrual cycle and Relationship Status and Context were the four main variables that were measured/manipulated alongside symmetry (see figure 8 in the appendices).

Analysing the plotted results of all the studies (see figure 24 at the end of results) we confirmed the positive relationship between symmetry and attractiveness.

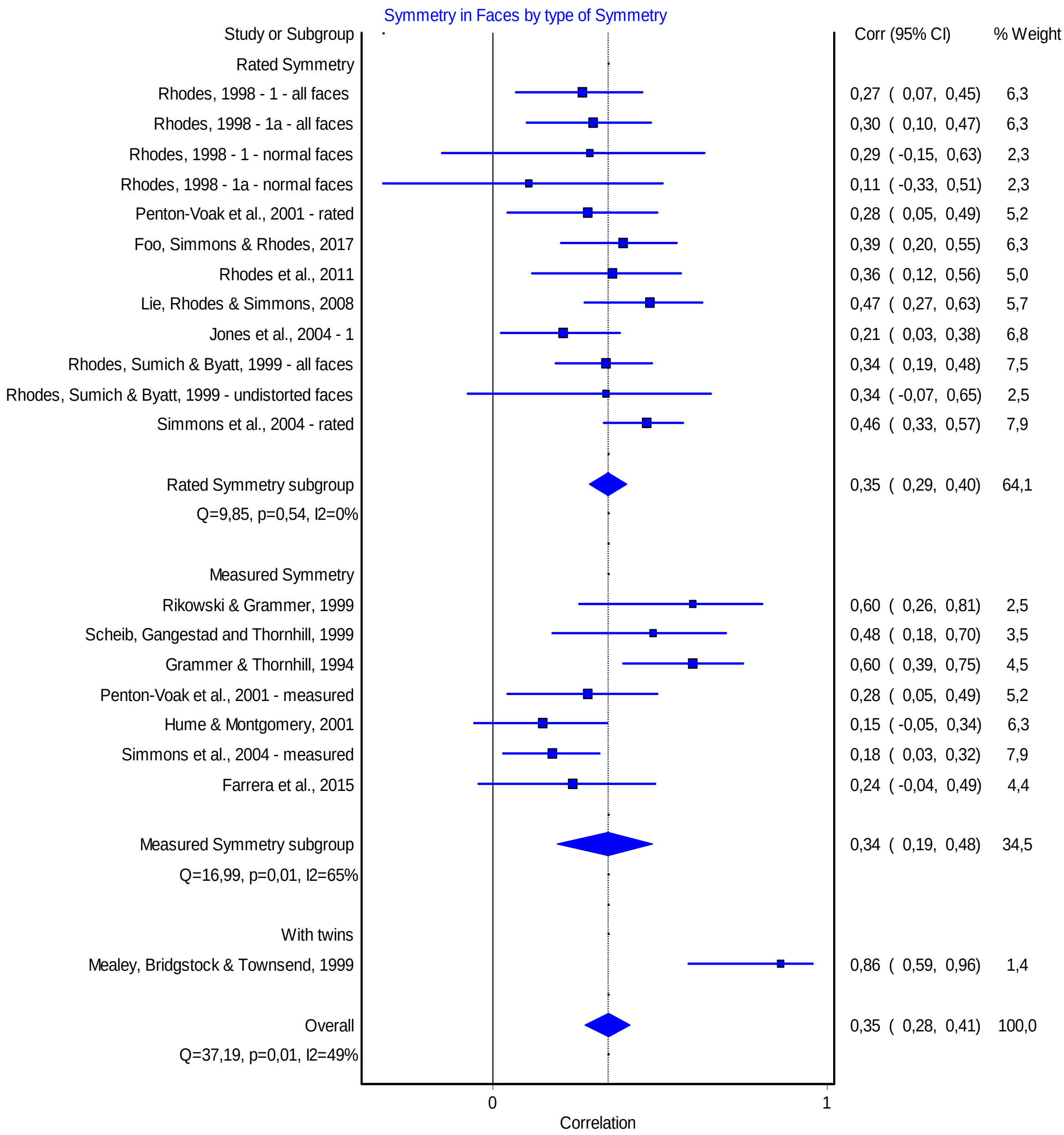


Fig. 5. Meta-analysis on symmetry based on correlations between symmetry and attractiveness.

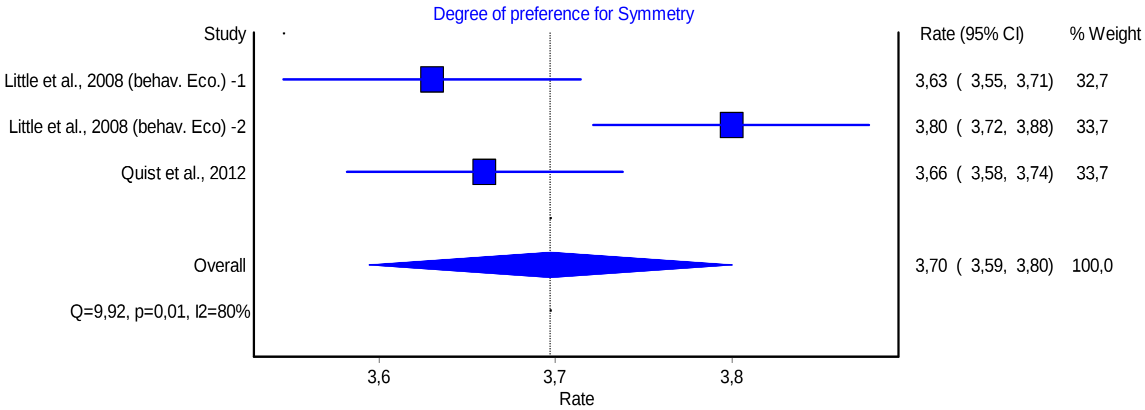


Fig. 6. Meta-analysis on symmetry based on ratings (from 1 to 7)– 3.5 is equivalent to chance, higher values correspond to an existing preference for more symmetrical stimuli.

Sexual Dimorphism of face Shape

In our meta-analysis (see fig. 9), we notice the existence of globally non-significant effect (IC 95% 0.44, 0.50, Chi2 p=0.01, I^2=97%), suggesting that preferences for masculinized (or feminized) face shapes do not differ significantly from chance. Due to quantity of studies extracted from one publication (DeBruine et al., 2010a), we separated the studies in two groups and, for the "DeBruine et al., 2010" subgroup we found a significant preference for feminized stimuli, in contrast with the "others" subgroup, where we found a significant preference for masculinized stimuli. For both groups, we found a statistically significant heterogeneity (I^2=83%, p<0.01; I^2=98%, p<0.01, respectively), with studies pointing to different preferences within each group.

Analyzing the systematic review (see table 3 of the Systematic Reviews section in *the* appendices) we identified the different methods used for gathering the attractiveness judgements and their respective prevalence. More than half the studies used two-alternative forced choice and rating paradigms (see figure 10 in *the* appendices). Also, we noticed that Relationship Context, Fertility phase of menstrual cycle, Relationship status and Pathogen Disgust were the four main variables that were measured/manipulated alongside symmetry (see figure 11 in *the* appendices). Noticing the large number of studies exploring the effect that relationship context or fertility phase of menstrual cycle had on preferences for sexual dimorphism of shape, we conducted a separate analysis for these variables (see figure 24 at the end of results). This analysis seemed pertinent because theoretically, according to the literature, these two variables are mostly responsible for the changes in results we see in studies that do not control for them – hence, their control should uniformize the results.

There are no univocal findings and virtually for any theory that collected considerable support there is valid contraposing evidence.

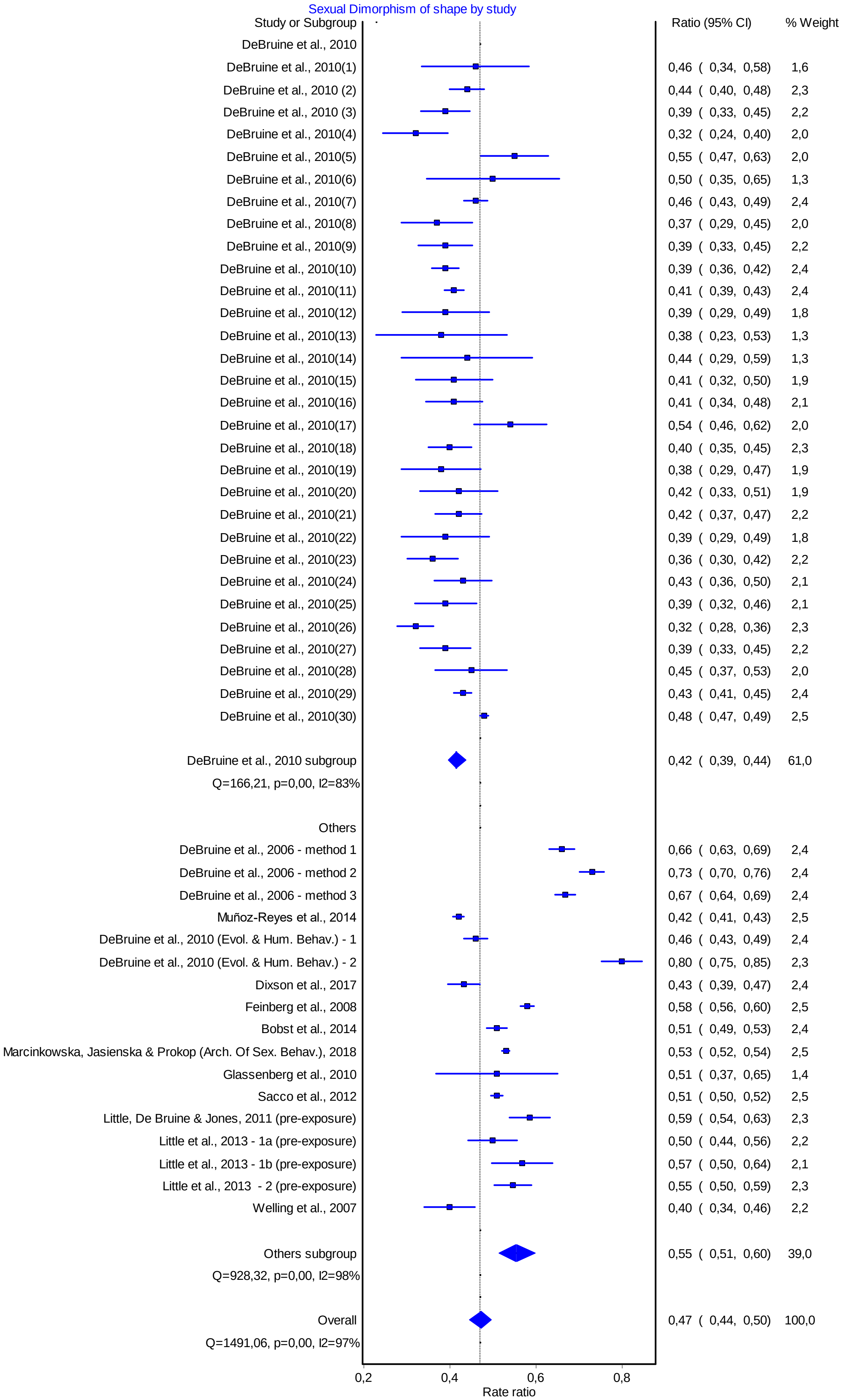


Fig. 9. Meta-analysis on sexual dimorphism of face shape, based on proportions of trials in which the more masculine stimuli was chosen.

Skin Color

This characteristic did not qualify for meta-analysis. As such, we reviewed the work that passed our initial set of criteria. Many of these studies use a space of colour measurement called CIELab, that is mainly composed by 3 axis: L*(0 = dark, 100 = light), a* (negative = green, positive = red) and b* (negative = blue, positive = yellow). The relevance of this information is to allow for an easier comprehension of the results.

Analysing the systematic review (see table 4 of the Systematic Reviews section in the appendices) we identified the different methods used for gathering the attractiveness judgements, and their respective prevalence (see figure 12 in the appendices). Ratings and two-alternative forced choice were the main methods utilized. Also, we identified the four main variables that were measured/manipulated alongside Facial Color and the number of studies in which they appeared (see figure 13 in the appendices). These were Sexual Dimorphism of (face) Shape, Symmetry, Ethnicity and Healthiness (of Face). Finally, we plotted the results of all the studies for this characteristic, subdivided by color dimension (see figure 24 at the end of results) and, from this analysis, we see a positive association between attractiveness and both yellowness and redness, and a negative one with lightness (although one study showed the opposite).

For a review and meta-analysis of the red-attractiveness hypothesis (concerning more than just redness on the face) we recommend reading Lehmann, Elliot, & Calin-Jageman (2018).

Facial hair

This characteristic did not allow for a meta-analytic approach. Analysing the systematic review (see table 5 of the Systematic Reviews section in the appendices) we identified the different methods used for gathering the attractiveness judgements, and their respective prevalence (see figure 14 in the appendices). Ratings and two-alternative forced choice were the main methods utilized. Also, we identified the four main variables that were measured/manipulated alongside Facial Hair, and the number of studies in which they appeared (see figure 15 in the appendices). These were Sexual Dimorphism of (face) Shape, Fertility phase of menstrual cycle, Nationality of participants and Contraceptive Use.

Nationality (and the consequent cultural differences) didn't seem to influence results significantly overall (Dixson, Rantala, Melo, & Brooks, 2017; Varella Valentova, Varella, Bártová, Štěrbová, & Dixson, 2017), with the exception of the Samoan and New Zealand samples documented in Dixson & Vasey (2012), that preferred clean-shaven faces overall. Interestingly, we noticed that in some studies where there were more options of facial hair distribution, participants tended to give the lowest ratings to either clean-shaven faces (Janif et al., 2014) or full beards (Dixson et al., 2013). This information is impossible to obtain in studies there are only two alternatives.

Finally, we plotted the results of all the studies for this characteristic (see figure 24 at the end of results) and, from this analysis, we see a positive association between attractiveness and the presence of facial hair.

Body Hair

This characteristic did not allow for a meta-analytic approach. Analyzing the systematic review (see table 6 of the Systematic Reviews section in supplemental materials) we identified the different methods used for gathering the attractiveness judgements, and their respective prevalence (see figure 16 in the appendices). Ratings and two-alternative forced choice were the main methods utilized. Also, we identified the four main variables that were measured/manipulated alongside Facial Hair, and the number of studies in which they appeared (see figure 17 in the appendices). These were Fertility phase of menstrual cycle, Nationality of participants, Body Type and Contraceptive Use.

Finally, from the plotted results of all the studies for this characteristic (see figure 24 at the end of results) we see that the pattern of results is unclear. Some studies report a preference for no body hair (Dixson, Dixson, Bishop, & Parish, 2010; Dixson, Dixson, Li, et al., 2007; Prokop, Rantala, Usak, & Senay, 2013; Rantala, Pölkki, & Rantala, 2010), and others demonstrate higher judgements of attractiveness when body hair is present (Dixson, Halliwell, East, Wignarajah, & Anderson, 2003; Dixson, Dixson, Morgan, et al., 2007; Dixson & Rantala, 2016; Valentova et al., 2017).

Body Type

This trait is, as explained before, a combination of several body characteristics: somatotype, WCR (or CWR, which is the inverse ratio), SWR (or WSR, which is the inverse ratio) and muscularity. Presenting them together was both a conceptual and convenience choice. Convenient because there was a relatively small number of studies that fit our criteria for each characteristic, and their individual presentation was unjustified. Conceptual because, by definition, somatotype is a division of an individual's physique according to muscularity (mesomorphy), fatness (endomorphy) and leanness (ectomorphy) (Carter & Heath, 1990) and, therefore encompasses changes in muscularity, which logically are correlated with WCR, CWR, SWR and WSR – and the stimuli used to assess each characteristic are identical.

Due to the absence of descriptive statistics (or to their presentation being limited to graphs in most studies – which could generate, overall, a significant error in results), we couldn't calculate SEs and, therefore, couldn't use them for meta-analysis, even though they fulfilled our criteria (Dixson et al., 2003; Dixson, Dixson, Li, et al., 2007; Dixson, Dixson, Morgan, et al., 2007). A meta-analysis was conducted with WCR (see figure 18), where we notice the existence of a globally significant negative relationship between WCR and attractiveness (IC 95% -0.84, -0.47, Chi2 p=0.02, I^2=74%), suggesting preferences for a smaller WCR.

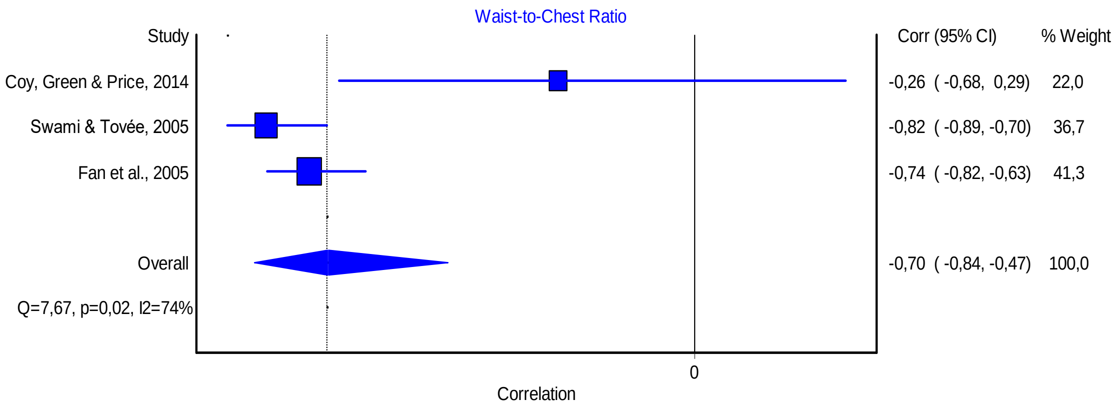


Fig. 18. Meta-analysis on waist-to-chest ratio (WCR), based on correlations between this variable and attractiveness.

Analyzing the systematic review (see table 7 of the Systematic Reviews section in the appendices) we identified the different methods used for gathering the attractiveness judgements, and their respective prevalence (see figure 19 in the appendices). The vast majority of studies used ratings. Also, we identified the four main variables that were measured/manipulated alongside Facial Hair, and the number of studies in which they appeared (see figure 20 in the appendices). These were Relationship Context, Sexual Dimorphism of (face) Shape and Nationality of participants.

Finally, from the plotted results of all the studies for this characteristic (see figure 24 at the end of results) we see that the majority of women prefer V-shaped or average (which still show some V-shape, only less pronounced) men. In none of the studies we analysed was there a preference for shapes associated with more fat, and fat accumulated in the belly was shown to significantly reduce a man's perceived attractiveness (Horvath, 1981). Interestingly, women's ideal muscularity seems to be only slightly more than average (around 60, on a scale from 0 to 100, varying from reduced to pronounced musculature – and consequent shape changes; Zellner & Lynch, 1999). In figures 19 and 20 of the appendices, respectively, we present, similarly to all other characteristics, a chart regarding the different types of attractiveness measurement utilized, and the most common independent variables manipulated along side body type (with the respective number of studies).

Height

We included LBR (leg-to-body ratio) in this analysis, because we found that it was analysed in some studies of height. Indeed, a person may be tall or short, but if the LBR is outside normality, judgements of attractiveness can potentially depend more on that factor, than on height itself. Given the growing body of evidence showing the relative, rather than absolute, importance of male height on perceived attractiveness (Varella Valentova, Bártová, Štěrbová, & Corrêa Varella, 2016), we focused our attention on the impact of SDS (Sexual Dimorphism in Stature) in judgements of attractiveness. As was mentioned above, we used the work of Pierce (1996) as a basis for ours, yet, as the studies mentioned there did not respect our criteria, we didn't include any of the studies reported in that paper's review table. In what concerns SDS, the stimuli in the studies are typically heterosexual couples varying in the relative height of the male in regards to the female, or *vice versa*. They are usually a set of five or six images, and participants have to choose the one where they would prefer to be the woman in that relationship (see figure 21). We used the weighted mean of preferences for all of the pictures in each study (sometimes having to calculate it) to compute the meta-analysis. We used the mean value of preferences because, in general, it was faithful to the data – the only exception to that being Sorokowski, Sorokowska, et al. (2015), in the Hazda population, where preferences for lower and higher SDSs than average resulted in a mean preference for the average.

In our meta-analysis (see fig. 21), we notice the existence of globally significant preference for height (IC 95% 1.08, 1.10, Chi2 $p<0.01$, I^2=79%), suggesting that women prefer a taller male partner.

Analyzing the systematic review (see table 8 of the Systematic Reviews section in the appendices), we noticed the four main variables that were measured/manipulated alongside height, and the number of studies in which they appeared (see figure 23 in the appendices). These were the participant's Own Height, Ideal or Current Partner's Height, Relationship Status and SOI (Sociosexual Orientation Inventory).

Finally, from the plotted results of all the studies for this characteristic (see figure 24 at the end of results) we see that the majority of women prefer a man taller than herself. The question "how much taller?" is answered by our meta-analysis, that suggests that the ideal SDS is 1.09, which, as a practical example, is the ratio between a woman with 165cm and a man with 180cm. Concerning LBR, studies all point in the same direction: a preference for a slightly above average, or average LBR compared to the population (Kiire, 2016; Versluys, Foley, & Skylark, 2018; Versluys & Skylark, 2017)

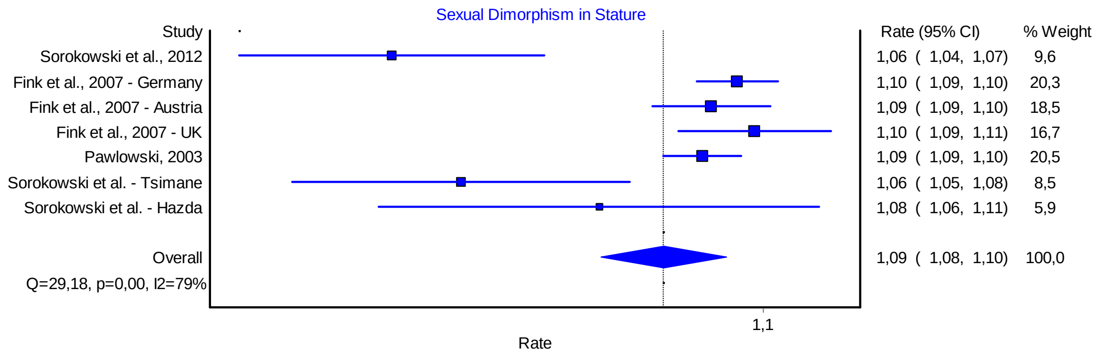
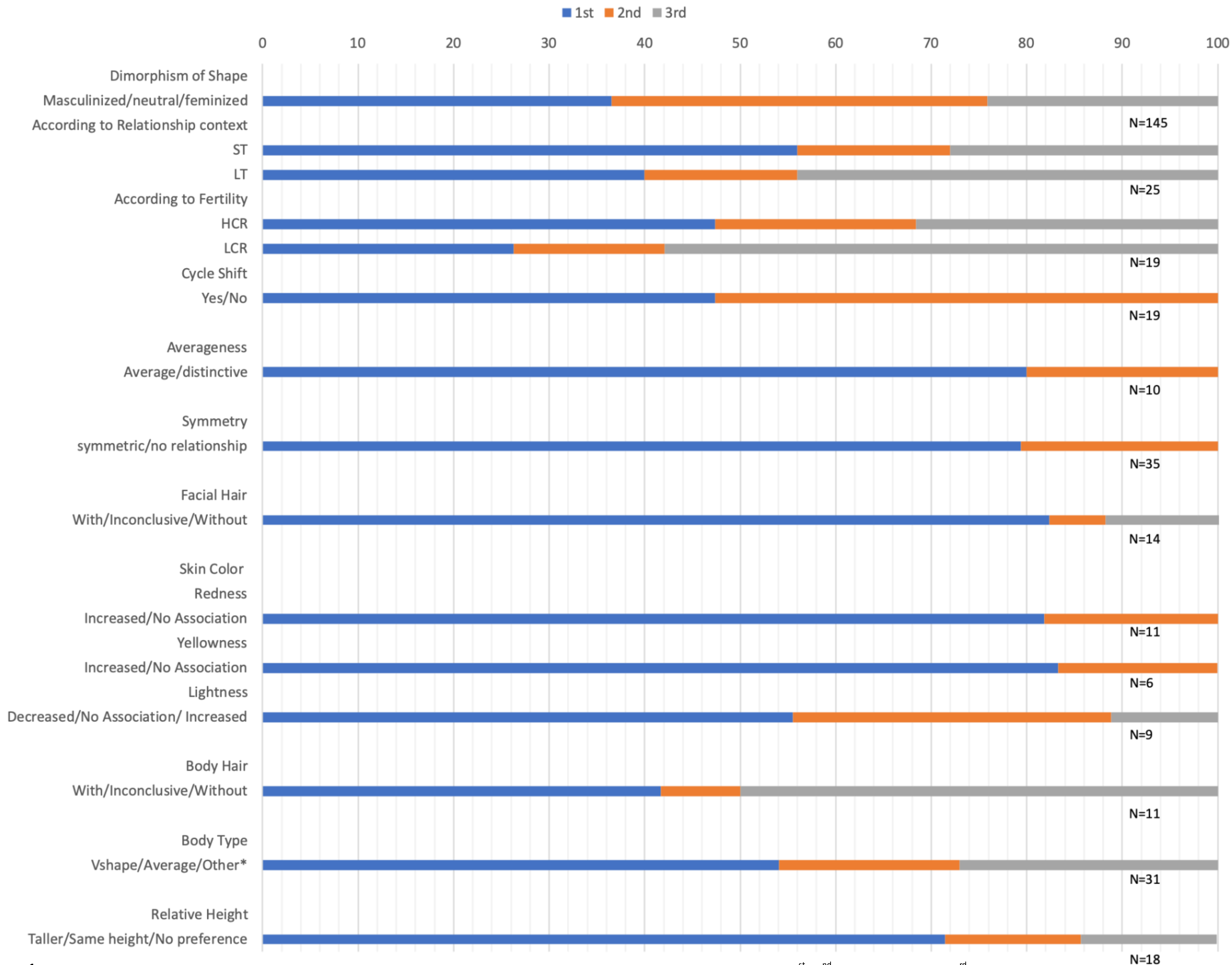


Fig. 21. Meta-analysis on sexual dimorphism in stature (SDS), based on the corrected average of m/f height ratio preferences.



1. **Fig.24**. Overall effects of the characteristics on attractiveness, organized by the categories presented before each colored line [1st , 2nd and, when existent, 3rd category presented, ex. Sexual Dimorphism of (face) Shape – overall – Masculinized (1st)/ Neutral (2nd)/ Feminized (3rd)]. (**sexual dimorphism of shape)** neutral category includes studies where there were no clear preferences, where preferences were not significant (p>0.1) and when there was different preferences for 3 or more levels of an IV; for the rest of the studies whenever there was a IV with 2 levels, we counted each group as a unit of analysis. * results that didn't fit the other terms (Vshape or average), or that didn't find significant results.

Discussion

Averageness

Since it was first empirically tested by Langlois and Roggman (1990), averageness underwent thorough scrutiny by the scientific community. Although the averaging of several faces does create an attractive composite (Langlois, Roggman, & Musselman, 1994), criticisms and alternative explanations of why that happened emerged (Benson & Perrett, 1992; Pollard, Shepherd, & Shepherd, 1999). An important one was that the effects were attributable to the increase of bilateral symmetry of the composites (Alley & Cunningham, 1991; Grammer & Thornhill, 1994). However, that hypothesis has long been put down as these traits have been shown to have independent effects in judgements of attractiveness (Komori, Kawamura, & Ishihara, 2009; Rhodes, Sumich, & Byatt, 1999; Rhodes et al., 2001).

Male perceived health is positively predicted by averageness (Foo, Simmons, et al., 2017), as it also communicates genetic quality (Lie, Rhodes, & Simmons, 2008). It is Likely that the absence of distinctiveness (the opposite of averageness) may be more important than the presence of averageness (Leder, Goller, Forster, Schlageter, & Paul, 2017), as distinctiveness may be more costly than averageness is beneficial. Indeed, even abstract (non-human) prototypes elicit positive affective reactions (Winkielman, Halberstadt, Fazendeiro, & Catty, 2006). Hence, averageness seems to represent the quality of an individual, regardless of sex (Lee et al., 2016), which justifies why this trait is judged positively, as being attractive to both females and males (Kościński, 2011). Such hypothesis is congruent with findings reporting that other animals too are found more attractive to people when average (Halberstadt & Rhodes, 2003). Also, the fact that averageness seems to be important in the judgements of attractiveness of infants and toddlers (Langlois & Roggman, 1990; Vingilis-Jaremko et al., 2014), who are mostly pre-pubescent, reinforces the doubt of its importance in sexual selection per se. Perhaps higher familiarity might be a proper explanation for higher preference for averageness, i.e. average faces of unfamiliar stimuli seem more familiar and are judged as more attractive, while the opposite is true for familiar faces, when averaged (Carr et al., 2017). All the above would explain why DeBruine, Jones, Unger, Little, & Feinberg (2007) decided to further explore the association between averageness and attractiveness by taking visual adaptation[2] into consideration, subsequently showing that non-average characteristics can be particularly attractive for the opposite sex.

Averageness may represent a different, yet related, mechanism to that of mate-choice which we try to analyse in this paper. It seems as though it communicates underlying traits that are of importance for survival (Rhodes, Zebrowitz, et al., 2001; Randy Thornhill & Gangestad, 1999a) – possibly representing natural selection more accurately than sexual selection (Kirkpatrick, 1982). Nonetheless, our results, building on those of Rhodes (2006), suggest that averageness can be regarded a sexually attractive trait of the human face and, for what concerns the present work, specifically of the male face.

[2] According to visual adaptation theory the preference for averageness of a face is not so much related to a mathematical averageness of the population's faces, but to an average of the faces we pay most attention to, which are, in general, attractive faces.

Symmetry

In our analysis of the systematic review we noticed that it was when symmetry was measured and manipulated that results sometimes did not support the general claim that symmetry is attractive. In the midst of all the supportive results, this datum drove us to further conceptual discussion of the role of symmetry in mate-choice.

The reason why symmetry is preferred has been thoroughly investigated (for a review, see Pisanski & Feinberg, 2013). Since FA is related with the inability to cope with the environmental challenges (e.g. disease, toxins, parasites; Livshits & Kobyliansky, 1991), its absence, *aka.* symmetry, is a correlate of the opposite (Fink, Neave, Manning, & Grammer, 2006, for a review, see Thornhill & Gangestad, 1999). Thus, symmetry signals health and genetic quality (Gangestad & Thornhill, 1997; Manning, 1995; Mentus & Markovic, 2016), regardless of sex. This provides a possible and most logical explanation for the increased preferences for symmetry in harsh environments where health should be a major concern (Dixson, Little, et al., 2017; Little, de Bruine, et al., 2011). Another context in which preferences for symmetry increased was when women were exposed to a very high sex ratio (m/f; Watkins, Jones, Little, DeBruine, & Feinberg, 2012). If preferences for symmetry were increased in those situations, then probably they can be less important in others. A recent study showed that in the fertile phase (with high testosterone), there were no notable preferences for symmetry and/or asymmetry (Hernández-López, García-Granados, Chavira-Ramírez, & Mondragón-Ceballos, 2017) – If symmetry had a leading role in mate-choice in women, these results would unlikely be obtained. However, they support the findings of some existing work (Farrera et al., 2015; Hromatko et al., 2006; Kościński, 2013; Langlois et al., 1994; Soler et al., 2014; Van Dongen, 2011) and, hence, shouldn't be ignored. Penton-Voak et al. (2001) mentioned that symmetrical faces possessed unidentified characteristics that were attractive independent of symmetry and, in 2006, Little and Jones proposed that a specialized unconscious mechanism existed for symmetry preferences (different from symmetry detection; see also Lewis, 2017). Perhaps facial symmetry, being an important signal of mate-quality (Dixson, Little, et al., 2017) representing his ability to adapt to environmental stress (Thornhill & Møller, 1997), became a cross-sexual unconscious preference by means of natural selection – and its effects on mate-choice might be moderated by other traits that, them too, are preferred by means of an implicit process, but of sexual selection (Kirkpatrick, 1982).

Independently of the conceptual considerations we can make, both our meta-analytic and study count , are in strong agreement with Rhodes (2006), and suggest that symmetry can be regarded as a sexually attractive trait of the human face and, especially, of the male face to women.

Sexual Dimorphism of Face Shape

Masculine facial traits are positively related with health (Rhodes, Chan, Zebrowitz, & Simmons, 2003; Randy Thornhill & Gangestad, 2006) and genetic quality (Gangestad & Thornhill, 2003b). However, men with higher levels of facial masculinity are more likely to pursue a short-term mating strategy (Gangestad & Simpson, 2000), and provide lower parental investment (Little, Jones, Penton-Voak, Burt, & Perrett, 2002). Men with more feminine facial characteristics are more likely to provide higher parental investment and cooperation in long-term relationships, at the cost of not providing such genetic quality (Perrett et al., 1998; Waynforth, Delwadia, & Camm, 2005). Evolutionary theory has proposed that women may employ a dual strategy in mate-choice to secure the most benefits (Buss, 2005). The hypothesis is that, when in the fertile phase of their cycle (theoretically associated with short-term mating preferences), they will seek to mate with a high quality male, so that those traits pass onto their offspring. However, when in the non-fertile phase (associated with long-term preferences), women seek males with lower levels of facial masculinity. There is a body of evidence supporting this hypothesis (Escasa-Dorne, Manlove, & Gray, 2017; Jones et al., 2018; Little, Connely, et al., 2011), and an argument was made for the influence of contraceptives in hampering this effect (Little et al., 2002). On the other hand, enough other studies report no such variations on preferences for masculinity with relationship context (Burriss et al., 2014; Burriss, Welling, & Puts, 2011; Carrito et al., 2016; Little et al., 2014) or cycle phase (Little & Jones, 2012; Marcinkowska et al., 2018), or present a lack of changes in such preferences in women taking contraceptives (Limoncin et al., 2015). Watkins, DeBruine, et al. (2012), in accordance with previous work (DeBruine, Jones, Tybur, Lieberman, & Griskevicius, 2010; Little, de Bruine, et al., 2011), posited that under high pathogen loads or when having high pathogen disgust sensitivity, women would pick a masculine man for health-related reasons. Also, in the USA, it seems that a State's health index is negatively correlated with facial masculinity preferences (DeBruine, Jones, Little, Crawford, & Welling, 2011). However, McIntosh et al. (2017), reported a general decrease in women's preferences for masculine stimuli that, although not significant, occurred after priming them with stimuli of pathogens and ecto-parasites. Moreover, Lee & Zietsch's (2015) results exhibited no relationship between pathogen disgust sensitivity and facial masculinity preferences in women, and such preferences have been also attributed to societies with lower, not higher, disease rates (Scott et al., 2014). All this evidence makes it hard to understand if these hypotheses are valid, and once again raises doubts about which degree of dimorphism is most attractive to women. Curiously, a cross-cultural study by Scott et al. (2014) proposed that preferences for sexually dimorphic faces might be evolutionary novel, verifying that it was in large-scale, urban societies, where fertility and homicide rate was low that preferences for dimorphism were bigger.

According to our meta-analysis, we see that there is no significant preference for either masculinity or femininity – as well it provides further evidence of the heterogeneity of results within the studies included. From the plotted results of all the studies regarding sexual dimorphism (see figure 24) we can extract the following information: 1) there is no clear preference for either masculinized or feminized stimuli; and there are a lot of studies that have a dispersion of results according to 3+ levels of the same independent variable, or that reported inconclusive results; 2) according to relationship context, the prediction that women prefer masculinized men for ST relationships and feminized men for LT relationships is mildly supported at best, since we still observe a large percentage of studies pointing to the opposite; 3) regarding fertility phase of menstrual cycle, we find it particularly interesting that more than half of the studies did not reflect the expected menstrual cycle-dependent changes in preferences; this means that the distribution we observe in HCR and LCR may in large not represent differences between conditions, but differences between studies (in which in both conditions participants preferred masculine or feminine male stimuli).

Nonetheless, the number of studies verifying the expected shifts in women's preferences for masculinity with changing contextual or personal conditions is still larger (Little, DeBruine, & Jones, 2013; Penton-Voak & Perrett, 2001; Penton-Voak et al., 1999; Reeve et al., 2017; Scott, Swami, Josephson, & Penton-Voak, 2008), than those contradicting it. Considering that, and the associations between health and increased masculinity in male faces (and decreased masculinity in female faces) (Randy Thornhill & Gangestad, 2006), we hypothesize that confounding variables might be sabotaging consistent findings, whether they be some of the aforementioned ones, or others that are still to be identified.

One interesting discovery was that of Burke & Sulikowski (2010), that noticed that by altering the tilt of the head to mimic how normally women see men's faces (slightly from bellow) and how men normally see women's faces (slightly from above), their perceived masculinity or attractiveness and femininity increased, respectively. The manipulation of stimuli in the opposite direction yielded the opposite results. According to the author, the explanation for this might rely on the height dimorphism men and women naturally have – and as we confirm in this work, It seems women prefer men taller than themselves. We, on the other hand, suspect there might be more to this effect than it initially leads. Although a height dimorphism might have existed in our evolution, there was a dynamic interaction between the individuals, where they would eat, rest, and probably spend most of their time in situations where this tilt would go mostly unnoticed in face perception. We therefore suggest it might also be linked with behaviour. Postures related with dominance tend to occupy more space and leave potentially fragile parts of the body exposed, i.e., that could compromise survival (e.g. chest, neck and genitalia). Postures of submission are associated with the opposite pattern, i.e. a closing of the body (Carney, Cuddy, & Yap, 2010). The slight variance in tilt of the faces might unconsciously communicate dominance or submission – and, hence, a male face tilted backwards might seem more dominant and, when tilted forward, more submissive, the same being true for women (Holland, Wolf, Looser, & Cuddy, 2017). It is most likely that, throughout evolution, non-verbal behaviour was complementary rather than identical between individuals (Tiedens & Fragale, 2003). Consequently, perceptions of masculinity/femininity may vary in accordance to what the typical behaviour modality of each sex was, from an evolutionary stand point – and attractiveness judgements may vary in accordance. In this case, a more dominant facial position of the male generates higher ratings of masculinity, and for the female a more submissive one is not only found more feminine, but also more attractive (see also Keating, 1985). The intention of this alternative explanation is solely that of hypothesising the nature of other factors influencing/moderating facial dimorphism preferences in more ecological settings.

Another interesting explanation was provided by Hu, Abbasi, Zhang, & Chen (2018), who proved that masculinity was preferred in attractive men's faces, whereas femininity was preferred in unattractive ones (see also, Yang, Chen, Hu, Zheng, & Wang, 2015). This suggests that a very attractive male face is more masculine, but a very unattractive face is also more masculine – and femininity may simply hinder a face's unattractiveness in male faces.

Personal differences in the woman, as was previously mentioned, may also explain this variability. Bressan and Damian (2018) claimed that parental features could shape later sexual preferences, and Selecka and Demuthova (2016) showed that depending on a woman's femininity, her preference for men's faces was affected. In the general discussion, we provide suggestions for the use of certain methodology in future studies that can help to shed light on previously overlooked variables.

Skin Colour

Jones, Little, Burt, & Perrett (2004) found that the ratings of attractiveness of full faces or skin patches taken from the same faces were correlated. This suggests that skin color (and its homogeneity) and texture play important roles on face preferences (Fink, Grammer, & Thornhill, 2001; Matts, Fink, Grammer, & Burquest, 2007), being potentially a more important sexually dimorphic cue than face shape (Carrito et al., 2016; Said & Todorov, 2011). The reason of why skin color impacts judgements of attractiveness might have to do with its influence on perceived and actual health (Stephen, Law Smith, Stirrat, & Perrett, 2009), particularly reproductive (Little, Jones, & DeBruine, 2011). Concerning the facial yellowness component (a masculine sexually dimorphic feature of color), carotenoid levels have been found to aid fertility in men, being low when they are infertile (Eskenazi et al., 2005). Also, yellowness positively predicts health measures (Stephen, Coetzee, & Perrett, 2011; Tan, Tiddeman, & Stephen, 2018). Regarding redness, it positively influences perceived health status (Thorstenson et al., 2017), possibly because the blood oxygenation and perfusion, who are responsible for increased facial redness, are associated with cardiovascular fitness (Re, Whitehead, Xiao, & Perrett, 2011). Men usually have darker skin than the women of the same population (Jablonski & Chaplin, 2000; van den Berghe & Frost, 1986), and women's attractiveness is related to increased lightness and luminance parameters (Russell, 2003), as they seem to be cues for her fecundity (Aoki, 2002). Although more research is needed, facial color seems to be an honest and consistent cue to both individual health and sexual dimorphism. Hence, it may have an important effect on judgements of attractiveness, and perhaps be a more relevant facial trait to mate-choice than the dimorphism of shape. Since color can be changed with diet (Lefevre & Perrett, 2015) and exercise (Re et al., 2011), it might reflect other, more flexible parameters of mate-quality, and thus be more relevant for mate-choice. Congruently, our results show a clear preference for increased redness and yellowness dimensions of facial color, and suggest the opposite pattern for the lightness dimension.

The fact that black faces received on more than one occasion higher attractiveness ratings than white or Asian ones, even from women of other cultures (Lewis, 2011, 2012), may indicate an evolutionary advantage of such color, or signal the attractiveness of associated parameters, like reduced age. Since other factors other than color may be involved in these preferences, in spite of finding them important to mention, we opted for not discussing them in further detail.

Facial Hair

In several studies, there was consistent evidence that facial hair was related with attractiveness in a non-random fashion. Indeed, in the context of business, male applicants with facial hair were consistently perceived more positively in regards to physical and social attractiveness, personality, competency and composure (Reed & Blunk, 1990). More, in most of the experimental research we analysed in this work, there is a clear preference for facial hair rather than its absence (Dixson & Brooks, 2013; Dixson & Rantala, 2016; Dixson, Sulikowski, Gouda-Vossos, Rantala, & Brooks, 2016), with the exception of women that have clean-shaven partners (Dixson et al., 2013). There seems to be an effect of exposure across cultures, where women that are most exposed to men with facial hair, tend to prefer it (Dixson, Rantala, et al., 2017), but more evidence on this effect is needed. Interestingly, although beards are generally more attractive than clean-shaven faces (Dixson, Lee, et al., 2018; Stower et al., 2019), they tend to be among the least attractive when other facial hair conditions are present – except for women that have bearded partners, who judge beards as the most attractive condition (Dixson et al., 2013). Potential reasons for this might be that: beards alter perceived facial structure and contribute to rapid judgements of anger, as well as masculinity (Craig, Nelson, & Dixson, 2019); or even that beards provide conditions for the proliferation of ectoparasites, with great health costs (Rantala, 2007). However, McIntosh et al. (2017) concluded that there was little evidence for this last prediction, since women demonstrated even higher attractiveness towards beards after being primed with pathogen and ectoparasite stimuli. Hence, the first explanation might be the most adequate, for men with pronounced masculinity are known to be less trustworthy and more prone to deserting their partner (Penton-Voak et al., 2003; Perrett et al., 1998). An alternative explanation is that there is a general preference for male facial hair, because it might signal ability to resist potential pathogens and disease, since hair may carry such agents (McIntosh et al., 2017) – as well as being a sexually dimorphic trait (Craig et al., 2019) –, and the preference for its distribution and intensity (whether it be heavy stubble, or beards) may vary according to other moderating factors. In some rare cases, these moderating factors (in this case probably mediating factors, since the relationship between the variables seizes to exist) may result in them preferring the owner(s) of (a) clean-shaven face(s) (Dixson et al., 2013).

Body Hair

There seemed to be no consistent preferences (Dixson & Rantala, 2016; Prokop et al., 2013). This may be due to the small number of studies that matched our criteria and that were analysed, or it may reflect the actual variability in preferences for this characteristic. We hypothesized that preferences could vary with age, since there are social trends that could influence body hair use and preferences for it – depilation practices being an example (Basow & O'Neil, 2014) – but no patterns were identified. The only variable that might have had an influence is that of differences between cultures. Dixson, Dixson, Morgan, et al. (2007), showed that in a sample of women from the Cameroon, their preferences for moderate body hair (there was only one of five images displaying more hirsuteness than the one chosen) were significantly above what was observed in other samples (Dixson et al., 2003; Valentova et al., 2017). Following this pattern, we noticed that in most studies with European samples, there was a preference for body hair, when faced with the binary choice (Dixson et al., 2003), and for the slight or very slight body hair when presented with multiple choice (Dixson & Rantala, 2016; Valentova et al., 2017). However, with the results obtained in Turkey and Slovakia, Prokop et al. (2013) demonstrated that not only women in their sample preferred hairless men, but also that those preferences weren't related with the ectoparasite avoidance hypothesis – which reduces the number of evolutionary explanations for preferences of lack of body hair. With the exception of the findings in the Cameroon, the analysis of the literature leads us to affirm that women seem to prefer a relatively hairless male body. Whereas taking them into account demonstrates a variability in women's preferences for male body hair, and suggests caution in assuming any position before more research is conducted. Maybe this characteristic does not play an important role in mate-selection, because the different levels of body hair observed today may not signal important changes in mate quality, and might, at this point, be an aesthetic factor more than anything else.

Body Type

There is general agreement that higher SHRs (Lee et al., 2015), lower WCRs (Coy et al., 2014; Price et al., 2013) and mesomorph somatotypes (Dixson et al., 2003) are considered attractive in males – upper body muscles are the most relevant (Durkee et al., 2019). However, and contrary to what the Media have lead men to think (Campbell, Pope, & Filiault, 2005), things might not be that simple. In point of fact, regardless of relationship context, women regularly judge the average somatotype as being the most attractive (Dixson, Dixson, Li, et al., 2007), or almost equally as attractive as the mesomorph (Dixson et al., 2010; Štěrbová et al., 2018). More, Lynch & Zellner (1999) showed that women's ideal partner was only slightly more muscular than average. In looking to understand this trait's influence on attractiveness, Frederick & Haselton (2007) proposed and demonstrated their inverted-U hypothesis, showing that women's judgements of attractiveness increase with muscularity only within certain levels, decreasing with demonstrations of pronounced or reduced muscularity. This provides evidence that there is a 'sweet spot' of muscularity that would better be justified by its functionality – it is perhaps within that range that more muscularity correlates with an increased ability to perform under evolutionarily relevant circumstances. Interestingly, muscularity seems to be more important for short-term unions (Frederick & Haselton, 2007) and to women with unrestricted sociosexuality (measured from Sociosexual Orientation Inventory scores; Provost et al., 2006). Being true, this would support the Dual Mating Hypothesis (Perrett et al., 1998), in that women would choose men displaying more fitness, i.e. muscularity in this case, for short sexual encounters, in order to secure good genes for their offspring. Nonetheless, more evidence is needed to support this theory. The variability in preferences for muscularity can be a consequence of widely known personal confounds, like own attractiveness (Little et al., 2001), or partnership status (Little et al., 2002).

Differently, some studies indicate that there is no significant impact of body type on women's judgements of attractiveness (Honekopf et al., 2007; Reeve et al., 2017). More, with a large sample of women, Zarzycki, Słyk, Price, & Flaga-Łuczkiewicz (2019) reported that, despite their preferences, less than half considered muscularity decisive for a relationship. Overall, the present data regarding body type suggest that the most attractive male body is one where the degree of muscularity is neither too pronounced, nor too reduced, showing a lower WCR, and, according to Horvath (1981), no waist fat – referred in jargon terminology as "spare tire". The mentioned lack of relevance of this cue in some cases – where there were no associations between body type and attractiveness, or where women did not find it decisive for a relationship, despite their preference – might prove an important finding, as it suggests that this may not be a primary concern or focus when thinking of physical attractiveness, i.e., there are other traits that play a more important role.

Height

Where probability theory predicted that the proportion of couples with the woman being taller would be 2/100, the actual proportion in real life was 1/720 (Gillis & Avis, 1980). Indeed, men are taller than their partner and, when that is not the case, the difference in heights tends to be very small (Stulp, Buunk, Kurzban, & Verhulst, 2013). That coincides with evidence showing that women prefer an SDS equal or greater than 1 (Boguslaw Pawlowski, 2003; Sorokowski et al., 2012; Varella Valentova et al., 2016), and tend to declare not accepting to be taller in a relationship (Salska et al., 2008). Besides, men in high SDS relationships announce less cognitive and behavioural jealousy (Brewer & Riley, 2010), and greater relationship satisfaction (Brewer & Riley, 2009). Interestingly, it appears that women who are shorter tend to prefer a higher SDS than women who are taller (Fink et al., 2007) – hence increasing their number of possible partners. Pawlowski & Jasienska (2005) investigated whether relationship context or phase of the cycle influenced women's preferences for SDS and, although for some there was an increase in preferred SDS in the fertile phase and short-term mating context, about 50% of the women did not alter their choice. Although more work is needed, these results suggest that the impact of these variables is limited in influencing preferences for height.

Because noticeable variability was found between cultures, where women from less developed countries showed increased variance in preferences, including for men being the same height or slightly shorter than themselves, we suggest more research should be done on this topic (Sorokowski & Sorokowska, 2012; Sorokowski, Sorokowska, et al., 2015). These differences may prove to be inexistent, or perhaps be related to the function men play in each of these cultures, i.e., if a shorter male (closer to women's height) has competitive advantages over taller ones, this may tip the scales in his favour. Congruently, since height related positively with antibody response only up to 185cm (Krams et al., 2015), preferences registered for relatively taller men might be related with sexual selection factors, possibly related with desired behavioural aspects (e.g. male-male competition, protection), more than with health. Height is, overall, for all intents and purposes, a physically attractive characteristic.

General Discussion

Physical attractiveness is known to have a positive influence both socially and professionally (for a review, see Langlois et al., 2000), as well as correlating with particular health measures (Roberts, Little, DeBruine, & Petrie, 2017; Skrinda et al., 2014). But the question becomes: what makes someone physically attractive? Evolutionary theory proposes that physical attractiveness is an important way in which an individual biologically communicates his or her value as a mate, through displaying specific physical characteristics. In this review of literature with meta-analyses, we focused on male physical attractiveness, specifically on eight traits, five of which were facial (avarageness, symmetry, dimorphism, skin color and facial hair) and the rest were relative to the body (body hair, body type and relative height).

Among the characteristics with the strongest effects on women's attractiveness perception were averageness and symmetry. Our meta-analyses show that increased averageness and symmetry relate to higher attractiveness judgements – thereby confirming what the literature already stated. However, it is worth reflecting on the fact that it may be the absence of distinctiveness and asymmetry (I.e., the opposites of averageness and symmetry) that is driving this relationship – controlling for certain known confounding variables, such as familiarity (Carr et al., 2017) and color cues for health (Jones et al., 2004), these results might prove different. Indeed, we encourage further research in which these variables are explored. There is no question that there is an effect, but it may be related with the perception of health and familiarity – both crucial in our survival as a species. However, since natural and sexual selection don't always favour the same traits, these may have a relative impact on overall judgments of attractiveness depending on the presence of other mate-value related characteristics.

In what regards waist-to-chest ratio, an increase in attractiveness was accompanied by a reduction in this ratio – specifically, preferences point to a slightly above average muscularity, with a tendency for an average/mesomorph shape. Although this conclusion is based on a short number of studies, it is noteworthy that no study we recovered described an opposite relationship between this variable and attractiveness. If on the one hand this urges further research on the topic, on the other it provides confirmation of the importance of this characteristic.

In terms of relative height, women reported a consistent preference for a male who was taller than them (a ratio of about 1,09) – even if in two studies there was a preference for men of the same height, we found only one study where there was a slight preference for a shorter man as a mate. The same consideration as that made for WCR emerges for height, although here the emphasis lies on future research regarding cultural differences.

Skin color showed an apparent consistence in findings throughout the literature in what concerns the yellowness and redness dimensions of CIELab – which seem to be preferred in Caucasian male faces. Changes in lightness, on the other hand, did not prove to be consistent in their impact on the perception of a man's attractiveness. There are not enough studies using the same methodology for analysing women's preference for skin color – we therefore incite the replication of studies such as that of Carrito et al. (2016) and Stephen et al. (2012), with a special emphasis on the lightness dimension.

Facial and body hair showed different impacts on male physical attractiveness. Facial hair presence, rather than absence, seems to gather an almost unanimous preference – with beards being a controversial aspect, sometimes generating the lowest attractiveness judgements. Body hair, on the other hand, did not show a pattern of preferences, apparently not being as relevant a trait as the others, in building male physical attractiveness.

Lastly, regarding sexual dimorphism of facial shape, we found a close to chance preference for feminine or masculine stimuli, depending on the subgroup i.e., with or without DeBruine et al (2010a), – thus finding significant variability of results. Not limiting the results to the meta-analysis, we found that a number of potentially confounding variables, such as relationship context and phase of cycle, had been explored in different experimental settings – again showing an inconsistent pattern of preferences for each one and, most importantly, not supporting the predicted shifts in women's preferences in a clear way. A recent review has shown that evidence of cyclical shifts in women's preferences, as predicted by the Dual Mating Hypothesis, is fragile (Jones, Hahn, & DeBruine, 2019). As such, the idea that women look for a high-quality mate for short-term sexual encounters during the fertile phase of their cycle might be unfounded and due to methodological artifacts, and provides mild support to the claim that such desire does not exist in natural settings (Flegr, Blum, Nekola, & Kroupa, 2019; Wood, Kressel, Joshi, & Louie, 2014). Our results provide further evidence for the inexistence of such preferences. Independently of the pertinence of each claim, explicitly separating short from long-term mate-choice in research might introduce artificial noise, making explicit something that is less likely to occur in real-life mate-choice (implicitly) and, thus, influence results. In an attempt to overcome the previous, we suggest that this variable should be studied separately and in more ecological settings.

Based on the evolutionary theory's proposal that male physical attractiveness is not as important as female physical attractiveness in establishing the mate-value of an individual, we hypothesize that the variability in preferences for certain physical traits in men might be a consequence of an implicit mechanism governing female mate-choice, in which physical attractiveness contributes only partly to a bigger attractiveness impression, to which behavioural aspects are of crucial importance. Hence, we propose that future studies in this field, similarly to some existing work, be based on both behavioural stimuli (e.g. video recordings of men, interactions) and behavioural measures of attractiveness (e.g. will to find out more about the man, or reported interest in seeing him again; Fisman, Iyengar, Kamenica, & Simonson, 2006; Wu et al., 2018), rather than participant reported judgements of attractiveness, which have been shown to poorly predict real-life mate choice (Eastwick & Finkel, 2008).

Primacy of Behaviour? A Personal Reflection.

The premise of basing mate-choice relevant attractiveness judgements on genetic quality poses a problem: what is genetic quality? The assumption that genes control biology is to a large degree a supposition, and is being undermined as more research is done (Powell, 2005). There seems to be a bridge between genotype and phenotype – and that bridge is called epigenetics (Goldberg, Allis, & Bernstein, 2007). As Nijhout (1990) put it, it is ultimately the gene's environment that activates its expression. As such, environmental influences (e.g. nutrition, stress, emotions) can modify the genes (Lipton, 2015) and, furthermore, those alterations can be passed on to future generations (Carone et al., 2010). This suggests the decisive impact that habits, such as patterns of behaviour (including diet), can have on the fitness of an individual (Ballestar, 2010), as well as that of his/her progeny. It is possible that humans have evolved ways of identifying a mate's quality that are sensitive to these influences, particularly those under the potential partner's control (behavioural aspects). Simultaneously, unconscious mechanisms for the preference of those aspects which relate with higher mate-quality might have developed, and could explain some of the variability we previously found in preferences for physical characteristics. Furthermore, these preferences may be evolutionarily more important than fixed health traits, thereby serving as a moderating variable for their importance.

Male attractiveness judgements are at least partly independent of physical traits, being moderated by environmental factors. For example, when a photo of a man is presented next to the one of a popular woman described as his partner, he is perceived as more attractive, than when paired with an unpopular woman (Little, Caldwell, Jones, & DeBruine, 2015). A man's attractiveness also increases for women when a pleasant women is looking at him, particularly so if she smiles (Chu, 2012). Overall, women are more likely to find a man more desirable when he is presented alongside a female (Gouda-Vossos, Nakagawa, Dixson, & Brooks, 2018). Furthermore, when men are presented in a car (Dunn & Searle, 2010), or apartment (Dunn & Hill, 2014) associated with higher socio-economic status (SES) their attractiveness increases significantly. Wang et al. (2018), using American, Chinese and European populations, have shown that higher SES can counteract the effects of lower physical attractiveness in men, with women being four times as sensitive to these cues, supporting differences predicted by evolutionary theory.

Mating requires a bigger investment from women (both biologically and behaviourally, during gestation and posterior early infancy, e.g. lactation) and for that reason, according to the Parental Investment Theory, they should be more selective in choosing a mate (Buss, 2005). Additionally, since unlike men (Lassek & Gaulin, 2019), women can't reliably assess a men's reproductive status by physical traits (Li & Meltzer, 2015), this may suggest different reasons for preferences of male physical attractiveness – as well as justifying its apparent lesser importance (Lassek & Gaulin, 2019; Li & Meltzer, 2015). More, by reason of men having to compete with each other (and win) in order to have a high position in the social hierarchy (Symons, 1980), SES might pose as a direct cue to male quality. Personality traits related with the acquisition of a higher SES and resources, such as ambition, have also been documented to be extremely attractive in men (Geary, 2010). Thus, what initially might seem a shallow preference for resources, can actually be found to be a sophisticated mechanism for mate-quality detection. This reinforces the idea that there is a multitude of factors that might moderate women's preferences for physical traits – thus resulting in distinct findings on male physical attractiveness.

As a hypothesis, we posit that status-oriented behaviour, as well as that related with increased parenting abilities, or cooperation, may be implicitly processed as a whole, together with physical attractiveness, to determine the mate-quality of a man. Consequently, bypassing the behavioural factors in assessing physical attractiveness will contribute to an inconsistency in results. To test this, with the same group of men, researchers can produce static and dynamic stimuli, as well as using them as actors in interactive settings, manipulating, in different studies, each of the traits analysed in this work, with different measures of attractiveness (rating, forced choice, interest in seeing the man again, wanting to spend more time in the presence of the man). A longitudinal study with a women cohort, could shed some clarity on the importance of specific male characteristics on female mate-choice.

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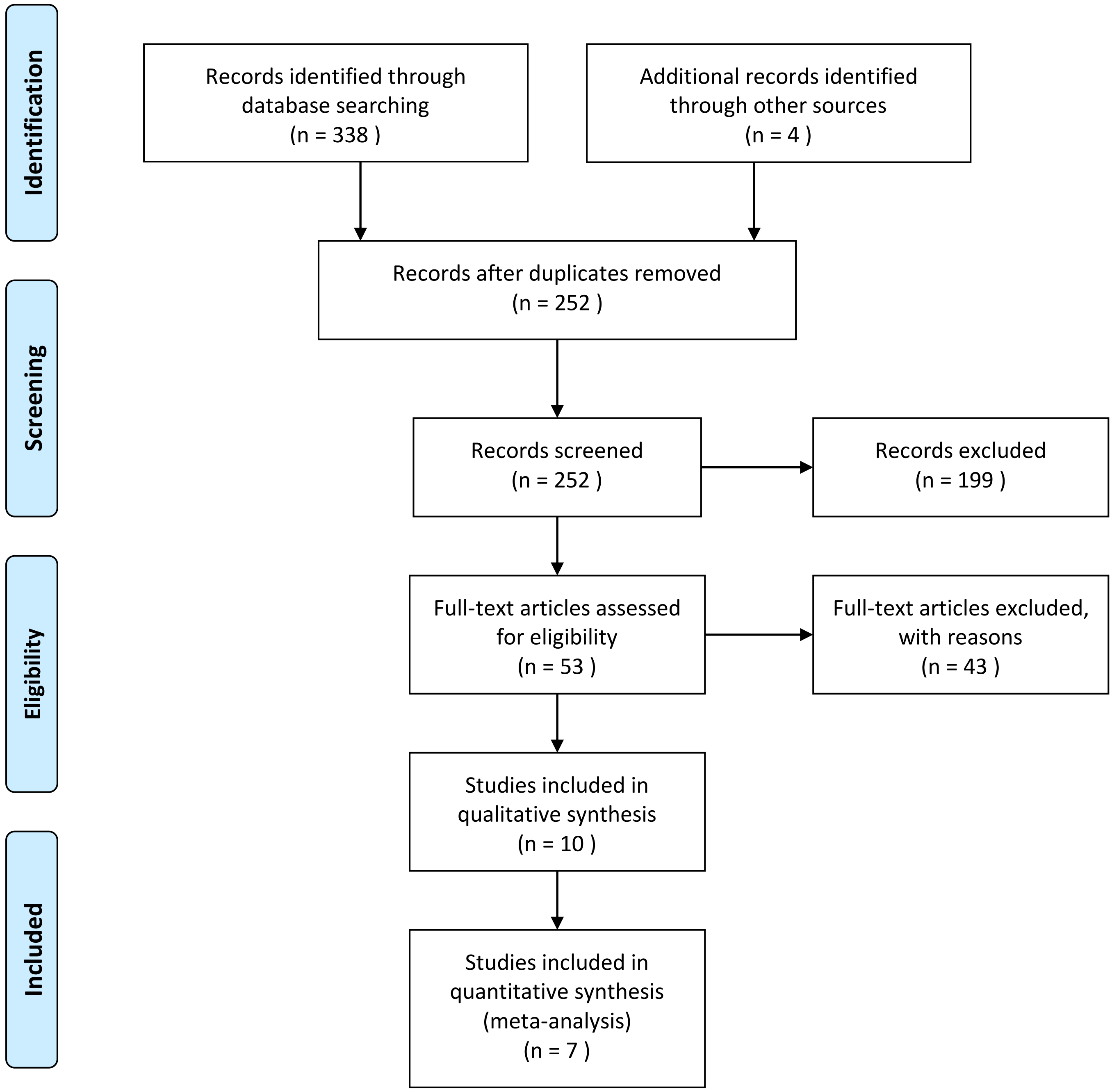
APPENDICES

APPENDICES 1 – PRISMA FLOWs e QUERIES

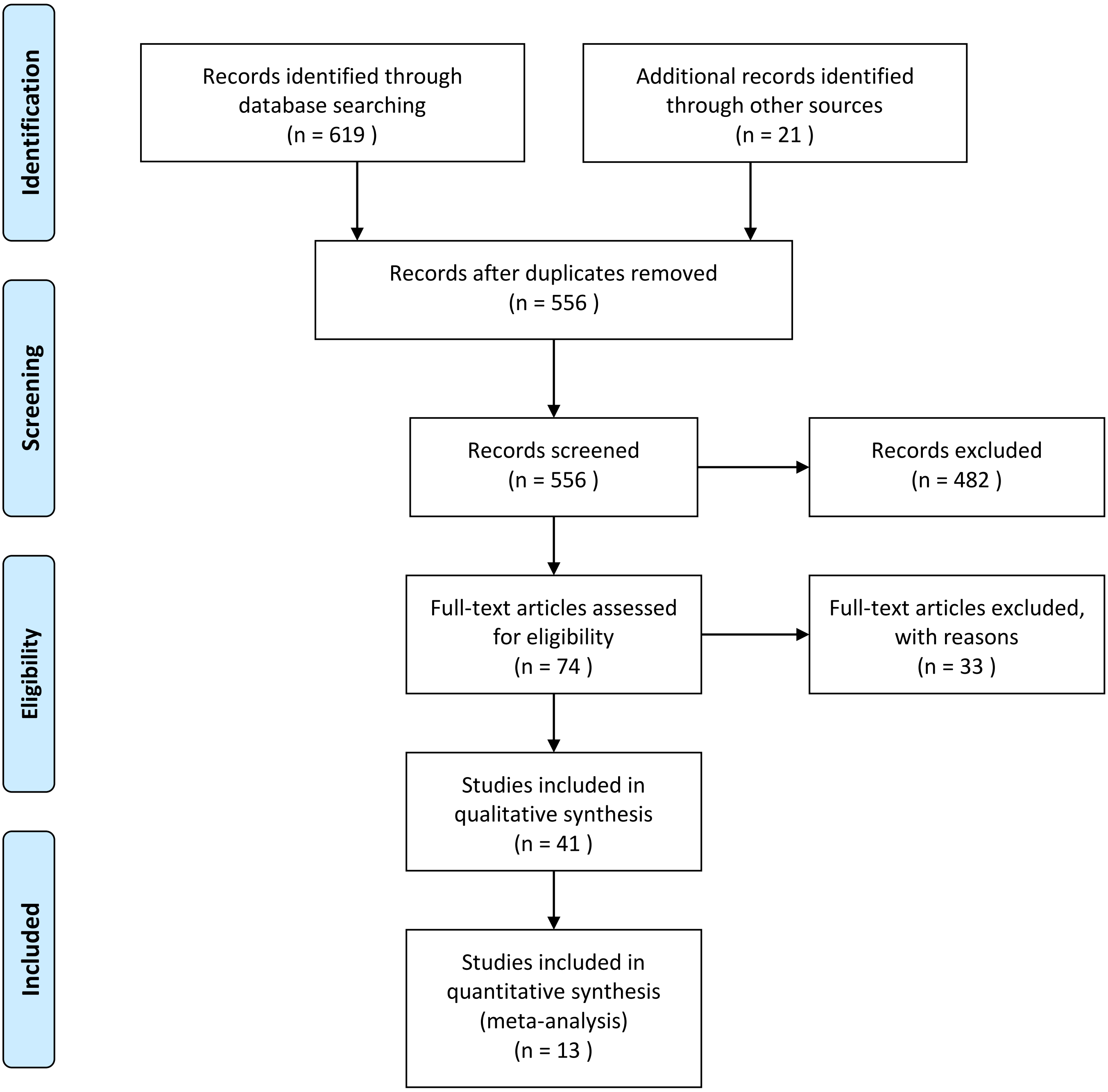
Table of Contents

PRISMA FLOWs

Averageness

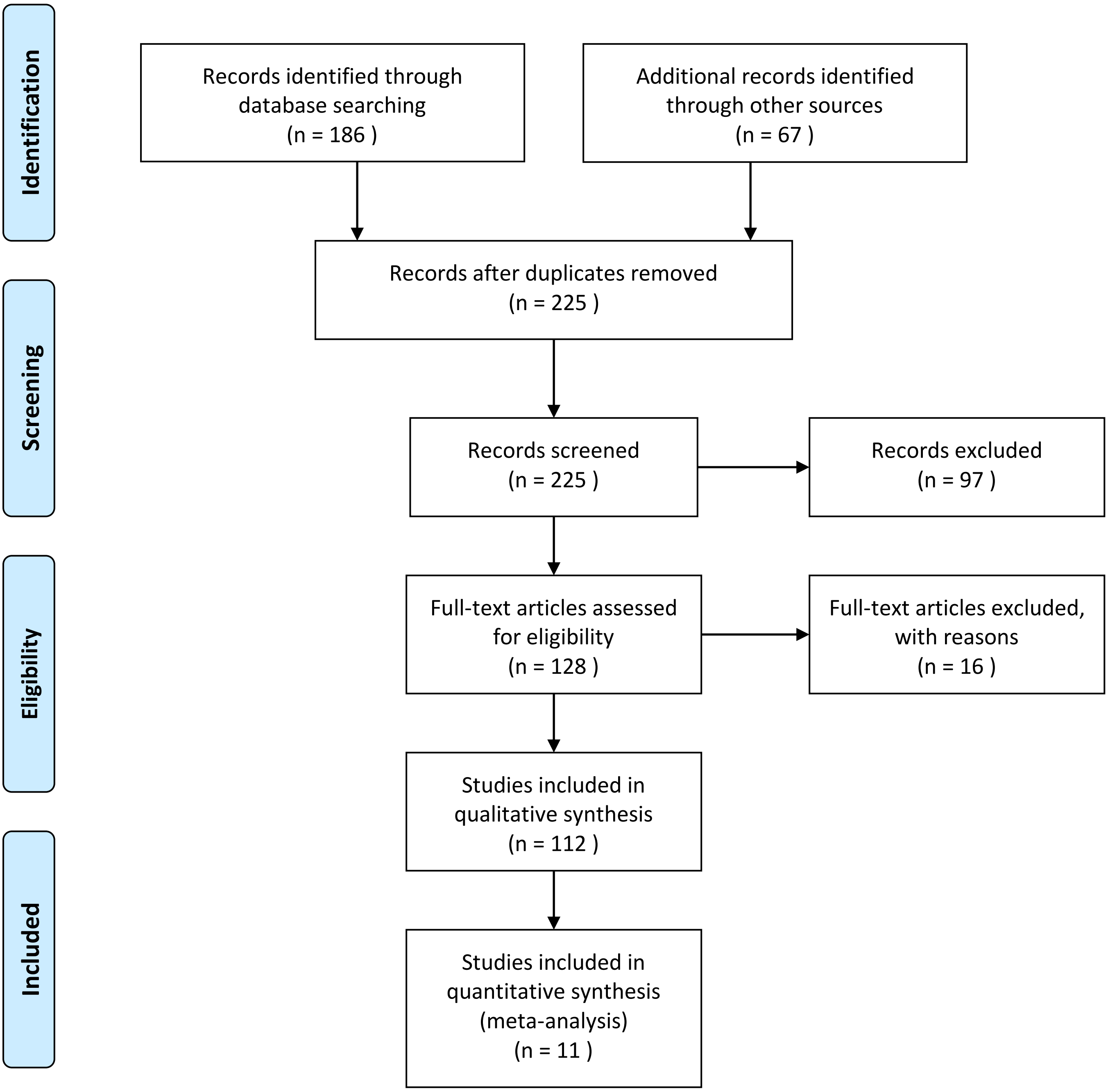


Symmetry

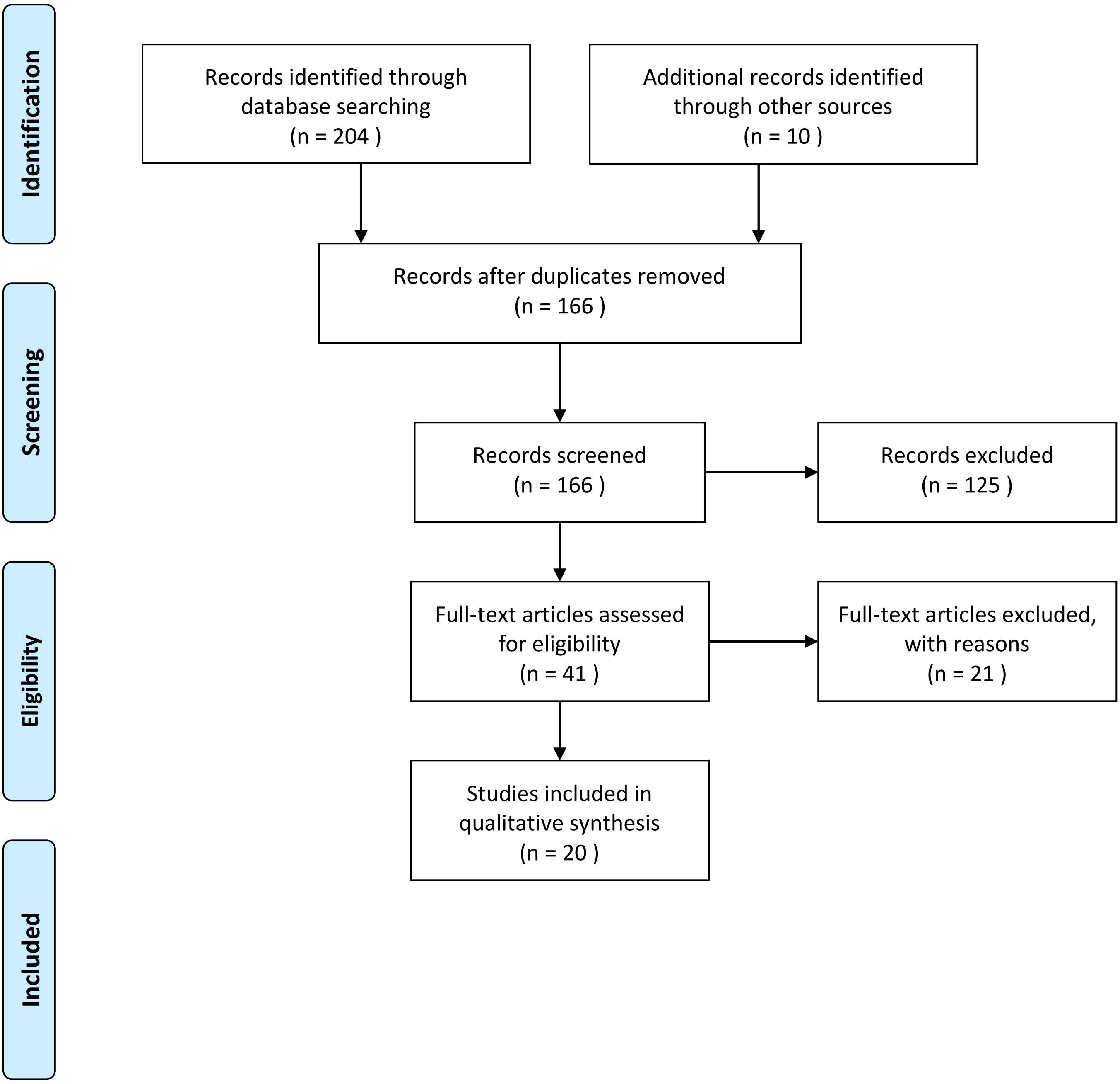


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 619)
Additional records identified through other sources (n = 21)
Records after duplicates removed (n = 556)
Records screened (n = 556)
Records excluded (n = 482)
Full-text articles assessed for eligibility (n = 74)
Full-text articles excluded, with reasons (n = 33)
Studies included in qualitative synthesis (n = 41)
Studies included in quantitative synthesis (meta-analysis) (n = 13)

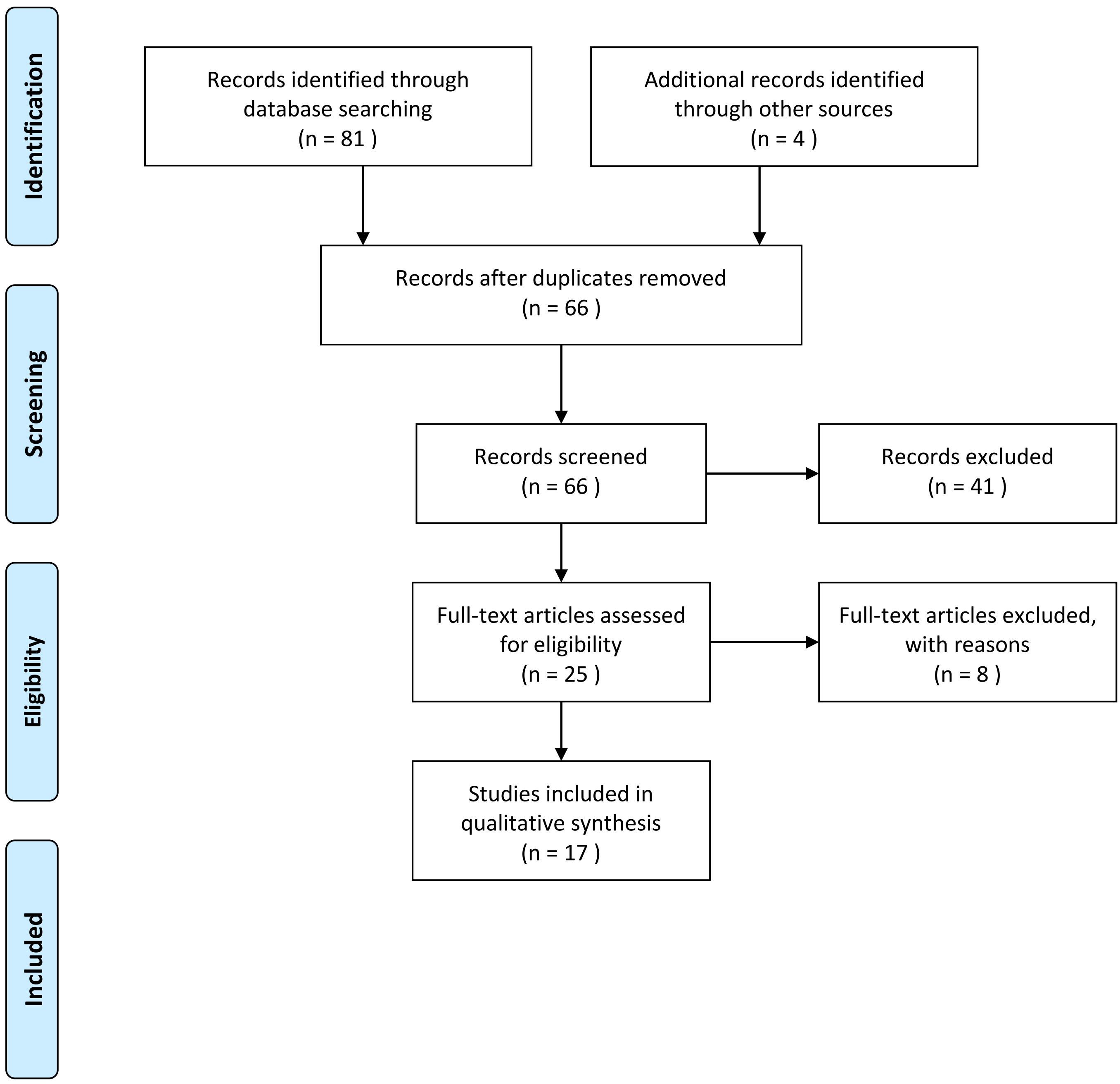
Dimorphism


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 186)
Additional records identified through other sources (n = 67)
Records after duplicates removed (n = 225)
Records screened (n = 225)
Records excluded (n = 97)
Full-text articles assessed for eligibility (n = 128)
Full-text articles excluded, with reasons (n = 16)
Studies included in qualitative synthesis (n = 112)
Studies included in quantitative synthesis (meta-analysis) (n = 11)

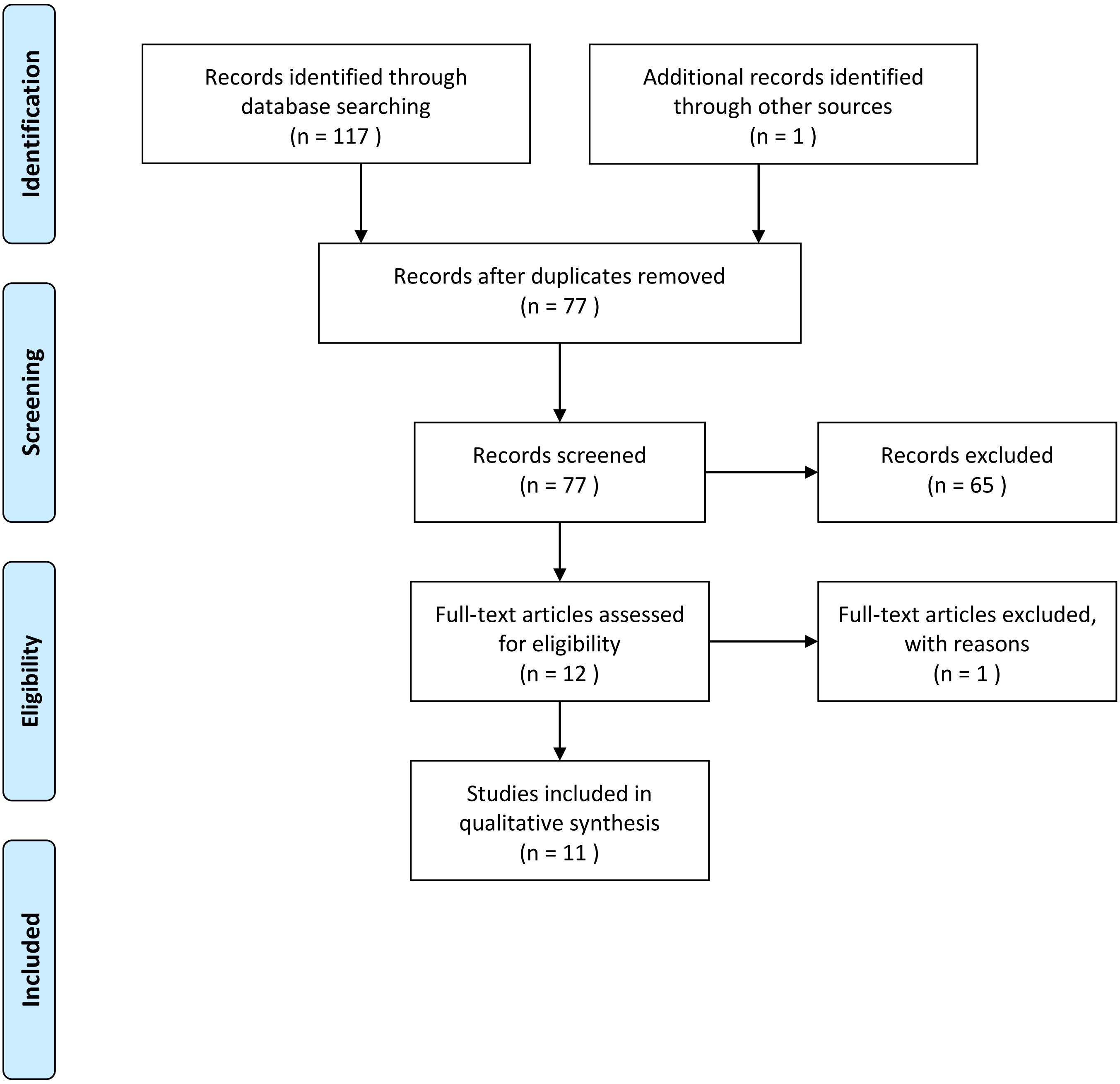
Skin Colour


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 204)
Additional records identified through other sources (n = 10)
Records after duplicates removed (n = 166)
Records screened (n = 166)
Records excluded (n = 125)
Full-text articles assessed for eligibility (n = 41)
Full-text articles excluded, with reasons (n = 21)
Studies included in qualitative synthesis (n = 20)

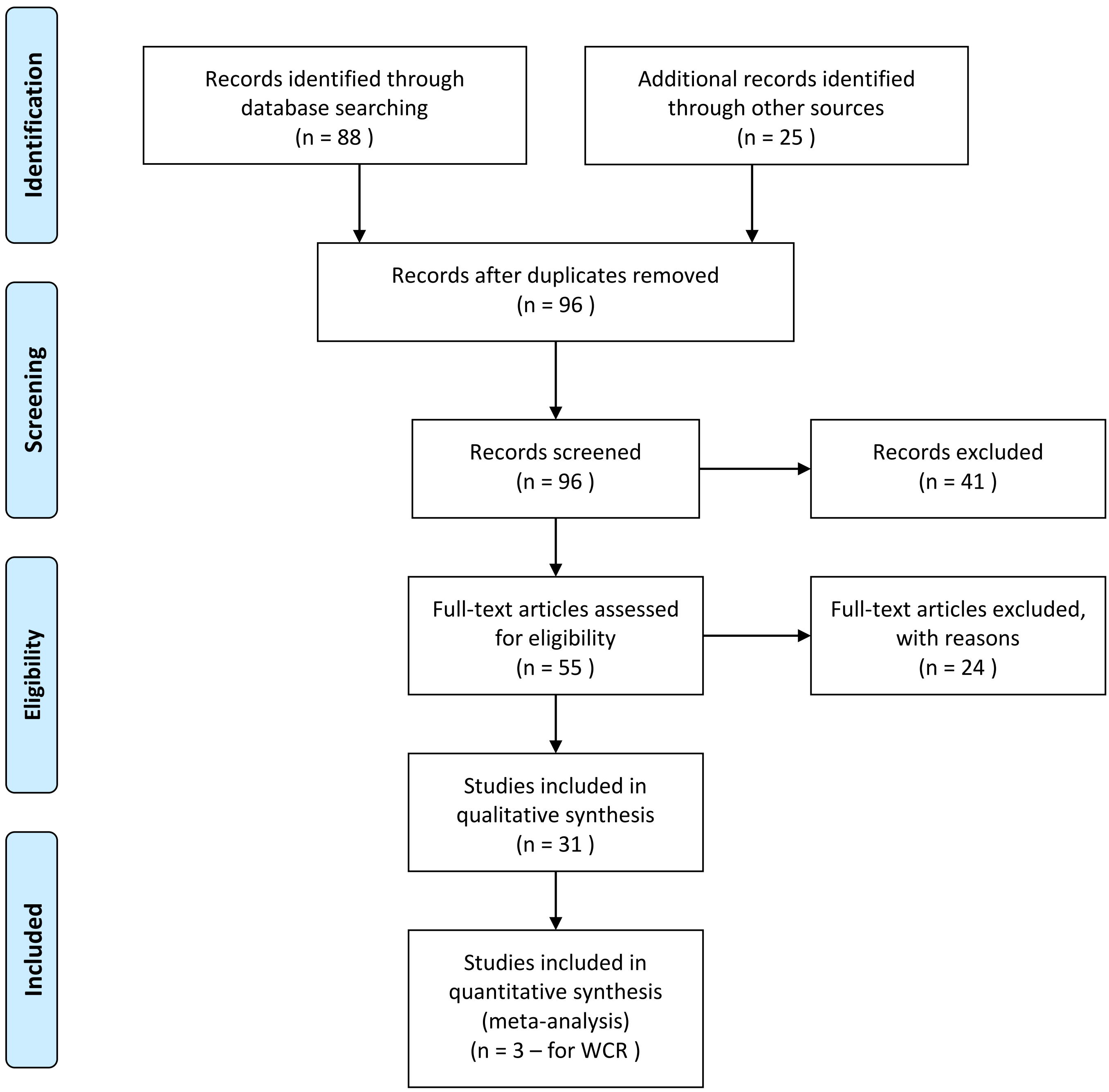
Facial Hair


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 81)
Additional records identified through other sources (n = 4)
Records after duplicates removed (n = 66)
Records screened (n = 66)
Records excluded (n = 41)
Full-text articles assessed for eligibility (n = 25)
Full-text articles excluded, with reasons (n = 8)
Studies included in qualitative synthesis (n = 17)

Body Hair

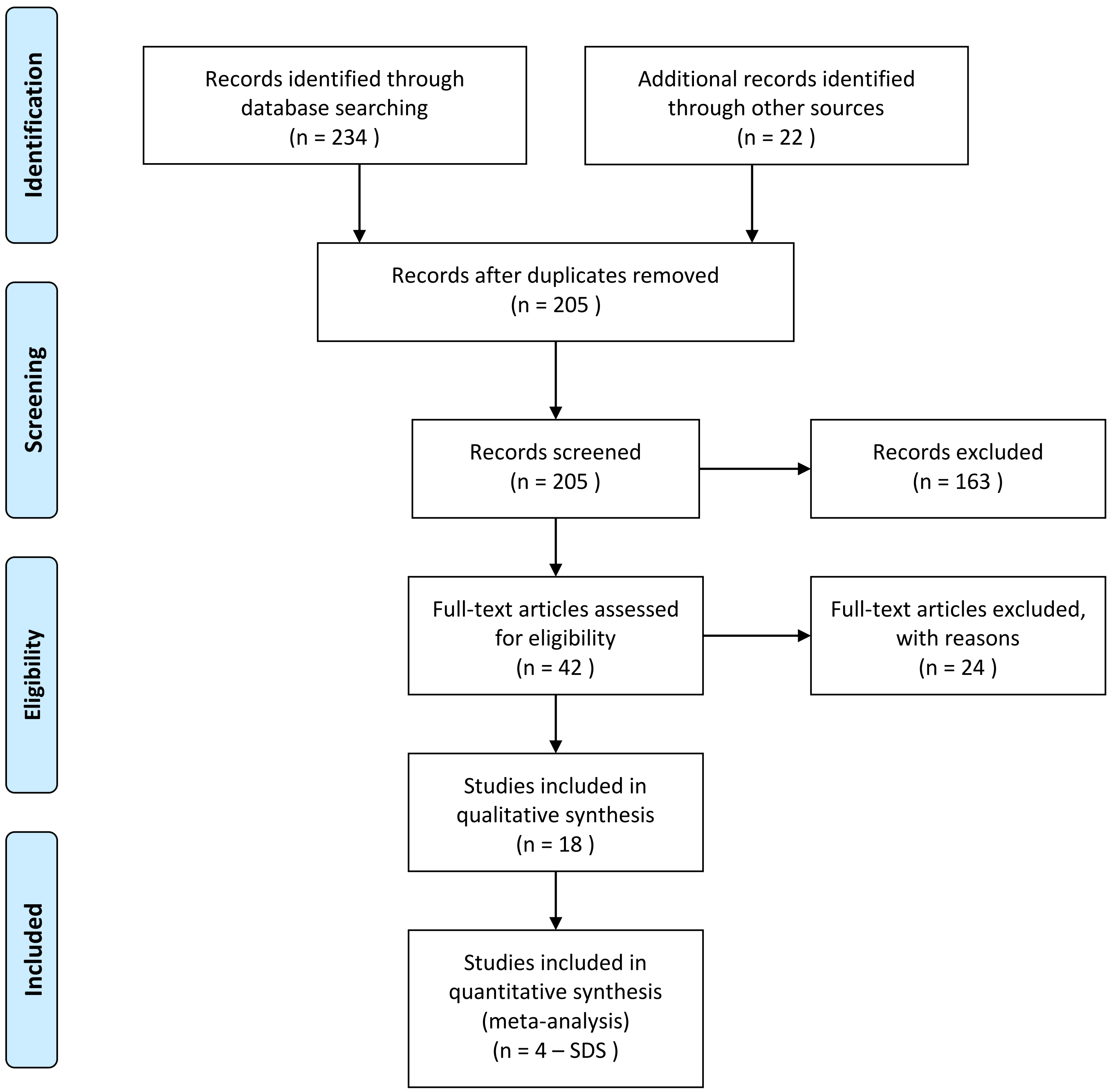

Identification
Screening
Eligibility
Included
Records identified through database searching (n = 117)
Additional records identified through other sources (n = 1)
Records after duplicates removed (n = 77)
Records screened (n = 77)
Records excluded (n = 65)
Full-text articles assessed for eligibility (n = 12)
Full-text articles excluded, with reasons (n = 1)
Studies included in qualitative synthesis (n = 11)

Body Type

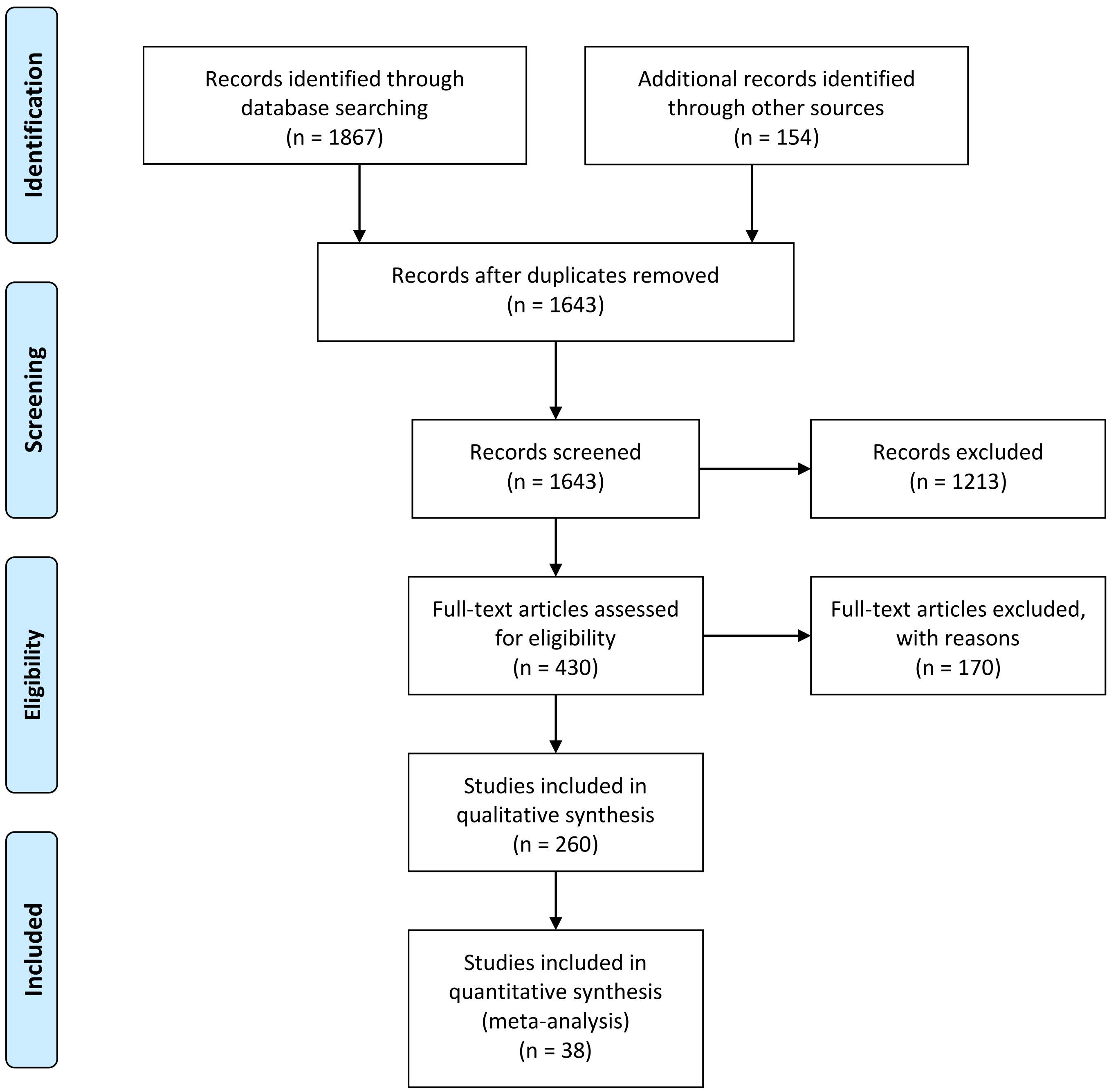


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 88)
Additional records identified through other sources (n = 25)
Records after duplicates removed (n = 96)
Records screened (n = 96)
Records excluded (n = 41)
Full-text articles assessed for eligibility (n = 55)
Full-text articles excluded, with reasons (n = 24)
Studies included in qualitative synthesis (n = 31)
Studies included in quantitative synthesis (meta-analysis) (n = 3 – for WCR)

Height & LBR


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 234)
Additional records identified through other sources (n = 22)
Records after duplicates removed (n = 205)
Records screened (n = 205)
Records excluded (n = 163)
Full-text articles assessed for eligibility (n = 42)
Full-text articles excluded, with reasons (n = 24)
Studies included in qualitative synthesis (n = 18)
Studies included in quantitative synthesis (meta-analysis) (n = 4 – SDS)

All Traits


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 1867)
Additional records identified through other sources (n = 154)
Records after duplicates removed (n = 1643)
Records screened (n = 1643)
Records excluded (n = 1213)
Full-text articles assessed for eligibility (n = 430)
Full-text articles excluded, with reasons (n = 170)
Studies included in qualitative synthesis (n = 260)
Studies included in quantitative synthesis (meta-analysis) (n = 38)

QUERIES

Averageness:
Scopus: (TITLE-ABS-KEY (averageness) OR TITLE-ABS-KEY (distinctiveness) AND TITLE-ABS-KEY (attractiveness) AND TITLE-ABS-KEY (face*) OR TITLE-ABS-KEY (facial)) AND DOCTYPE (ar OR re) AND PUBYEAR > 2004

WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** (averageness OR distinctiveness) *AND* **TOPIC:** (facial OR face*)
Time Span: 2004-2019. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Symmetry:
Scopus: (TITLE-ABS-KEY (*symmetry*) OR TITLE-ABS-KEY (*fluctuating* AND *asymmetry*) AND TITLE-ABS-KEY (*attractiveness*) OR TITLE-ABS-KEY (*facial* AND *attractiveness*) OR TITLE-ABS-KEY (*sexual* AND *selection*)) AND DOCTYPE (*ar* OR *re*) AND PUBYEAR > *2003* ---- 342 docs

WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** (*symmetry) *AND* **TOPIC:** (face OR facial) *AND* **TOPIC:** (mating OR "sexual selection")
Time Span: 2004-2019. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Sexual dimorphism:
Scopus: (TITLE-ABS-KEY (*"sexual dimorphism"*) AND TITLE-ABS-KEY (*masculinity* OR *femininity* OR *masculinization*) AND TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*"sexual selection"* OR *"mate choice"* OR *mating*) AND TITLE-ABS-KEY (*face** OR *facial*)) AND DOCTYPE (*ar* OR *re*) AND PUBYEAR > *2003*

WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** ("sexual dimorphism") *AND* **TOPIC:** (face OR facial) *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice") *AND* **TOPIC:** (masculinity OR femininity OR masculinization)
Time Span: 2004-2019. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Colour:
WOK**: TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** (face* OR facial) *AND* **TOPIC:** (skin OR colour OR color OR tone OR colouration) *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*skin* OR *colour* OR *colour* OR *tone* OR *colouration*) AND TITLE-ABS-KEY (*face** OR *facial*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) AND DOCTYPE (*ar* OR *re*)

Somatotype:

WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** ("male somatotype" OR somatotype* OR physique OR "body type" OR muscularity) *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*"male somatotype"* OR *somatotype* OR *physique* OR *"body type"* OR *muscularity*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) AND DOCTYPE (*ar* OR *re*)

Leg-to-body ratio:
WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** ("leg-to-body ratio" OR LBR) *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*"leg-to-body ratio"* OR *lbr*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) AND DOCTYPE (*ar* OR *re*)

Waist-to-chest ratio:
WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** (wcr OR "waist-to-chest ratio" OR cwr OR "chest-to-waist ratio") *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*wcr* OR *"waist-to-chest ratio"* OR *cwr* OR *"chest-to-waist ratio"*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) AND DOCTYPE (*ar* OR *re*)

SHR:
WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** ("WSR" OR "waist-to-shoulder ratio" OR "SHR" OR "shoulder-to-hip ratio" OR SWR OR "shoulder-to-waist ratio") *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*"WSR"* OR *"waist-to-shoulder ratio"* OR *"SHR"* OR *"shoulder-to-hip ratio"* OR *swr* OR *"shoulder-to-waist ratio"*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) --- 4 docs

Height: (meta-analysis from 1996)
WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** (height OR SDS OR "sexual dimorphism in stature" OR "Male-taller norm" OR stature) *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice")

Time Span: 1996-2019. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*height* OR *sds* OR *"sexual dimorphism in stature"* OR *"Male-taller norm"* OR *stature*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"*)) AND PUBYEAR > *1995* --- 63 docs

Facial hair:
WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** (face* OR facial) *AND* **TOPIC:** (hair OR beard*) *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*face** OR *facial*) AND TITLE-ABS-KEY (*hair* OR *beard**) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) AND DOCTYPE (*ar* OR *re*)

Body hair:
WOK: **TOPIC:** (Attractiveness OR attraction) *AND* **TOPIC:** ("body hair*" OR "chest hair" OR hirsuteness OR "secondary sexual traits" OR "trunk hair") *AND* **TOPIC:** (mating OR "sexual selection" OR "mate choice" OR "sexual dimorphism")
Time Span: Todos os anos. **Index:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC.

Scopus: (TITLE-ABS-KEY (*attractiveness* OR *attraction*) AND TITLE-ABS-KEY (*"body hair"* OR *hirsuteness* OR *"chest hair"* OR *"secondary sexual traits"* OR *"trunk hair"*) AND TITLE-ABS-KEY (*mating* OR *"sexual selection"* OR *"mate choice"* OR *"sexual dimorphism"*)) AND DOCTYPE (*ar* OR *re*)

APPENDICES 2 – SYSTEMATIC REVIEWS

Table for systematic review (Averageness)

Study (authors)	Year	Sex of Participants (subjects)	Participants' Age	N	Nationality of Participants	Study Design	Independent Variables	Stimuli considered	Task (type of rating)	Overall Preference (increase in white; decrease in dark)	Observations
Grammer & Thornhill	1994	F, M	-	52	-	Correlation	Composition of faces (natural, 4 face composite, 8 face composite, 16 face composite), sex (male vs. Female)	Male faces	Rating from 1 to 7	Averageness	In meta-analysis
Jones & Hill	1993	F, M	Undergraduates at the University of Michigan in Ann Arbor; students at the Federal University of Bahia in Salvador, Brazil; and natives of several villages of Ache (or Guayaki) Indians in eastern Paraguay	200 F	Brazil, EUA, Paraguay, Venezuela & Russia	Correlation	Ethnicity (brazilian, EUA, Paraguayan), sex (male vs. Female	Male faces	Order 9 pictures from least to most attractive	Averageness	In meta-analysis
Rhodes et al.	2005	F, M	M = 19.5, S.D.= 6.0	118 F	Australia	Correlation	Measured FA & rated distinctiveness (reverse rated = averageness), stimuli (faces vs. Bodies), sex (male vs. Female)	Male faces (& bodies)	Rating from 1 to 7	Averageness (in faces and bodies)	In meta-analysis
Foo, Simmons & Rhodes	2017	F, M	M = 31.8, S.D = 7.5	131 F	-	Correlation	Measured facial color (on CIELab) and age, rated sexual dimorphism, symmetry, averageness (reverse rating of distinctiveness), adiposity	Male faces	Rating from 1 to 9	Averageness	In meta-analysis
Vingilis-Jaremko, Maurer & Gao	2014	F, M	M = 9.3, Age range: 8–10	25	Canada	3x2x3x2 Split plot	Age (5 years, 9 years, adults), school (boys, girls, mixed), Averageness (+-50% of group average), sex of face (male, female)	Male faces	Forced choice from pairs	Averageness	
Kościński	2013	F, M	M = 23.7, SD = 1.22	30 F	Poland	3x3 split plot	Type of stimuli (photograph, frame, video-clip), sex of rater (male, female, both), sex of face (male vs female - but only opposite sex ratings) -- measured femininity, averageness & symmetry --- other non important ratings for this analysis	Male faces	Rating from 1 to 7	Averageness	
Rhodes et al.	2011	F	Age range: 17–35	58 (divided by groups)	Australia	Correlations	Rated attractiveness, distinctiveness, symmetry and masculinity	Videos of male faces	Rating from 1 to 10	Averageness	In meta-analysis
Said & Todorov	2011	F, M	both sexes: M = 19.8, SD = 1.3	23	-	Correlations	Models of sexual dimorphism, averageness (related to position of face in multidimensional face space) as well as more complex one (the one built and being analysed)	Images of male faces	Rating from 1 to 9	Averageness	In meta-analysis
Lie, Rhodes & Simmons	2008	F, M	attr: M = 20.50, SD = 4.65; aver: M = 20.53, SD = 3.40	29 (13 attr)	Australia	Correlations	Measured attractiveness, averageness, symmetry, masculinity	Images of male faces	Rating from 1 to 10	Averageness	In meta-analysis
Peters, Rhodes & Simmons	2008	F	attr -- 1st set: M = 19.9, SD = 3.8; 2nd set: M = 28.9, SD = 3.4 -- other characteristics: M = 21.6, SD = 4.9	attr: 39 (12 1st set); other: 36 (12 each)	-	Correlations	Measured attractiveness, averageness, symmetry, masculinity, phase of cycle (2nd set of attr, high vs low fertility)	Images of male faces & bodies	Rating from 1 to 7	Averageness	Not significative

Table for systematic review (Symmetry)

Study (authors)	Year	Sex of Participants (subjects)	Age of participants	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	Overall Preference (II = symetry)	Obs.
Rhodes - 1	1998	F, M	-	32 F	New Zealand	full within (correlations)	Symetry (perfect, high, normal, low), rated attractiveness, symmetry and mate appeal	Male faces (different levels of symmetry)	Rating from 1 to 10	||	In meta-analysis
Rhodes - 1a	1998	F, M	-	64 F (32 sym, 16 attr, 16 appeal)	New Zealand	between (correlations)	Symetry (perfect, high, normal, low), rated attractiveness, symmetry and mate appeal	Male faces (different levels of symmetry)	Rating from 1 to 10	||	In meta-analysis
Rhodes - 2	1998	F, M	-	30 F	New Zealand	3x2 split plot	Symetry (perfect, high, normal)	Male faces (different levels of symmetry)	Forced choice between pairs	All types of pairs = || (most symmetrical)	
Cardenas & Harris	2007	F	M = 19.8, SD = 2.86	60	USA & Chile	2x2x2x3 split plot	Cycle (high vs. Low conception risk); Painting (symmetrical vs. Asymmetrical); Conditions (1, 2 and 3)	Male faces (different levels of feature and paint symmetry)	Forced choice between pairs	Condition 1 = || ; condition 2 = || (symmetrical painting enhanced attractiveness); condition 3 = asymmetrical painting made symmetric faces not be preferred	
Foo, Simmons & Rhodes	2017	F, M	M = 31.8, S.D = 7.5	131 F	-	Correlation	Measured facial color (on CIELab) and age, rated dimorphism, symmetry, averageness (reverse rating of distinctiveness), adiposity	male faces	Rating from 1 to 9	||	In meta-analysis
Penton-Voak et al. -1	2001	F, M	-	11 F	-	Correlation	Rated attractiveness, Measured FA, and rated Symmetry	male faces	Rating from 1 to 7	||	In meta-analysis
Rhodes et al.	2011	F	Age range: 17–35	58 (divided by groups)	Australia	correlations	Rated attractiveness, distinctiveness, symmetry and masculinity	videos of male faces	Rating from 1 to 10	||	In meta-analysis
Lie, Rhodes & Simmons	2008	F, M	attr: M = 20.50, SD = 4.65; sym: M = 21.20, SD = 3.43	23 (13 attr)	Australia	Correlations	Measured attractiveness, averageness, symmetry, masculinity	images of male faces	Rating from 1 to 10	||	In meta-analysis
Peters, Rhodes & Simmons	2008	F	attr -- 1st set: M = 19.9, SD = 3.8; 2nd set: M = 28.9, SD = 3.4 -- other characteristics: M = 21.6, SD = 4.9	attr: 39 (12 1st set); other: 36 (12 each)	-	Correlations	Measured attractiveness for a short term mate, averageness, symmetry, masculinity, phase of cycle (2nd set of attr, high vs low fertility)	Images of male faces & bodies	Rating from 1 to 7	||	
Jones et al. - 1	2004	F	M = 24.13, SD =3.83	22	-	Correlations	Rated similarity (of RR and LL derived from 1 face; treated as symmetry), healthiness and attractiveness	images of male faces	Rating from 1 to 7	||	In meta-analysis
Scheib, Gangestad & Thornhill	1999	F	M = 20.51, SD = 2.55	79 (36 attr and 43 sym - separate for full and half faces)	USA	Correlations	Measured attractiveness of full and half faces, measured symmetry of full and half faces	images of male faces (full or halves)	Rating from 1 to 7	||	In meta-analysis
Hume & Montgomery	2001	F, M	all together: M =20.36, SD = 0.24	226 F	78.4% self-identified as White, 14% as Asian and 7.6% as Other ethnicities	Correlations	Measured assymetry, rated attractiveness	images of male faces	Rating from 1 to 7	||	In meta-analysis
Simmons et al.	2004	F, M	M = 19.5, SD = 6.0	57 F	-	Correlations	Rated symmetry (both sexes), rated attractiveness (opposite sex only)	images of male faces	Rating from 1 to 7	||	In meta-analysis
Rikowski & Grammer	1999	F, M	-	24 F	-	Correlations	Rated odour quality (intensity, pleasantness, sexyness), attractiveness, and measured body & face asymmetry	images of male faces	Rating from 1 to 7	||	In meta-analysis
Little & Jones	2012	F	M = 20.2, SD = 2.6	20	-	2x2x2x2 split plot	Sexual dimorphism (+-50%), Measured facial symmetry, Relationship Contect (ST vs. LT), Phase of cycle (low fertility, high fertility)	images of male faces	Forced choice between pairs	|| all conditions (but only significant for short term high fertility and long term low fertility)	
Little et al.(Biolog. Psych.) - 1	2007	F	M = 19.5, SD = 1.29	31	-	2x2x2 split plot	Cycle phase (late follicular, high progesterone), Symmetry (symmetric or asymmetric), sex of face (male vs. Female)	images of male faces	Forced choice between pairs	|| (not significative)	
Little et al. (Biolog. Psych.) - 2	2007	F	M = 25.0, SD = 4.8	210 (161 internet)	-	2x2x2x2 split plot	Relationship status (in a relationship, not in one), Cycle (high fertility, low fertility), symmetry (original, symmetric), relationship context (ST vs. LT)	images of male faces	Forced choice between pairs	|| (overall - significantly more for short term context)	
koehler, Rhodes & Simmons	2002	F	non-pill: M = 22.24, SD = 6.86; M = 18.81, SD = 2.20	56 (29 non-pill)	Australia	2x4x2x2 split plot	cycle phase (low fertility vs. High fertility), symmetry (low, normal, high, perfect), relationship context (ST vs. LT), pill use (yes vs. No)	images of male faces (varying in symmetry)	Rating from 1 to 7	|| (higher ratings for higher symmetry)	
Farrera et al.	2015	F, M	M = 19.40, SD = 1.77	62	Mexico	Correlation	Measured Fluctuating asymmetry	images of male faces	Rating from 1 to 4	No association between FA and attractiveness	

Hromatko, Tadinac & Prizmić	2006	F	M = 21.8, SD = 2.20	92 (64 in natural cycle)	-	2x3 split plot; 2x2 split plot	Symmetry (normal vs. Symmetrical), relationship status (single or commited - if commited, rate satisfaction), pill takers (low Estrogen & Progesterone vs. High Estrogen & Progesterone), natural cycle (early follicular, late follicular, mid-luteal)	images of male faces (symmetrical or asymmetrical)	Rating from 1 to 7	Women preferred normal faces to symmetrical	
Hernández-López et al.	2017	F	M = 22, SD = 2.8	145	Mexico	correlations	Symmetry (symmetrical or asymmetrical), rated fatherliness, fidelity and economic success, measures of T, P4 & E2 (testosterone, progesterone and estrogen)	images of male faces (symmetrical or asymmetrical)	Forced choice between pairs & rating in 10 cm lines	When T levels were low, as P4/E2 increased, less probability of considering symmetric as most attractive. When T levels were high, independently of P4/E2, neither face was more attractive.	
Van Dongen	2014	F, M	-	50-80 raters per photograph	Belgium	Correlations	Measured Fluctuating asymetry, Measured masculinity/femininity	images of male faces	Rating from 1 to 10	No association between FA and attractiveness	
Kościński	2013	F, M	M = 23.7, SD = 1.22	30 F	Poland	3x3 split plot	Type of stimuli (photograph, frame, video-clip), sex of rater (male, female, both), sex of face (male vs female - but only opposite sex ratings) - measured femininity, averageness & symmetry - - other non important ratings for this analysis	images of male faces	Rating from 1 to 7	Symmetry didn't predict attractiveness	
Soler et al.	2012	F, M	M = 21.7, SD = 1.3	64	Colombia & Spain	Correlations	Measured Asymmetry, rated attractiveness	images of male faces	Rating from 1 to 10	No significtive correlation between absolute asymmetry and attractiveness - only significant for exocanthion–tragion–subnasal angle	
Watkins et al. - 1	2012	F	M = 22.94, SD = 6.76	100	-	2x2 split plot	Symmetry (original, symmetrized), Slideshow condition (83% men and 17% women, or 83% women and 17% men)	images of male faces (symmetrical or original)	Forced choice from pairs	|| in pretest and increase in symmetry preference regarding the sex in majority in slideshow	
Watkins et al. - 2	2012	F	M = 24.97, SD = 8.74	100	-	2x2 split plot	Symmetry (original, symmetrized), Slideshow condition of atractiveness (male high variance, male low variance, female low variance and female high variance))	images of male faces (symmetrical or original)	Forced choice from pairs	|| in pretest and increase in symmetry preference in men high variance	
Little, De Bruine & Jones	2011	F, M	M = 24.8, SD = 6.6	124 F	-	2x2x2 split plot	pathogen images (high vs. Low), Symmetry (symmetric vs. Asymmetric), sexual dimorphism (+-50%)	Images of male faces (symmetrical vs asymmetrical)	Forced choice from pairs	|| (and even bigger preference after the high pathogen condition)	
Little et al.	2001	F	M = 21.2, SD = 4.5	90	-		Dimorphism (11 images ranging from +50% Fem to +50% Masc), Symmetry (original vs. Symmetrical), rated own attractiveness	Images of male faces (symmetrical vs asymmetrical)	Forced choice from pairs	|| (chosen significantly above chance)	
Little et al. (Behav. Eco) - 1	2008	F, M	F: M = 21.4, SD = 2.4	58 F	-	2x2x2x2 split plot	Dimorphism (+-50%), Symmetry (symmetric vs. Asymmetric), sex of face (male vs female), sex of rater (male vs female)	Images of male faces (symmetrical vs asymmetrical)	Forced choice & Strength of preference	||	In meta-analysis (3,5)
Little et al. (Behav. Eco) - 2	2008	F, M	F: M = 26.1, SD = 6.7	176 F	-	2x2x2 split plot	Dimorphism (+-50%), Symmetry (symmetric vs. Asymmetric), sex of rater (male vs female)	Images of male faces (symmetrical vs asymmetrical)	Forced choice & Strength of preference	||	In meta-analysis (3,5)
Marcinkowska et al. (Psychoneuroend.)	2018	F	M = 28.8, SD = 4.56	99	Poland	3x3x2x2x2 split plot	Face & body dimorphism (+-50% masculinisation), symmetry (symmetrical vs asymmetrical), phase of cycle (follicular, ovulation, luteal), participants (all women, L+ women, or textbook women), Self-judged attractiveness, Socio-sexuality Revised, Partner's body attractiveness, Partner's face attractiveness, Relationship's satisfaction	images of male faces	Forced choice from pairs	Overall preference for || (weak). Substantial evidence for the lack of cyclical shift in facial symmetry preference.	
Lewis	2017	F	age range: 18 and 28	86	UK	3x2x2x2 full within	Symmetry (symmetrical, w/asymmetries), yaw rotation (frontal vs rotated), lighting (central vs side), task (attractiveness rating, forced choice, asymmetry detection)	images of male faces	Rating from 1 to 9; forced choice; identify if symetrical or not	Overall preference for || (higher for frontal stimuli with central light, followed by side stimuli rotated)	
Peters, Simmons & Rhodes	2009	F	attr: M = 28.9, SD = 3.4; masc & symm: M = 21.6, SD = 4.9	49 (25 attr)	-	2x2 split plot (and correlations with other measures)	Rated attractiveness for short term partner, Fertility (high vs low), ratings of masculinity & symmetry, relationship status (single vs commited)	Images of male faces & bodies	Rating from 1 to 7	Overall preference for || (no significative difference between groups)	
Dixson et al.	2017	F	M = 30.79, SD = 13.15	103	Vanuatu	3x2x2x2x2 split plot	Dimorphism (+-50% masculinization), Facial skin tone (+-50% skin darkness), Symmetry (symmetrical vs asymmetrical), facial adiposity (+-50% weight/adiposity), Malaria rates (high, low, medium)	Images of male faces (symmetrical vs asymmetrical)	Forced choice from pairs	Overall preference for || (significantly higher for high malaria rate)	
Mealey, Bridgstock & Townsend	1999	F, M	undergraduates	43 F (rated attractiveness)	Australia	Within	Symmetry (more symmetrical or less symmetrical)	images of twins (previously rated for summetry - more or less symmetrical)	Forced choice from pairs & rating from 1 to 7	|| ; across twin pairs, the magnitude of the difference in perceived attractiveness was directly related to the magnitude of perceived differences in asymmetry; Less FA = Higher attractiveness	

Table for systematic review (Sexual Dimorphism of Face Shape)

Note 1. Under Nationality of participants, "-" means that it is not specified - many of these unspecified studies had online experiment tasks; In Study design, when nothing is referred the first "2" is related with Masculinized vs. Feminized.
Note 2. When studies compared degrees of masculinity (male vs. supermale), we categorized the least masculine with the ♀ symbol. In all studies, under "type of stimuli" and "overall effects" we only consider the part of the experiment relating to women rating men. Data regarding the IV dimorphism - when other IVs were tested independently, that information is not documented. The dependent variable is Attractiveness, others have not been reported.

Study (authors)	Year	Sex of Participants (subjects)	Participants' Age	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	Overall Preference		Observations
Burriss et al.	2014	F	M = 20.42 , SD = 3.77	93	UK	2x2 within	Relationship Context (ST vs. LT), Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Forced choice in pairs	ST = ♀	LT = ♀	
Little et al.	2002	F	M = 21.7, SD = 4.8	158	UK	2 (continuous variable) x2 within	Relationship Context (ST vs. LT), Partnership status (single vs partnered), Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Alter face until its most attractive	ST = ♀	LT = ♀	
Rhodes, Hickford & Jeffery - 1	2000	F, M	students and staff of Canterbury University	128 (64 F)	New Zealand	2x2 within	sex of rater (male vs female), Dimorphism (average or +50% masculinity)	Images of male faces (average or +50% masculinity)	Forced choice in pairs	Average face preferred to increased dimorphism face		In meta-analysis
Rhodes, Hickford & Jeffery - 2	2000	F, M	All but eight were aged between 17 and 25	96 (48 F)	Australia	9x2 within	Dimorphism (-100%, -75%, -50%, -25%, average, +25%, +50%, +75%, +100% masculinity), sex of rater (male vs female)	Images of male faces (-100%, -75%, -50%, -25%, average, +25%, +50%, +75%, +100% masculinity)	Forced choice of sets of 9 images	♀		
Scott et al.	2010	F, M	sample 1: M = 19.5, SD = .66; sample 2: M = 27, SD = 7.3	sample 1: 22 F; sample 2: 18 (10 F)	UK	correlation	Measured morphometric masculinity, Measured Skin Color (part of participants only rated skin patches),	Images of male faces	Ratings from 1-9, or 1-7	No relationship between morphometric masculinity & attractiveness		
Carrito et al. - 2	2016	F	M = 20.11, SD =4.26	61	-	Within	Skin color, Dimorphism (-100% to +100% masculinization)	Images of male faces (-100% to +100% masculinization)	Alter face until its most attractive	♀		
Carrito et al. - 3	2016	F	M = 20.39, SD = 2.95	52	Portugal	2 (continuous variable) x2 within	Relationship Context (ST vs. LT)	Images of male faces (-100% to +100% masculinization), as well as skin color	Alter face until its most attractive	ST = ♀	LT = ♀	
Penton-Voak et al. -1	2004	F	British: M = 24.9, SD = n. s.; Jamaican: M = 20.9, SD = n. s.	74 (26 British)	UK & Jamaica	5x2x3 split plot	Ethnicity of rater (British vs. Jamaican) & Ethnicity of faces (British, Jamaican, Japanese)	Images of male faces (-40%, -20%, average, +20%, +40%)	Forced choice of sets of 5 images	British Raters, overal = ♀ : British faces = ♀ Jamaican faces = ♂ Japanese faces = ♀	Jamaican Raters = ♂	
Little et al. (Behav. Eco)	2011	F	M = 22.4, SD = 4.1	25	UK	2x2 split plot	Relationship Context (ST vs. LT), Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Forced choice of pairs	ST = ♂	LT = ♀	
Jones et al. -2	2013	F	M = 24.61 , SD = 6.44	48	75% North America, 10% Europe, 6% UK & 9% other regions	2xcontinuous variables	measured pathogen, moral, and sexual disgust & masculinity, Dimorphism (high vs low masculinity)	Images of male faces (high masculinity vs. low masculinity)	Forced choice & Strength of preference	♂		In meta-analysis
Stower et al.	2019	F	short term: M = 31.52, SD = 6.74; long term: M = 31.48, SD = 6.09	336 (164 ST)	U.S.A. (97%), Canada (2%) & Australia, New Zealand, and Britain or elected not to answer (1%).	2x4 split plot	Relationship context (ST vs. LT), There was also co-parenting and Friendship levels of the VI.; Facial Hair (clean shaven, full beard).	Images of male faces (+-50% masculinity; facial hair - clean shaven, full beard)	Rating how attractive from 0 to 100	Tendency to ♂ (but neutral preferred to both)		
Smith et al. (Journal of Evo. Psy.)	2009	F	M = 19.92, SD = 3.55	147	-	2x2 within	Relationship Context (ST vs. LT) & Contraceptive use (yes vs. no), Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Forced choice & Strength of preference	No significant directionality of results		
Little et al. (Behav. Eco) - 1	2008	F, M	F: M = 21.4, SD = 2.4	58 F	-	2x2x2x2 split plot	Dimorphism (+-50%), Symmetry (symmetric vs. Asymmetric), Sex of face (male vs female), Sex of participant (male vs female)	Images of male faces (+-50% masculinity)	Forced choice & Strength of preference	♂		In meta-analysis
Little et al. (Behav. Eco) - 2	2008	F, M	F: M = 26.1, SD = 6.7	176 F	-	2x2x2 split plot	Dimorphism (+-50%), Symmetry (symmetric vs. Asymmetric), Sex of participant (male vs female)	Images of male faces (+-50% masculinity)	Forced choice & Strength of preference	♂		In meta-analysis
Scheib et al.	1999	F	M = 20.51, SD = 2.55	79	USA	correlation	Masculinity Index*	Images of male faces (varying in masculinity index)	Rating how attractive from 1 to 7	♂ (positive correlation between attractiveness and masculinity index		
little et al. (Evol. & Human Behav.)	2008	F, M	M = 24.9, SD = 7.0	51 F	-	2x2x2 within	Relationship Context (ST vs. LT) & Paired W/ Masculine or Feminine woman face, Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Rating how attractive from 1 to 7	ST = ♂	LT = ♂	
Little et al.	2007	F	no oral contraception: M = 24.4, SD = 6.8; oral contraception: M = 22.5, SD = 4.5	64 (not using) 44 (using)	no oral contraception: 50 white, 9 East Asian, 4 Indian/ Pakistan, 1 Hispanic; oral contraception: 38 white, 3 Indian/ Pakistan, 2 East Asian, 1 Black	2x2x2 within, plus control of contraception pill	Contraceptive (yes vs. no) & Relationship context (long-term vs. short-term) & Harshness (harsh vs. safe), Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Forced choice in pairs	Both w/ or without contraception = ♂	ST (both harsh and safe) = ♂ ; LT harsh = very light ♀ & LT safe = ♂	
Waynforth, Delwadia & Camm	2005	F	-	60	UK	continuous variables	Sociosexual Orientation Inventory score & Masculinity measures	Images of male faces	Forced choice in pairs	No significant directionality of results (slightly ♀)		
Welling et al.	2008	F	M = 22.39, SD = 3.29	94 (52 high att. group)	-	2x2 split plot	Sexual attractiveness of pictures of men - between judgements (high vs. Low), Dimorphism (+-50% masculinity)	Images of male faces (+-50% masculinity)	Forced choice & Strength of preference	Before other independent variable, high and low att. group = ♀	After: high att. group = not significant, very slight ♂; low att. group = ♀	In meta-analysis
Danel & Pawlowski - part 2	2007	F	M = 23.2, SD = 1.48	67	Poland	correlation	EME (Eye mouth eye angle)	Images of male faces (naturally varying in EME)	Rating how attractive from 1 to 7	♀ (negative correlation between EME and attractiveness)		
Dixson et al. -1	2018	F	M = 24.91 years, SD = 3.47	2161	-	5x4 within	Beardedness (clean shaven, light stubble, heavy stubble, full beard); note: only short term relationship judgement, Dimorphism (-50%, -25%, average, +25%, +50%)	Images of male faces (-50%, -25%, average, +25%, +50%)	Rating how attractive from 1 to 10	No directionality of results (neutral/average preferred)		
Dixson et al. -2	2018	F	M = 22.07, SD = 4.6	68	-	3x2x2x3 split plot	Relationship context (short term vs. Long term), Fertility (high vs. Low) & LH levels (surge, 1 day after, 2 days after)	Images of male faces (-50%, un-manipulated, +50%)	Rating how attractive from 1 to 5	Un-manipulated more attractive than ♀ or ♂	Excluding un-manipulated = ♀ (not significative for LT)	
Smith et al. (Behav. Eco.)	2009	F, M	Lab sample: M = 21.1, SD = 5.8; Online sample: M = 20.4, SD = 2.7	Lab sample: 354; Online sample: 5564	Lab sample: UK; online sample: -	2x2 within	Apparent Health (high vs. low), dimorphism (+-50% masculinization)	Images of male faces (+-50% masculinity)	Forced choice & Strength of preference	High apparent health = ♂	Low apparent health = no preference	

Holzleitner & Perrett	2017	F	M = 29.19, SD = 8.65	224	-	7x2x2x2 split plot	Self rated attractiveness (high vs. low), Pathogen disgust (high vs. Low), self-reported health (high vs. Low), relationship status (partnered or single), controled also Sexual orientation (only males, slightly females)	Images of male faces (-100%, -50%, average, + 50%, +100%, + 150%, +200%)	Rating how attractive from 1 to 8	Across all women = ♂	
Marcinkowska et al. (Scient. Rep.)	2019	F	M = 25.21 years, SD = 5.44 years	4483	34 countries	2x34 Split plot	Coutry of origin and its country level factors (ex.: life expectancy at birth, human development index, years lost to disease, etc.)	Images of male faces (+-50% masculinity)	Forced choice in pairs	Overall preference = slight ♀	
Jones et al.	2018	F	M = 21.46 years, SD = 3.09	584	-	2x2x3 split plot	Relationship context (ST vs. LT), longitudinal study with 3 main testing times, [also analysed: contraceptive use (not using, using, using but in the menstruation moment/break, stopped using), Relationship status (in a stable relationship, not in a stable relationship) ---x4x2]	Images of male faces (+-50% masculinity)	Forced choice in pairs	Overall preference = ♂ (significantly stronger in short term context)	
Penton-Voak & Perrett	2000	F	M = 30.7 years, SD = -	139 (55 high risk, 84 low risk; excluding pill takers)	-	2x2 split plot	Dimorphism (-50%, -30%, average, +30%, +50% masculinity), Conception risk (high vs. Low)	Images of male faces (-50%, -30%, average, +30%, +50%)	Forced choice of 5 faces	Preference in high risk group = ♂ (30%); no preference in low risk group	
Hu et al.	2018	F, M	M = 20.1, SD = 1.12 (M & F)	80 (40 F)	China	2x2 within	Dimorphism (masculinized vs feminized), Attractiveness (more attractive vs. less attractive)	Images of male faces (masculinized more attractive, masculinized less attractive, feminized more attractive, faminized less attractive)	Rating how attractive from 1 to 5	Preference in more attractive faces = ♂; Preference in less attractive faces = ♀	
Marcinkowska, Jasienska & Prokop (Arch. Of Sex. Behav.)	2018	F	-	3720	-	2x5	Fertility:(1) naturally menstruating women who were in the high-conception probability phase of their menstrual cycle, (2) naturally menstruating women who were in the low-conception probability phase, (3) pregnant, (4) lactating, and (5) post-menopausal women. [also, measured SOI]	Images of male faces (+-50% masculinity)	Forced choice in pairs	Pregnant, high & low conception menstrual cycle = ♂; lactating = no preference; Post-menopausal = ♀	
Foo, Simmons & Rhodes	2017	F, M	M = 31.8, S.D = 7.5	131 F	-	Correlation	Measured facial color (on CIELab) and age, rated sexual dimorphism, symmetry, averageness (reverse rating of distinctiveness), adiposity	Male faces	Rating from 1 to 9	♂	
Peters, Rhodes & Simmons	2008	F	attr -- 1st set: M = 19.9, SD = 3.8; 2nd set: M = 28.9, SD = 3.4 -- other characteristics: M = 21.6, SD = 4.9	attr: 39 (12 1st set); other: 36 (12 each)	-	Correlations	Measured attractiveness, averageness, symmetry, masculinity, phase of cycle (2nd set of attr, high vs low fertility)	Images of male faces & bodies	Rating from 1 to 7	♂	
Little & Jones	2012	F	M = 20.2, SD = 2.6	20	-	2x2x2x2 split plot	Sexual dimorphism (+-50%), Measured facial symmetry, Relationship Contect (ST vs. LT), Phase of cycle (low fertility, high fertility)	Images of male faces (+-50% masculinity)	Forced choice between pairs	Overall ♂ (significant for short term high fertility, and close to significant for and long term low fertility - all the rest not significant)	
Little, De Bruine & Jones	2011	F, M	M = 24.8, SD = 6.6	124 F	-	2x2x2 split plot	pathogen images (high vs. Low), Symmetry (symmetric vs. Asymmetric), sexual dimorphism (+-50%)	Images of male faces (+-50% masculinity)	Forced choice from pairs	♂ (and even bigger preference after the high pathogen condition)	In meta-analysis - pre-exposure
Little et al. (Proc. Of the R. S.)	2001	F	LT: M = 22.0, SD = 5.2; ST: M = 22.4, SD = 5.4	181 (66 LT)	-	11 x 2 split plot	Dimorphism (11 images ranging from +50% Fem to +50% Masc)+ relationship context (LT vs ST), Symmetry (original vs. Symmetrical), rated own attractiveness	Images of male faces (from -50% to 50% masculinization)	Forced choice from pairs	♀ Overall (no significative differences between ST & LT)	
Johnston et al.,	2001	F	between 18 and 35, M = 22	42 (40 USA)	USA & Austria	full within	1200 frame movie (from super male to super female), phase of cycle (high fertility risk vs low fertility risk)	Images of faces (ranging from supermale to superfemale)	Select face most similar to target (attractive men's face, masculine men's face - and other 13 targets)	Attractive face was more masculine when in high fertility; The attractive male face was significantly more masculine than the average male face (high fertility group. N = 29)	
Penton-Voak et al. -1	2001	F, M	-	15 F	-	Correlation	Measured dimorphic characteristics (eye size, lower face height/face height, cheekbone prominence, face width/lower face height, and mean eybrow height), Rated attractiveness, Measured FA, and rated Symmetry	Images of male faces	Rating from 1 to 7	None of the dimorphic traits were correlated with attractiveness	
Swaddle & Reierson	2002	F	age range: 18–21	30	-	21 x 2 full within	Sequence of 21 representations of increasing or reducing levels of testosterone (and its impact in dimorphism), position of face (front or profile), rated dominance and sexual attractiveness	Images of male faces (ranging in dimorphism between high or low levels of testosterone)	Forced choice from 21 images	Most attractive face very close to normal face - so no association between testosterone shape and attractiveness	
Marcinkowska et al. (PLOS ONE)	2019	F	M = 23.01 years, SD = 5.34	6482	-	2 x 2 x 2 split plot; 2 x 2 x 2 split plot	Oral contraceptive (yes vs. No), Relationship status (partnered vs. Single), masculinity (+-50%), sex of face (male vs. Female)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Femininity preference was near chance; no alterations with contraceptive use	
Carrito et al.	2018	F, M	all: M = = 22.94, SD = 3.93	17 F	Portugal	2 x 2 x 2 split plot	dimorphism (+-50% masculinization); sex of face (male vs female), sex of participant (male vs female)	Images of male faces (+-50% masculinity)	Decide whether attractive or not attractive	No reported statistical differences between male-female raters; slightly higher ratings of attractiveness to ♀	
Marcinkowska et al. (Psychoneuroend.)	2018	F	M = 28.8, SD = 4.56	99	Poland	3x3x2x2x2 split plot	face & body dimorphism (+-50% masculinization), symmetry (symmetrical vs asymmetrical), phase of cycle (follicular, ovulation, luteal), participants (all women, L+ women, or textbook women), Self-judged attractiveness, Socio-sexuality Revised, Partner's body attractiveness, Partner's face attractiveness, Relationship's satisfaction	Images of male faces (+-50% masculinity)	Forced choice from pairs	Overall preference for ♀ . Lack of cyclical shift in facial masculinity preference.	

Borras-Guevara, Batres & Perrett (Evol. & Hum. Behav.)	2017	F, M	M = 31.5, SD = 9.4	77 F	Colombia	2x2 within (x2 split plot w/ sex of participant)	dimorphism (+-50% masculinization); ethnicity of face (european vs salvadoran); assessed Violence (5 factors), Health (5 factors) and Education factors (3 factors)	Images of male faces (+-50% masculinity)	Forced choice from pairs	General preference for ♂ (womens masculinity preferences lowered with agreement with "Men are dangerous to their children" in European and salvadorian faces, and a similar influence appeared when danger feelings/robberies factor was higher, lowered preference for masculinity)		
McIntosh	2017	F	M = 31.94, SD = 6.69	688	78.6% were Caucasian, 8.4% African-America, 7.4% were Asian, 0.6% were Native American, 0.1% were native Pacific islander and 4.8% identified as other	4x2x2x2 (pre-treatment/post treatment) split plot	facial hair (clean shaven, 6-8 weeks natural growth), dimorphism (+-50%masculinization), pathogen exposure (pathogens treatment, ectoparasites treatment, mixed treatment, control), score in Three-domain disgust scale	Images of male faces (+-50% masculinity)	Rating from 0 to 100	Pre-treatment: ♂ (stronger for women in relationships)--- also, masculinity preference increased as moral disgust increased.	Post-treatment: ratings generaly lower - but no effects of priming	
Mogilski & Welling	2017	F, M	all: M = 20.68, SD = 4.20	294 F	76.2%;8.1%black,6.3%Asian,3.3% Hispanic/ Latino, and 6.1% other	3x3x3x2x2 within (x2 split if we consider sex of participant)	Symmetry (+-50% symmetry, unaltered), dimorphism (+-50% masculinization, unaltered), color health (+-50% difference between healthy and unhealthy, unaltered), relationship context (ST vs LT), sex of face (male vs female)	Images of male faces (+-50% masculinity)	Rank 11 images	From graph: without considering relationship context, lower preference for ♂, higher for ♀, and even higher for original faces		
Escasa-Dorne, Manlove & Gray - 1	2017	F	age range: 18–45	211	-	2x2x3x2 split plot	Ethnicity of face (South Asia, East Asia, South America, Europe, and African-Caribbean), dimorphism (+-60% masculinization, unaltered), relationship context (ST vs LT), women were cycling (yes vs no), breastfeeding (yes vs no), hormonal contraceptive (yes vs no)	Images of male faces (+-60% masculinity)	Forced choice of three faces	ST = ♂ (non significant)	LT = ♀	
Escasa-Dorne, Manlove & Gray - 2	2017	F	age range: 18–45	260 (155 breastfeeding)	Phillipines	2x2x3x2 split plot	Ethnicity of face (South Asia, East Asia, South America, Europe, and African-Caribbean), dimorphism (+-60% masculinization, unaltered), relationship context (ST vs LT), women were cycling (yes vs no), breastfeeding (yes vs no), hormonal contraceptive (yes vs no)	Images of male faces (+-60% masculinity)	Forced choice of three faces	ST = ♀	LT = ♀	
Zietsch et al.	2015	F	M = 33.11, SD = 5.00	2160	Finland	3x2x3 split plot	Dimorphism (+-50% masculinization), responsed on SOI and Three-domain disgust scale, self-rated attractiveness, subjects (identical twin, non identical twins, siblings)	Images of male faces (+-50% masculinity)	Rating w/ forced choice (1 - left much more attractive - to 8 - right much more attractive)	Slight but significant preference for ♂		
Van Dongen	2014	F, M	-	50-80 raters per photograph	Belgium	Correlations	Measured Fluctuating asymetry, Measured masculinity/femininity	Images of male faces	Rating from 1 to 10	Not significant - but masculinity corrrelated negatively with attractiveness		
Muñoz-Reyes et al.	2014	F	M = 20.86, SD = 2.10	810	Spain (&/or Chile)	3x2x2 split plot	dimorphism (masculinized vs feminized), hormonal situation (fertile, non fertile, contraceptive use), relationship status (single vs partnered),	Images of male faces (masculinized vs feminized)	Forced choice from pairs	Overall preference for ♀		In meta-analysis
Little et al. (Psychoneuroend.) - 1	2013	F	exp. group: M = 19.7, SD = 1.5; cont. group: M = 20.7, SD = 1.9)	55 (18 exp.)	UK	11x2x3x2 split plot (for opposite sex ratings)	Dimorphism (11 face shapes ranging from +50% masculinized to +50% feminized), Sex of face (same vs opposite sex), relationship context (ST vs LT), exp group (before and after hormonal contraception ∪ 3 months)	Images of male faces (ranging from 50% feminized to 50% masculinized)	Alter face until its most attractive	In exp. Group, across contexts, there was a decrease in preference for masculinity (in opposite sex ratings)		
watkins	2012	F	M = 23.00, SD = 6.70	147	-	2x2x2 (plus covariate = desire for pregancy) split plot	relationship status (singe vs partnered), dimorphism (+-50% masculinized/feminized), responses to "desire for pregnancy", sex of face (male vs female)	Images of male faces (+-50% masculinity)	Forced choice and strength of preference	Partnered women with desire to get pregnant preferred ♂ (weak but significative correlation)	Overall, partnered women preferred neither masculine or feminine male faces; Unpartnered women tended to prefer ♂ , but not significantly	
Welling et al.	2009	F	M = 18.22, SD = 1.09	808	-	2x2 within (then correlating with other factors)	Dimorphism (feminized vs masculinized shape), assessed Big 5 personality factors and own attractiveness, sec of face (male vs female)	Images of male faces	Forced choice from pairs	Extraversion positively correlated with ♂; openness to experience negatively correlated with ♂		
Peters, Simmons & Rhodes	2009	F	attr: M = 28.9, SD = 3.4; masc & symm: M = 21.6, SD = 4.9	49 (25 attr)	-	2x2 split plot (and correlations with other measures)	, rated attractiveness for short term partner, Fertility (high vs low), ratings of masculinity & symmetry, relationship status (single vs partnered)	Images of male faces & bodies	Rating from 1 to 7	Overall preference for ♂ (no significative difference between groups)		
Little & Mannion	2006	F	M = 23.5, SD = 5.6	65	UK	2x2x2 split plot	Dimorphism (+-50% masculinization), self rated body and facial attractiveness, attractiveness condition (attractive vs unattractive)	Images of male faces (+-50% masculinity)	Forced choice and strength of preference	Seeing unattractive females lead to stronger ♂ preference (probably because of increase in self-rated attractiveness, that also happened)		
Cornwell et al. - 1	2004	F, M	M = 20.7, SD = 2.12	56 F	UK	Correlations	Odor (two male pheromones, MP1 and MP2; a female pheromone, FP (Steraloids Inc, RI, USA); and two filler items, clove oil and oil of cade), Dimorphism (range from -50% to +50% masculinity), relationship context (ST vs LT)	Images of male faces (ranging from -50% to +50% masculinization)	Alter face until its most attractive	Positive correlation found was between ♂ for long- term relationships and the ratings of the male pheromone MP2		
Cornwell et al. - 2	2004	F, M	M = 20.40, SD = 1.76	96 F	UK	Correlations	Odor (two male pheromones, MP1 and MP2; a female pheromone, FP (Steraloids Inc, RI, USA); and two filler items, clove oil and oil of cade), Dimorphism (-+50% masculinity), Relationship context (ST vs LT), cucle phase (luteal vs follicular)	Images of male faces (ranging from -50% to +50% masculinization)	Alter face until its most attractive	Positive correlation found was between ♂ for long- term relationships and the ratings of the male pheromone MP2		
Limoncin et al.	2015	F	age range all: 26.14–39.88	116 (46 pregnant)	Italy	4x2x2 split plot	Cycle situation (early follicular, ovulation, taking contraceptive, pregnant), relationship context (ST vs LT), dimorphism (from extremely masculinized to extremely feminized - 21 frames), university degree (yes vs no), secondary degree (yes vs no),	Images of male faces (ranging from feminized to masculinized)	Alter face until its most attractive	Pregnant woman prefer ♀ in both contexts. Women in ovulation prefered ♂ in both contexts (although less for LT). Early follicular and women on contraceptives prefer for ST = ♂, and for LT = ♀		

lee et al.	2014	F, M	M = 24.15, SD = 6.18	333 F	-	2x2x2 within	Dimorphism (+-30% masculinized in shape and color), Intelligence (intelligent vs non-intelligent description), Relationship context (St vs LT), pre-rated intelligence and attractiveness, self reported masculinity, mate-value and attractiveness, SES, level of education, tem-item personality inventory and three-factor disgust scale	Dating profiles of male individuals	Rating (don't say which scale)	Higher ratings for ♂ in ST; ♂ preference was higher in participants reporting high subjective SES, and low sociosexual attitudes.	
Saxton et al.	2009	F	M = 23, SD = 5	60	USA	2x2x2 within	Dimorphism (+-50% masculinization), Self similarity (25% similar or dissimilar), Relationship context (ST vs. LT)	Images of male faces (+-50% masculinity)	Rating from 1 to 7	Significant preferences for ♂ across relationship context	
Borras-Guevara, Batres & Perrett (Behav. Eco & Soc.)	2017	F	M = 26.7, SD = 6.01	83	Colombia	3x2x	Ethnicity (colombian, salvadoran, european), Dimorphism (+-50% masculinization), Have children (yes vs no) assessed indicators of health, level of education, access to media and perceptions of violence	Images of male faces (+-50% masculinity)	Forced choice from pairs	For colombian faces: higher perceptions of risk for domestic violence in their surroundings = lower ♂ preference (to a point where preference was ♀). European and salvadoran faces were not affected - slight preference for ♀ in salvadorean and for ♂ in european	
Ditzen et al.	2017	F	original sample (N =56): M = 28, SD = 3.1	52	Switzerland	2x2x2x3x8 split plot and within (then it varies depending on analysis chosen)	Moment (late follicular and the mid-luteal , aka. Control- for same women), Condition (stress, control), measured P4, T and E2, cortisol (8 times) and subjective stress VAS, Dimorphism (+-50% masculinization)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Late follicular phase, as well as higher E2 = higher ♂; in late follicular and mid-luteal, in stress condition = slight ♀ preference, but in control condition = slight ♂ preference	
Lyons et al.	2016	F	M =21.94, SD =5.75	48	UK	2x2x2 split plot	relationship status (single vs partnered), Dimorphism (+-50% masculinization), condition (scarcity vs wealthy), relationship context (ST vs. LT), self-rated how (i) physically safe, (ii) happy, (iii) healthy, and (iv) financially secure they would be in the context depicted, Measured eye movements (eye tracking)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Partnered women in scarcity context = ♂ , in wealthy = ♀; single in scarcity = slight ♀, and in wealthy = slight ♂	
Lee & Zietsch - 1	2015	F	M = 36.79, SD = 10.52	447	residing in USA	2x2 split plot	Dimorphism (+-50% masculinization - morphed with hypermale and hyper female, each extended 200%), Age of stimuli (young, middle-aged), rated disgust sensitivity on Three domain disgust scale	Images of male faces (+-50% masculinity)	Forced choice and strength of preference (1 to 8)	No association beteen pathogen disgust sensitivity and masculinity preference! (only for young <35 women did this association exist)	
Lee & Zietsch - 2	2015	F	M = 38.55, SD = 12.67	395	residing in USA	2x2 split plot	Dimorphism (+-50% masculinization - morphed with hypermale and hyper female, each extended 200% - but templates were from younger faces fro the older stimuli ad vice-versa), Age of stimuli (young, middle-aged), rated disgust sensitivity on Three domain disgust scale	Images of male faces (+-50% masculinity)	Forced choice and strength of preference (1 to 8)	No effect of pathogen disgust sensitivity in masculinity preferences	
Lee & Zietsch - 3	2015	F	M= 34.99, SD = 8.23	386	residing in USA	Correlations	Pre-rated masculinity of faces, rated disgust sensitivity on Three domain disgust scale	Images of male faces (+-50% masculinity)	Rating from 1 to 100	No evidence for an association between pathogen disgust and preference for facial masculinity regardless of the age of the participants or stimuli;	
Skrinda et al.	2014	F	M = 21.13, SD = 1.24	37	Latvia	Regressions	Rating for masculinity (by men), Measured fundamental frequency, immune system and testosterone measurements	Images of male faces	Rating from -5 to 5	There was a significant positive linear relationship between ♂ and attractiveness	
Moore et al.	2013	F	M = 26.51, SD = 8.36	2842	Multicultural, majority (>50%) from Finland	Correlations (Bivariate analysis	Dimorphism (high vs low levels of Testosterone in the face), Stress (high vs low levels of Cortisol in the face), measures of country Human Development Index, Gini & Pathogen stress	Images of male faces (varying in levels of Testosterone in the face)	Rating from 1 to 7	There was an inverse relationship between preferences for cues to testosterone and a societal-level measure of development	
Boothroyd & Brewer	2014	F	M = 25.9, SD = 9.3	124	UK	correlations	Dimorphism (masculinized vs feminized), Sex of stimuli (male vs female), Reported SES, score on SOI, and rating in conceptualized components: behavioral impulsivity, planning, and sensation seeking	Images of male faces (masculinized vs feminized)	Forced choice with strength of preference (0 to 7)	Planning was the only predictor of ♂ preference (those who engaged in less planing preferred more masculine faces	
Geniole & McCormick - 1	2013	F	1 set: M = 19.41, SD = 1.68; 2 set: M = 19.43, SD = 1.30	59 (29 - 1 set)	Canada	Regressions	Rated Masculinity & Aggression (1 set), and Attractiveness and desirability for ST and LT relationship (2nd set), stimuli (digitally manipulated vs original)	Images of male faces (real and digitalized)	Rating from 1 to 7	When judgements (for the 25 faces) of aggression are controlled for, the relationship between masculinity and attractiveness is stronger and significative (the same happened for desirability for St and LT relationships). The same happened in the 54 digitalized faces (which	
Geniole & McCormick - 2	2013	F	M = 20.69, SD = 3.46	26	Canada	Regressions	Rated attractiveness, masculinity and aggression	Images of male faces	Rating from 1 to 7	The non significant original negative correlation between attractiveness and masculinity, reversed direction and became stronger when judgements of aggression were controlled for (added as a simultaneous predictor)	
Geniole & McCormick - 3 (analysed other 2 studies: experiments 1 of Carré et al., 2009 & Geniole et al., 2012)	2013	F	-	16 (Carré et al.); 10 (Geniole et al.)	-	Regressions	Rated attractiveness, masculinity and aggression	Images of male faces	-	The original negative correlations between attractiveness and masculinity in both studies changed in direction , and became significative in Carré et al.	
Watkins et al.	2012	F	M = 21.6; SD = 5.05	90	-	2x2 split plot	Dimorphism (+-50% masculinization), environmental threat (resource scarcity vs pathogens)	Images of male faces (+-50% masculinity)	Forced choice from pairs	In the pathogen threat, women chose masculine faces as significantly more attractive	

Sacco et al.	2012	F	M = 22.76, SD = 4.13	1044	72% were from North America, 13% were from mainland Europe, 6% were from the United Kingdom, and 9% were from other regions	2x2 split plot (SOI as covariate)	Relationship status (single vs partnered), score in SOI, Dimorphism (+-50% masculinization)	Images of male faces (+-50% masculinity)	Forced choice from pairs	No preference	In meta-analysis
Stephen et al.	2012	F	age range: 18-26	62 (30 Africans)	South Africa & UK	Regressions	Ethnicity (African vs caucasians), Measured masculinity index	Images of male faces (varying in ethnicity)	Rating from 1 to 7	No role of morphological masculinity in predicting attractiveness (4 participants demonstrated significant higher preferences for ♀)	
Quist et al.	2012	F	M = 22.80, SD = 4.93 years	144	-	2x2 within	Dimorphism (+-50% masculinization), Condition (faithful vs unfaithful)	Images of male faces (+-50% masculinity)	Rating from 1 to 7	♂ Found more attractive; And ♂ significantly more attractivein faithful condition	
O'Connor et al.	2012	F	M = 18.71, SD = 1.71	63	Canada	2x2 within	facial dimorphism (+-50%), pitch (+-20 Hz -- 0.5 ERB)	Videos with men (faces + voices together)	Rating from 1 to 7	Participants rated ♀ faces as more attractive	
Soler et al.	2012	F, M	M = 21.7, SD = 1.3	64	Colombia & Spain	Correlations	Measured Asymmetry, rated attractiveness, calculated facial Masculinity index, ethnicity of rater (spanish vs colombian)	Images of male faces	Rating from 1 to 10	For spanish raters = no association between ♂ and attractiveness; for colombian raters = ♂ index negatively correlated with attractivenes. Overall preference for ♀ (stronger in colombians)	
Burriss, Welling & Puts	2011	F, M	F: M = 20.10, SD = 1.91; M: M = 20.74, SD = 3.34	224 (112 F)	USA	2x2 within (+ correlations w/ other variables)	Dimorphism (+-50% masculinization), self and partner rated masculinity, relationship context (ST vs. LT)	Images of male faces (+-50% masculinity)	Forced choice with strength of preference (0 to 8)	ST = ♂; LT = ♂ (stronger)	
Smith et at. (Person. & Ind. Dif.)	2009	F	M = 19.8, SD = 1.93	42	32 identified as Caucasian, 5 as East Asian (e.g., Chinese), 4 as West Asian (e.g., In- dian), and 1 as African	full within	Dimorphism (+-50% masculinization), Measured WHR, height, BMI	Images of male faces (+-50% masculinity)	Forced choice from pairs	Preference for ♀	In meta-analysis
Scott et al.	2008	F, M	F: M = 29.4, SD = 10.8	26 F	Malaysia	2x2x2 split plot	Ethnicity (Caucasian, East Asian, South Asian, Afro-Caribbean, and South American), Dimorphism (+-60% masculinization, original composite), Relationship context (ST vs LT), Have you ever been too sick to work? (yes - Unhealthy - vs no - Healthy)	Images of male faces (+-60% masculinity and original)	Forced choice from three options	Overall ♂ --- much stronger for ST and Healthy	
Jones et al. - 1	2005	F	M = 25.33, SD = 2.96	93 (73 face preference test)	-	2x2 split plot	Relationship status (single vs partnered), Rated commitment to relationship, Dimorphism (masculinized vs feminized), sex of stimuli (male vs female), length of relationship (<3 years or > 3 years), Estimates of progesterone and estrogen levels	Images of male faces	Forced choice from pairs	Women w/ relationships <= 3 years preferred ♂ more than the ones >3 years	
Jones et al. - 2	2005	F	M = 24.37, SD = 2.73	656	-	2x2 within	Health (+-50% towards healthy faces - shape/color/texture), Dimorphism (+-50% masculinization), Estimated progesterone and estrogen levels, Cycle phase (late-follicular, mid-luteal)	Images of male faces (+-50% masculinization/healthiness)	Forced choice from pairs w/ strength of preference (0 to 7)	Preference for ♂ was strongest in late-follicular phase, ♂ preference negatively related to predicted progesterone level.	
Penton-Voak et al. -1	1999	F	M = 21	39	Japan	2x5x2 split plot	Dimorphism (-40%, -20%, average, +20%, +40% masculinization), cycle phase (low conception risk vs high conception risk), steady boyfirend (yes vs no), Ethnicity of stimuli (japanese vs Caucasian)	Images of male faces (-40%, -20%, average, +20%, +40% masculinization)	Forced choice from 5 images	Preference for less feminized faces in high conception risk than in low conception risk	
Penton-Voak et al. -2	1999	F	M = 20	65 (28 ST, 27LT, 10 Both)	UK	2x3x(continuum)x2 split plot	Dimorphism (range from -50% to +50% masculinized), Relationship context (ST vs LT), oral contraception (yes vs no), cycle phase (low conception risk vs high conception risk)	Images of male faces (ranging from -50% to +50% masculinization)	Alter face until its most attractive	For ST and High conception risk phase = less feminine;	
Welling et al.	2007	F	M = 22.38, SD = 7.48	70	-	2x2x2 within	Dimorphism (+-50% masculinized), Sex of stimuli (male vs female), Testosterone (highest T session, lowest T session)	Images of male faces (+-50% masculinity)	Forced choice from pairs	More testosterone = more ♂ preference, BUT ♀ preference!!!	In meta-analysis
Dixson et al.	2017	F	M = 30.79, SD = 13.15	103	Vanuatu	3x2x2x2x2 split plot	Dimorphism (+-50% masculinization), Facial skin tone (+-50% skin darkness), Symmetry (symmetrical vs asymmetrical), facial adiposity (+-50% weight/adiposity), Malaria rates (high, low, medium)	Images of male faces (+-50% masculinity)	Forced choice from pairs	♀	In meta-analysis
Dixson et al.	2016	F	age range: 18-100	8520	-	3x5 split plot	Dimorphism (-50%, -25%, unmanipulated, +25%, +50% masculinization), Context (attractiveness, ST, LT)	Images of male faces (-50%, -25%, unmanipulated, +25%, +50%)	Rating from 0 to 5	Unmanipulated > 25% manipulations > 50% manipulations	
Feinberg et al.	2008	F, M	all: M = 24.3, SD = 6.042	1213 F	-	2x2x2 split plot	Dimorphism (+-50% masculinization), (+-20 Hz), sex of rater (male vs female)	Images of male faces (+-50% masculinity)	Forced choice from pairs w/ strength of preference (0 to 7)	♂	In meta-analysis
Little et al. - 1	2010	F	children: 11-12; adults: M = 20.9, SD = 2.7	191 (99 Adults)	UK	2x2 split plot	Dimorphism (+-50% masculinization), Participants (children vs adults)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Adults = ♂; Children = ♀ (none was significant)	In meta-analysis (only adults)
Little et al. - 2	2010	F	regular menses: M = 47.9, SD = 2.5; menopausal: M = 52.4, SD = 3.8	163 (63 Pre-menopausal)	-	2x2 split plot	Dimorphism (+-50% masculinization), Participants (pre vs post menopausal)	Images of male faces (+-50% masculinity)	Forced choice from pairs	♂	Meta-analysis (only pre-menopausal)
Little et al. - 3	2010	F	The blocks were age 11—14: N = 469, mean = 13.5, SD = 0.7; 15—25: N = 4207, mean = 19.0, SD = 3.1;		-	2x5 split plot	Dimorphism (+-50%)	Images of male faces (+-50% masculinity)	Forced choice & Strength of preference	♂	
Little et al. (- 1a	2013	F	M = 23.7, SD = 7.0	77	-	2x2x2 split plot	Dimorphism (+-50% masculinization), sex of face (male vs female), male-male competitiveness (direct vs indirect)	Images of male faces (+-50% masculinity)	Forced choice from pairs	No preference in pre-exposure; Preference for ♂ augmented in the Direct competitiveness condition	
Little et al. - 1b	2013	F	M = 22.4, SD = 6.0	51	-	2x2x2 split plot	Dimorphism (+-50% masculinization), sex of face (male vs female), Violence (weapons vs peaceful)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Preference for ♂ in pre-exposure; and also in general in post exposure - but in weapons condition = significant increase in ♂, in peaceful condition	

Little et al. - 2	2013	F	M = 23.6, SD = 6.7	171	-	3x2x2 split plot	Dimorphism (+-50% masculinization), Environmental wealth (high, low, mixed), sex of face (male vs female)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Preference for ♂ in pre-exposure and post-exposure. Low wealth = significantly decreased preference for ♂; High wealth = significantly increased ♂ preferences, Mixed wealth = no change	
DeBruine et al. (Proc. Of the R. S. B)	2010	F	age ranges: 16 and 40, Ms = 22.0 to 25.2	4794	30 countries	Within (and correlations with health, wealth, SOI and age measures)	Dimorphism (+-50% masculinization), Measured National Health Index, results of SOI	Images of male faces (+-50% masculinity)	Forced choice from pairs	♀	In meta-analysis
DeBruine et al.	2011	F	-	8338	USA (different states)	regressions	Dimorphism (+-50% masculinization), Measured National Health Index, results of SOI, and SHI (State Health Index)	Images of male faces (+-50% masculinity)	Forced choice from pairs	Masculinity preferences were strongly (negatively) predicted by SHI (no access to proportions of masculine stimuli chosen)	
DeBruine et al. (Evol. & Hum. Behav.) -1	2010	F	M = 25.3, SD= 6.63	345	-	Within (with separation in analysis for high vs low disgust sensitivity)	Dimorphism (+-50% masculinity), Scores on Three Domain Disgust Scale	Images of male faces (+-50% masculinity)	Forced choice from pairs	♀ ; Higher disgust sensitivity in pathogen domain preferred masculinity more than did those with lower disgust sensitivity.	In meta-analysis
DeBruine et al. (Evol. & Hum. Behav.) -2	2010	F	M = 23.8, SD = 5.38	74	-	Within (with separation in analysis for high vs low disgust sensitivity)	Rated masculinity of faces (4 with highest and 4 with lowest in all possible pairings; masculine vs feminine), Scores on Three Domain Disgust Scale	Images of male faces (masculine vs feminine)	Forced choice from pairs	♂ ;Higher disgust sensitivity in pathogen domain preferred masculinity more than did those with lower disgust sensitivity.	In meta-analysis
Little, Jones & DeBruine (Person. & Indivi. Dif.)	2008	F	M = 25.1, SD = 6.6	150 (96 low fertility)	-	2x2x2 split plot	Fertility (high vs low), Dimorphism (highest ranking masculine faces vs lowest ranking), relationship status (partnered vs single)	Images of male faces (masculine vs feminine)	Forced choice from pairs	Overall preference for ♂; when partnered, and fertile, more preference for masculine;	
Provost et al. - 1	2006	F	M = 18.79, SD = 0.73	40 (only 20 for analysis)	Canada	5x4x2 split plot	Dimorphism (-40%, -20%, average, +20%, +40% masculinization), somatotype (back images of endomorph, ectomorph, mesomorph, and average), results of SOI (sociosexually restricted vs unrestricted)	Images of male faces (-40%, -20%, average, +20%, +40% masculinization)	Rating from 1 to 6	No effects of dimorphism on ratings	
Provost et al. - 2	2006	F	M = 19.16, SD = 1.22	55 (only 24 in analysis)	Canada	2x2x2 split plot	Rating context (dating, ST, LT), two men (out of 10) who differed the most from one another in terms of perceived masculinization, but who received the most similar attractiveness ratings, results of SOI (sociosexually restricted vs unrestricted)	Speed dating	Rating from 1 to 9; forced choice w/ strength of judgement (1 to 4)	It would seem women w/ restricted sociosexuality preferred less masculinized man for long-term relationships but for short term, slightly preferred the masculinized -- which was preferred by the 'unrestricted' women for every condition	
Glassenberg et al.	2010	F, M	M = 30.55, SD = 9.27	218 heterosexual females	-	2x4 split plot	Dimorphism (+-50% masculinization), Results of SOI, Participants (homosexual males, homosexual females, heterosexual males, heterosexual females)	Images of male faces (+-50% masculinity)	Forced choice from pairs	No preferences	In meta-analysis
Scott et al.	2014	F, M	-	357 F	10 countries (12 different groups)	12x2x2x5 split plot	Dimorphism (+-60% masculinization, unaltered), Human Development Index values, Relationship context (ST vs LT), sex of rater (male vs female), sex of face stimuli (male vs female), Ethnicity of stimuli (5 different), Cultural groups/raters (12 different)	Images of male faces (+-60% masculinity, 5 ethnicities))	Forced choice between three images	Preferences for ♂ in 5 groups, for neutral faces in 5 groups and for ♀ in 2 groups; preferences for dimorphism are stronger in large-scale, urban societies and in groups that have low disease, fertility, and homicide rates.	
DeBruine et al.	2006	F	all: M = 24.0, SD = 7.3; for subgroup(124): M = 21.9, SD = 3.51	324 (124)	-	3x2 within	Manipulation of Dimorphism (sex.dimorphism method vs perceived masculinity method vs pubertal development method), Dimorphism (masculinized vs feminized)	Images of male faces (masculinized vs feminized)	Forced choice from pairs	♂ for all methods (they used 324 but then described the tests only for 124)	
Bobst et al.	2014	F	M = 23.1 SD = 2.6	62 (27 no contraception)	Switzerland (supposed)	2x2 split plot (regressions for hormone levels)	Dimorphism (+-25% masculinization), Contraception (yes vs no), Measured hormonal levels (T, E, P)	Images of male faces (+-25% masculinization)	Forced choice from pairs	No preference	In meta-analysis
Marcinkowska et al.	2016	F	M = 29.9, SD = 3.46	113	Poland	2x3x2x2 split plot	relationship status (single, partnered, hard to say), Dimorphism (+-40% masculinization), relationship context (ST vs LT), conception risk (high vs low)	Images of male faces (+-40% masculinization)	Forced choice from pairs w/ strength of preference (1 to 8)	all ST = ♂ all LT = ♂	
Reeve, Kelly & Welling	2017	F	M = 19.65, SD =1.53	63	USA	3x25 (x2) x25 (x2) split plot	Condition (acceptance, neutral, rejection), stimuli (bodies vs faces), Bodies (muscle mass - from low to high - and Waist-to-Chest ratio - from low to high - in 5 increments), Faces (dimorfism - masculine or feminine -, and coloration - lighter to darker eyes, lips, and cheeks relative to skin tone - in 5 increments). There were other mate preference variables measured through a mate-preferences inventory (see Schwarz and Hassebrauck, 2012)	Images of male faces (masculinized to feminized)	Choose 3 pictures from 25	Acceptance condition participants had higher preferences for facial masculinity than control and rejection condition participants	

Gangestad, Thornhill & Garver-Apgar	2010	F	M = 20.9, SD = 4.1	66 (couples)	USA	2x2 within	Sexual attraction (their partners or other men - assessed through questions), Measured and Rated masculinity, Intelligence measures, cycle phase (luteal vs follicular)	Own partners	Rating from 1 to 4	As men's facial masculinity increased, their partners experienced less boost in attraction to men other than primary partners when fertile		
Penton-Voak et al.	2003	F	M = 20.2	82	UK	11x2x	Stimuli ethnicity (Japanese, caucasian and african-caribbean), dimorphism (+-50% masculinized - in 11 'steps'), relationship context (ST vs LT), self-rated and other-rated attractiveness, measured WHR	Images of male faces (varying in ethnicity and masculinization)	Alter face until its most attractive	Overall preference for femininity across both contexts (significantly different from average in LT context) - ♀; with data split by WHR (high, low) w/ other-rated attractiveness as a covariate - main effect of context on preferences - greater preference for masculinity in ST. (other analysis reported)		
Penton-Voak & Perrett - 1	2001	F	M = 30.7, range: 14-50	139	UK	5x2 split plot	Dimorphism (-50%, 30%, average, 30%, 50% masculinization), Estimated conception risk (high vs low)	Images of male faces (varying in -50%, 30%, unmanipulated, 30%, 50% masculinity	Forced choice of 5 faces	High conception risk = ♂	Low conception risk = slight tendency to ♀	
Penton-Voak & Perrett - 2	2001	F	M = 21	39	Japan	2x5x2x2 split plot	stimuli ethnicity (Japanese, British), Dimorphism (-40%, -20%, average, 20%, 40% masculinization), estimated cycle phase (follicular, luteal), current steady relationship (yes vs no)	Images of male faces (varying in -40%, 20%, unmanipulated, 20%, 40% masculinity and ethnicity)	Forced choice of 5 faces	Overall preference for ♀ ; less preference for femininity when in high conception; tendency for women in relationships to prefer more masculine faces, and show biggest shift with cycle phase		
Penton-Voak & Perrett - 3	2001	F	M = 20	49 (23 ST, 26 LT)	UK	2x2x2 split plot	Stimulus ethnicity (caucasian, japanese), Dimorphism (range from -50% to +50% masculinized), relationship context (ST vs LT), Conception risk (high vs low)	Images of male faces (varying from -50% to 50%)	Alter face until its most attractive	Overall preference for ♀; only in ST there were cyclic shifts favoring changes in masculinity preference in high risk phase (less preference for femininity) -		
Batres & Perrett	2017	F, M	training camp condition: M = 19.25, SD = 1.04; control condition: M = 22.45, SD = 0.82	19 (8 training condition)	UK	2x2x2x3 (x20) (x20)split plot	Dimorphism (from -100% to 100% masculinization), adiposity (-100% to 100% shape difference between prototypes), sex of participant (male vs female) and sex of face (male vs female), condition (control vs training), time (sessions 1, 2 and 3)	Images of male faces (varying from -100% to 100% in masculinity or adiposity)	Alter face until its most attractive	Female participants in training condition preferred more feminine male faces than control women;		

Table for systematic review (Color)

Note 1. "R" means "Redness", "Y" means "Yellowness" and "D" means "Darkness".

Study (authors)	Year	Sex of Participants (subjects)	Age of participants (years)	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	Overall Preference
Stephen et al. (Evol. Psyc.)	2012	F	Age range: 18 - 25	45	-	Within	Varying facial redness on a continuum (13 variations from -16*a to +16*a)	Images of male faces (varying in a continuum of redness coloration)	Make the face as attractive as possible	More (R)
Lewis	2011	F, M	-	10	UK	Within	Race (Black, Mixed race, White), diferent ratings (masculinity/femininity, black/white, etc)	Images of male faces (different in color of skin)	Ratings from 1 to 7	(D)
Lewis	2012	F, M	Age range: 18 and 30	20	UK	Within	Race (Asian, Black, White)	Images of male faces (varying in race)	Ratings from 1 to 10	(D)
Thorstenson et al. - 1	2017	F	M = 31.4, range 19–64	119	USA (most, 80%)	Within	Redness of skin on CIELab (+-5 units of a*)	Images of male faces (varying in redness coloration +-5 units)	Forced choice from pairs	(R)
Thorstenson et al. - 2	2017	F	M = 32.5, aged 19 - 62	119	USA (most, 70%)	Within	Redness of skin on CIELab (+5 units a* vs. neutral), Redness of skin on CIELab (-5 units vs. neutral)	Images of male faces (varying in redness coloration +-5 units, or neutral)	Forced choice from pairs	(R, R) Always the 'reddest' version "R"
Thorstenson et al. - 3	2017	F	-	126	-	Within	Redness of skin on CIELab (+5 units a* vs. neutral)	Images of male faces (varying in redness coloration +5 units or neutral)	Ratings from 1 to 9	(R)
Thorstenson et al. - 4	2017	F	M = 19.6, range 18–23	167	USA	Within	Redness of skin on CIELab (+5 units a* vs. neutral)	Images of male faces (varying in redness coloration +5 units or neutral)	Ratings from 1 to 9	(R)
Stephen et al. (Evol. & Human Behav.)	2012	F	rating african faces: 18–26; rating caucasian faces: 18 - 26	62 (rate african faces 35)	UK & South Africa	Regressions	measured shape masculinity, as well as CIELab coordinates for the different color axis), Ethnicity (african faces vs. Caucasian faces)	Images of male faces (african or causcasian - natually changing in colors)	Ratings from 1 to 7	(Y) (D) For participants judgning same ethnicity faces, increased yellowness and decreased lightness increased attractiveness
Dixson et al.	2017	F	M = 30.44, SD = 12.45	265	Vanuatu	2x2x2x2x3 split plot	Malarial prevalence (high, moderate, low), skin darkness (high, low), Symmetry (asymmetric, symmetric), facial adiposity (high, low), facial shape (+-50% masculinisation)	Images of male faces (varying in skin darkness)	Forced choice from pairs	Prefences were equivocal
Carrito et al. - 1	2016	F	M = 22.65, SD = 6.60	48	(caucasian) -	Within	Masculinisation of color (continuum from -200% to 200% - ±1.710 L* units, ±1.024 a* units and ±0.577 b* units)	Images of male faces (varying in a continuum of color masculinization)	Make the face as attractive as possible	(R) (Y) Preference for greater masculinization (so, more units of several axis of CIELab)
Carrito et al. - 2	2016	F	M = 20.11, SD = 4.26	61	(causasian) -	Within	Masculinisation of shape (-100% to 100% continuum), Masculinization of color (-300% to 300% continuum)	Images of male faces (varying in a continuum of color masculinization)	Make the face as attractive as possible	(R) (Y) Preference for greater masculinization (so, more units of several axis of CIELab)
Carrito et al. - 3	2016	F	M = 20.39, SD = 2.95	52 (26 ST)	Portugal	Color (continuum) X masculinisatio n (continuum) X 2 split plot	Masculinisation of shape (-100% to 100% continuum), Masculinization of color (-200% to 200% continuum), relationship context (ST vs. LT)	Images of male faces (varying in a continuum of color masculinization)	Make the face as attractive as possible	(R) (Y) Preference for greater masculinization (so, more units of several axis of CIELab) -- not significant effect of context
Jones et al.	2004	F	Age range all: 18 - 23	44 (24 attractiv eness judgeme nts)	-	2x2 split plot	Healthiness (+-50% healthiness of face - color and texture), participants (attrativeness, healthiness)	Images of male faces (+-50% healthiness of face - color and texture)	Rating from 1 to 7	Although color measures of the faces judged as healthy wasn't made - there was a positive correlation between healthiness of a face (in aspects only of color and texture) and its rated attractiveness
Foo, Rhodes & Simmons	2017	F	attr: M = 33.09, SD = 7.70; health: M = 33.18, SD = 7.72	66 (33 attractiv eness)	-	3x2 split plot (and correlations)	Participants (attractiveness, healthiness, placebo), faces (pre and post-supplementation), measured oxidative stress, immune function and semen quality	Images of male faces (pre-post supplementation, placebo)	Forced choice from pairs	(R) (Y) Significantly different attractiveness for post supplementation group - associated with Redness (a*) and Yellowness (b*) increase

Foo, Simmons & Rhodes	2017	F, M	M = 31.8, S.D = 7.5	131 F	-	Correlation	Measured facial color (on CIELab) and age, rated sexual dimorphism, symmetry, averageness (reverse rating of distinctiveness), adiposity	Male faces	Rating from 1 to 9	Not significant regressions between facial color and attractiveness - although there were relationships between color and other measures (f.e. symmetry)
Sorokowski, Sorokowska & Kras	2013	F, M	M = 38.4, SD = 8.7	53 F	Papua	3x2x2 split plot	Skin colour (25% darkened, average and 25% brightened), sex of face (male vs female), sex of rater (male vs female) - other questions to giain information about contact with other cultures	Male faces (25% darkened, average and 25% brightened)	Forced choice from three faces	Averaged and Brightened face more attractive than darkened face
Jones et al. - 2	2004	F	M = = 27.5, SD = 4.3	80 (40 attractiveness)	-	2x2 split plot	Participants (attractiveness, healthiness), Color and Texture (of symmetrical faces vs asymmetrical faces), healthiness and attractiveness	Images of male faces	Forced choice from pairs	Faces w/ color & texture from symmetrical faces were rated significantly more attractive (and also healthier; we do not know the measure of color)
Reeve, Kelly & Welling	2017	F	M = 19.65, SD =1.53	63	USA	3x25 (x2) x25 (x2) split plot	Condition (acceptance, neutral, rejection), stimuli (bodies vs faces), Bodies (muscle mass - from low to high - and Waist-to-Chest ratio - from low to high - in 5 increments), Faces (dimorfism - masculine or feminine -, and coloration - lighter to darker eyes, lips, and cheeks relative to skin tone - in 5 increments). There were other mate preference variables measured through a mate-preferences inventory (see Schwarz and Hassebrauck, 2012)	Images of male faces (masculinized to feminized)	Choose 3 pictures from 25	No effects of color
Frost	1994	F	Range: 19 - 23	98	Canada	2x2x2x2 split plot	Photographs (darker complexion, lighter complexion), sex of face (male vs female), contraceptive use (yes vs no), cycle phase (High E/P, low E/P)	Images of male faces (darker or lighter)	Forced choice from pairs	No contraceptive: higher E/P phase, significantly higher preference for darker faces than low E/P -- but lighter faces preferred in absolute terms. Contraceptive users: higher preference for darker faces than non users (and no significant chanfe with cycle phase)-- but still absolute preferrence for lighter faces

Table for systematic review (Facial Hair)

Note 1. Since in these studies the degrees of facial hair used changed frequently, we always refer it in Ivs.
Note 2.   0 - clean shaven, | - very light; || - light stubble (light), ||| - heavy stubble (medium), |||| full beard (heavy) ---- adapt the notation for any study from the least to the most facial hair intensity.

Study (authors)	Year	Sex of Participants (subjects)	Age of participants (in years)	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	Overall Preference
Dixson & Vasey	2012	F	Samoan women: M = 21.36, SD = 3.30; New Zealand Women: M = 20.38, SD =3.63	100 Samoan, 129 NZ	Samoa & New Zealand	2x2 split plot	Facial Culture (Samoan vs. New Zealand), Facial Hair (clean-shaven vs. Full beard)	Images of men's faces (smiling with or without beard)	Ratings from 0 to 5	0 (& older women judged bearded faces higher than younger ones)
Dixson & Brooks	2013	F, M	M = 27.94 , SD = 8.23	351	79.9% were European, 8.4% were Asian, 4.2% were Native American, 1.8% were African, Middle Eastern or Australasian and 5.7%	within	Facial Hair (clean shaven, light stubble, heavy stubble, full beard)	Images of men's faces (varying in facial hair)	Ratings from 0 to 5	|||
Dixson & Rantala	2016	F	M = 27.24, SD = 8.21	3805	0.8% were African or African American, 4.0% were Asian, 82.7% of participants were European, 4.4 %were Hispanic/Latin/Latin or South American, 6.9 % were other, and 1.2 % elected not to answer.	5x2x3 split plot	Use of hormonal contraceptives (yes vs. No), Relationship status (single, recently formed, long-term), facial hair (clean shaven, very light stubble, light stubble, medium, heavy)	Images of men's faces (varying in facial hair)	Forced choice from pairs	Hairy over Cleanshaven; ||
Dixson et al.	2016	F	-	8520	Women predominantly of European descent	4x5x3 split plot	facial hair (clean-shaven, light stubble, heavy stubble, fullbeard), masculinity (+50%, +25%, unmanipulated, -25%, 50%) and relationship context (attractiveness, short-term, long-term) as fixed effects.	Images of men's faces (varying in facial hair & masculinity)	Ratings from 0 to 5	|||
Neave & Shields (2nd part)	2008	F	M = 21.7, SD = 5.20	60	UK	Within	Facial Hair (clean-shaven, light stubble, heavy stubble, light beard and full beard)	Images of men's faces (varying in facial hair)	Ratings from 1 to 7	|
Stower et al.	2019	F	short term: M = 31.52, SD = 6.74; long term: M = 31.48, SD = 6.09	336 (164 ST)	U.S.A. (97%), Canada (2%) & Australia, New Zealand, and Britain or elected not to answer (1%).	2x2x4 split plot	Relationship context (ST vs. LT - there were also two others, but not for attractiveness) & Masculinity (+-50%), Facial hair (full beards vs clean shaven faces)	Images of men's faces (varying in facial hair & masculinity)	Ratings from 1 to 100	| (full beard)
Janif, Brooks & Dixson	2014	F, M	M = 26.17, SD = 7.28	1453	70.47% European, 9.6% Asian, 6.12% Central/South American, 2.46% Oceania, 2.28% African/Middle Eastern, 1.86% Native North American and 7.2% chose not to answer -- includes male participants)	3x4 Split plot	Pre-exposure (rare-beard, rare clean-shaven and even), Facial hair (Clean shaven, light stubble, heavy stubble, full beards)	Images of men's faces (varying in facial hair)	Ratings from -4 to 4	All conditions of facial hair more attractive than clean chaven
Valentova et al.	2017	F, M	Czech Rep.: M = 28.56, SD = 7.86; Brazil: M = 25.56, SD = 6.08	883 (417 Brazil)	Czech Republic and Brazil	4x2x2 split plot	Facial hair (clean-shaven, light stubble, heavy stubble, full beard); Nationality (CR vs. BR), Sex (Heterosexual women, homosexual men)	Images of men's faces (varying in facial hair)	Forced choice between in a group of images	CR = | ; BR = | (overall preferrence for hair greater in Brazil)
Dixson, Tam & Awasthy	2013	F	M = 29.93; SD = 14.29	426	-	separate analysis for each IV, so: 4x3; 4x2; 4x3 split plot	Reproductive status (pre-menopausal, post-menopausal, pregnant), Fertility within cycle (low fertility vs. High fertility), phase of cycle (menses, follicular, luteal), facial hair (clean shaven, light stubble, heavy stubble, full beard), Current partner's degree of facial hair (clean shaven, light stubble, heavy stubble, full beard)	Images of men's faces (varying in facial hair)	Ratings from 0 to 5	Post-menopausal women gave higher ratings to all categories of facial hair & full beards (||||) were the least attractive; High fertility group gave the highest ratings to all categories of facial hair, heavy stubble most attractive, and full beards least attractive; Luteal phase participants gave highest ratings to all categories overall & heavy stubble most attractive, and full beards least attractive; Women with clean shaven partners preferred clean shaven faces, and highest rankings of full beards were by women with partners with full beards.
Dixson et al.	2019	F	M = 30.71, SD = 11.03	2419	Australia	2x4, 2x2, 2x2 split plot; correlations	Facial hair (bearded vs. Clean shaven), Reproductive status (contraceptive, no contraceptive, pregnant, mother), Parity (nullparous, parous), stage of pregnancy (in weeks..several measures), breastfeeding (yes vs. No), Age of offspring (measured)	Images of men's faces (either bearded or clean-shaven)	Forced choice from pairs	All but pregnant women demonstrated preference for bearded men ||| ; Preference greater in women with no children; as children get older, bigger preference for beards;
Dixson et al. (Hormones & Behav.)	2018	F	of the initial 70 participant sample: M = 27.9, SD = 5.75	52	Poland	2x3 within	Cycle phase (follicular, periovulatory, luteal), facial hair (bearded vs. Clean shaven)	Images of men's faces (either bearded or clean-shaven)	Forced choice from pairs	In all phases = | (bearded)
Dixson et al. (Psychoneur.) - 1	2018	F	M = 24.91, SD = 3.47	2161	Women predominantly of European descent	4x5 Within	Facial Hair (clean shaven, light stubble, heavy stubble, full beard), Masculinity (-50%, -25%, neutral, +25%, +50%)	Images of men's faces (varying in facial hair and masculinity)	Ratings from 0 to 100	Overall = ||
Dixson et al. (Psychoneur.) - 2a	2018	F	M = 22.07, SD = 4.6	68	-	2x3x3x2 split plot	Relationship context (ST vs. LT), Facial Hair (clean-shaven, heavy stubble, full beard), Masculinity (-50%, unmanipulated, +50%), fertility (high vs. Low)	Images of men's faces (varying in facial hair and masculinity)	Ratings from 0 to 5	ST = ||; LT = ||
McIntosh	2017	F	M = 31.94, SD = 6.69	688	78.6% were Caucasian, 8.4% African-America, 7.4% were Asian, 0.6% were Native American, 0.1% were native Pacific islander and 4.8% identified as other	4x2x2x2 (pre-treatment/post treatment) split plot	facial hair (clean shaven, 6-8 weeks natural growth), dimorphism (+-50%masculinization), pathogen exposure (pathogens treatment, ectoparasites treatment, mixed treatment, control), score in Three-domain disgust scale	Images of male faces (+-50% masculinity)	Rating from 0 to 100	| ; Beards received higher ratings of attractiveness than clean-shaven faces; ratings ofattractiveness were significantly lower for clean-shaven faces post-treatment than pre-treatment; as pathogen disgust increased, so did preference for beardedness
Dixson et al. (Evol. & Hum. Behav.)	2017	F	-	3814	87 countries	Within	Beardedness (clean-shaven, heavy, medium, light and very light), Measured national-level predictor variables (NHI, Gini, Homicide rates, amongst five others), Investigation of typical facial hair in different cities using facebook;	Images of male faces (clean shaven or with 10 day beard growth, grouped according to the distribution of hair)	Forced choice from pairs	Younger women had stronger preferences for beards; tendency for countries with lower gross national income to have women with higher preferences for beards;cities where beards are more common tend to show greater preferences for beards
Garza, Heredia & Cieślicka	2017	F	M = 23.15, SD = 5.65	155	USA (mexican america)	4x3 within	WCR (small (0.7), medium (0.8), and large (0.9)), Hair (face only, chest only, both, or none), Measured conceptive risk	Images of a male (varying in WCR & hair presence)	Binary (yes/no) and rating from 1 to 6	All types of hair 2 times as likely to be attractive than both facial and chest hair; however, no significant main effect of hair.

Table for systematic review (Body Hair)

Note 1. Images of men are FRONT POSED.
Note 2. The same logic of notation used in "Facial Hair" was applied here (0, |, ||, |||).

Study (authors)	Year	Sex of Participants (subjects)	Age of participants (in years)	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	Overall Preference
Basow & O'Neil	2014	F, M	M = 19.17, SD = 1.04	141 F	88.5% were Caucasian with 5% Hispanic/Latino, 3.7% African American, 3.2% Asian, 2.8% other, and .9% multiracial	2x4 split plot	Body hair (no hair, slightly hairy, somewhat hairy, moderately hairy - other 2 categories combined with 4th), sex (men vs. Women)	Images of men's torsos (varying in hirsuteness)	Forced choice between 6 images	0 or | chosen by over 70% ---- | was the most preferred
Dixson et al. - 5	2003	F	60% of participants were aged between 21-30 years old. 25,5% were under 20 years old, 4,2% 31-40, 7,2% 40-50 and 3,2% > 50.	277	UK	2x2	Body hair (with vs. Without), Somatotype (mesomorph vs. Endomorph)	Drawings of mens bodies (varying in somatotype and hirsuteness)	Ratings from 0 to 5	|
Dixson et al. (American Journal of H. B.)	2007	F, M	68% of them were 20 years or less in age, and the remainder were aged 21–30 years	320 F	China	Within	Body hair (5 levels from no trunk hair to pronounced hirsuteness)	Images of men's bodies (varying in hirsuteness)	Ratings from 0 to 5	0 (declining with every increase)
Dixson et al. (Arch. Of Sex. Behav.) - 2	2007	F, M	<20 years old = 12%; 21–30 years = 35%; 31– 40 years = 32%; 41–50 years = 14%; >50 years = 7%	72 F	Cameroon	Within	Body hair (5 levels from no trunk hair to pronounced hirsuteness)	Images of men's bodies (varying in hirsuteness)	Ratings from 0 to 5	Highest attractiveness rating for the 4th figure (|||) (only significant comparing with 0 condition)
Dixson et al. - 2	2010	F, M	NZ: M = 20.1; USA: M = 20.7	185 NZ & 81 USA	New Zealand & USA	2x5 split plot	Body hair (5 levels from no trunk hair to pronounced hirsuteness)	Images of men's bodies (varying in hirsuteness)	Ratings from 0 to 5	0 (declining with every increase, for both nationalities)
Dixson & Rantala	2016	F	M = 27.24, SD = 8.21	3805	0.8% were African or African American, 4.0% were Asian, 82.7% of participants were European, 4.4 %were Hispanic/Latin/Latin or South American, 6.9 % were other, and 1.2 % elected not to answer.	4x2x3 Within	Use of hormonal contraceptives (yes vs. No), Relationship status (single, recently formed, long-term), Body Hair (very light, light, medium, heavy)	Images of men's bodies (varying in hirsuteness)	Forced choice from pairs	| (light body hair)
Valentova et al.	2017	F, M	Czech Rep.: M = 28.56, SD = 7.86; Brazil: M = 25.56, SD = 6.08	883 (417 Brazil)	Czech Republic and Brazil	5x2x2 split plot	Body hair (5 levels from no trunk hair to pronounced hirsuteness); Nationality (CR vs. BR), Sex (Heterosexual women, homosexual men)	Images of men's bodies (varying in hirsuteness)	Forced choice between in a group of images	Most preferred = | (in CR more preference for hair, since the 2nd most attractive was ||, and in Brazil was 0)
Prokop et al.	2013	F	Slovak: M = 19.50, SE = .11 ; Turkish: M = 19.67, SE = .11	155 (120 Slovak)	Slovakia & Turkey	2x2x2 split plot	Body hair (with vs. Without), nationality (Slovak vs. Turkish), conception risk (high vs. Low) -- controlling also for disgust sensitivity and PVD (perceived Vulnerability to diseases	Images of men's bodies (with or without hair)	Forced choice from pairs	0
Rantala, Pölkki & Rantala	2010	F	M = 34.5, SD = 13.6	299	Finland	2x4 split plot	Fertility (fertile phase of cycle, nonfertile phase of cycle, postmenopausal women, pregnant women), body hair (with, without)	Images of men's bodies (with or without hair)	Forced choice from pairs	Pre-menopausal women = 0 ; post menopausal women = |
Garza, Heredia & Cieślicka	2017	F	M = 23.15, SD = 5.65	155	USA (mexican america)	4x3 within	WCR (small (0.7), medium (0.8), and large (0.9)), Hair (face only, chest only, both, or none), Measured conceptive risk	images of a male (varying in WCR & hair presence)	Binary (yes/no) and rating from 1 to 6	All types of hair 2 times as likely to be attractive than both facial and chest hair; however, no significant main effect of hair.

Table for systematic review (Body Type)

Note 1. "A" means "Average" and "M" means "Mesomorph". Lower case "a" indicates moderate Average.

BACKPOSED

Study (authors)	Year	Sex of Participants (subjects)	Age of participants (years)	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	**Overall Preference** (white - not included in meta-analysis; dark - included in meta-analysis)
Dixson et al. - 1	2003	F	All: 60% of participants were aged between 21-30 years old. 25,5% were under 20 years old, 4,2% 31-40, 7,2% 40-50 and 3,2% > 50. (all sample)	275 (162 British)	UK & Sri Lanka	2x4	Somatotype (Ectomorph, Endomorph, Mesomorph and Average), Culture (UK, Sri Lanka)	Male figures (varying in somatotype)	Ratings from 0 to 5	(M)
Dixson et al. - 2	2003	F	All: 60% of participants were aged between 21-30 years old. 25,5% were under 20 years old, 4,2% 31-40, 7,2% 40-50 and 3,2% > 50. (all sample)	190	UK	Within	Morphed somatotypes (morphed between endomorph, ectomorph and mesomorph, n=9)	Male figures (varying in somatotype- morphed)	Ratings from 0 to 5	(M) More mesomorphy, more attractiveness
Dixson et al. - 3	2003	F	All: 60% of participants were aged between 21-30 years old. 25,5% were under 20 years old, 4,2% 31-40, 7,2% 40-50 and 3,2% > 50. (all sample)	333	UK	2x4x5 (split plot)	Somatotype (mesomorph, endomorph), WHR (0.7, 0.8, 0.9, 1.0), WSR (0.5, 0.6, 0.7, 0.8, 0.85)	Male figures (varying in somatotype, WSR and WHR)	Ratings from 0 to 5	(M) Preferred SWR of 0.8 in both somatotypes (although in endomorphic almost no preference - suggesting the mesomorphic somatotype is a mediator variable between SWR and attractiveness)
Dixson et al. - 5	2003	F	All: 60% of participants were aged between 21-30 years old. 25,5% were under 20 years old, 4,2% 31-40, 7,2% 40-50 and 3,2% > 50.	277	UK	2x2	Body hair (with vs. Without), somatotype (mesomorph vs. endomorph)	Drawings of men's bodies (varying in somatotype and hirsuteness)	Ratings from 0 to 5	(M)
Dixson et al. (American Journal of H. B.)	2007	F, M	68% of them were 20 years or less in age, and the remainder were aged 21–30 years	320 F	China	Within	Somatotype (Ectomorph, Endomorph, Mesomorph and Average)	Male figures (varying in somatotype)	Ratings from 0 to 5	(A)
Dixson et al. (Arch. Of Sex. Behav.) - 2	2007	F, M	<20 years old = 12%; 21–30 years = 35%; 31– 40 years = 32%; 41–50 years = 14%; >50 years = 7%	72 F	Cameroon	Within	Somatotype (Ectomorph, Endomorph, Mesomorph and Average)	Male figures (varying in somatotype)	Ratings from 0 to 5	(M) (a)
Dixson et al. - 2	2010	F, M	NZ: M = 20.1; USA: M = 20.7	185 NZ & 81 USA	New Zealand & USA	2x4 split plot	Somatotype (Ectomorph, Endomorph, Mesomorph and Average)	Male figures (varying in somatotype)	Ratings from 0 to 5	(M) (A)
Horvath	1981	F, M	-	178	Canada	2x2x3x2 split plot	Shoulder Width (2 measures), Chest muscularity emphasis (3 measures) & waist fat (absence or presence), sex of rater (m vs. F)	Male figures (varying in somatotype)	Ratings from 0 to 9	The presence of waist fat ("spare tire") had the most impact on women's rating on attractiveness - when it was present, less attractiveness
Frederick & Haselton - 1	2007	F	M = 20.44, SD = 3.59	141	USA	Within	Muscularity (muscular vs non muscular), Total body weight (large, medium or small), brawny (large, muscular), built (medium, muscular), toned (small, muscular), slender (small, nonmuscular), typical (medium, nonmuscular), and chubby (large, nonmuscular)	Male figures (varying in body weight and muscularity)	Ratings from 1 to 9	Most attractive was Built, followed immediately by Toned, and then Brawny

Frederick & Haselton - 2	2007	F	M = 18.79, SD = 1.40	286	USA	Within	Silhouettes of men (from slender and nonmuscular to slender and extremely muscular), rating context (ST, LT, general attractiveness)	Male silhouettes (varying in somatotype)	Ratings from 1 to 9	Inverted U hypothesis supported - attractiveness increases with muscularity, but low or high muscularity are less appealing to women -- best ST partner more muscular than best LT partner
Provost et al. - 1	2006	F	M = 18.79, SD = 0.73	40	Canada	5x4x2 split plot	Dimorphism (-40%, -20%, average, +20%, +40% masculinization), somatotype (back images of endomorph, ectomorph, mesomorph, and average), results of SOI (sociosexually restricted vs unrestricted)	Back images of male bodies (endomorph, ectomorph, mesomorph, and average)	Rating from 1 to 6	(M) Women with unrestricted Sociosexuality strongly preferred
Štěrbová et al.	2018	F, M	M = 25.66, SD = 4.76	769 F (412 (53.6%) women reported they were exclusively heterosexual, 303 (39.4%) mostly heterosexual, and 54 (7%) somewhat heterosexual)	-	25x2 split plot	Somatotype (25 different, constituted by different levels of Endo, Ecto and Meso-morphism), participants (heterossexual women vs homosexual men), Reported Somatotype of current partner, ideal partner, father when growing up and most recent sexual partner (instead of rating of attractiveness), also rated quality of relationship with father	Figures of male bodies (varying in level of Endo, Ecto and Meso-morphism)	Forced choice from 25 figures	(M) (A) Positive moderate correlation between actual parter and ideal one - chose combination of mesomorphy/ectomorphy somatotypes, leaving aside endomorphy.
Reeve, Kelly & Welling	2017	F	M = 19.65, SD =1.53	63	USA	3x25 (x2) x25 (x2) split plot	Condition (acceptance, neutral, rejection), stimuli (bodies vs faces), Bodies (muscle mass - from low to high - and Waist-to-Chest ratio - from low to high - in 5 increments), Faces (dimorfism - masculine or feminine -, and coloration - lighter to darker eyes, lips, and cheeks relative to skin tone - in 5 increments). There were other mate preference variables measured through a mate-preferences inventory (see Schwarz and Hassebrauck, 2012)	Images of male bodies (varying in WCR and muscle mass)	Choose 3 pictures from 25	No significant effect of any body characteristic
Durkee et al.	2019	F, M	M = 25.09, SD = 7.32	503	Spain	14x2 split plot	Muscles (trapezius, deltoids, pectoralis, biceps, abdominals, obliques, forearms, quadriceps, tibialis anterior, shoulders, latissimus dorsi, triceps, glutes, and calves), participants (male vs female vs trainers), muscle important for attractiveness (yes vs no), Muscle hard to build (yes vs no)	Image of highly muscled man (identifying each of the 14 muscles addressed)	Rating from 1 to 7 (not muscled to highy muscled)	Women reported preferring larger obliques, followed by glutes, abdominals, biceps, shoulders, triceps, calves, deltoids, quadriceps, pectoralis, latissimus dorsi, forearms, tibialis anterior, and trapezius; no difference in women's size preferences between upper- and lower-body muscles; women preferred muscles included in Factor 3 (harder to build) to be larger. Muscles in the upper body were more important for attractiveness.

Zarzycki et al.	2019	F, M	less than 50	4043 F	Poland	12x4x2 split plot (and other variables)	area of studies (humanities, social, medical, agricultural, natural sciences, technical, and artistic), place of residence prior to the beginning of studies (village, city up to 10,000 inhabitants, city 10,000–100,000 inhabitants, city 100,000–500,000 inhabitants, and city over 500,000 inhabitants), Muscularity scale (4 types of body), Muscle groups (12)	Images of bodies (4 types of muscularity, no stimuli for the 12 groups of muscles)	Rating from 0 to 4 (relevance of muscles to attractiveness)	The majority of women found type 2 the most attractive (between Mesomorph and Average) - and only less than half considered muscularity as a decisive factor for relationship
Beck, Ward-Hull & McLear	1976	F	undergraduate students	115	USA	15 x2 split plot	Sex of body (male vs female), stimuli (chest, buttocks, leg size - varying in size -2, -1, 0, 1, 2 - and proportionately large, moderate and small overall body), responses to personality and attitude scales	Silhouettes of male bodies (varying in chest, buttock or leg size dimensions, and on 3 overall dimensions)	Forced choice from pairs w/ strength of preference	Preference for moderate overall body dimensions (standard); Preferred the normal leg size (almost similar ratings for -1 and +1), the smallest buttocks (-2), and slightly smaller chest (-1)
Gitter, Lomranz & Saxe	1982	F, M	undergraduate students	102 F	USA & Israel	2x2x4x8 split plot	Head (held up vs. bent forward) and Shoulders (held straight back vs. slouched forward); Shape ("Atlas" us. "pillar"), Neck (thick vs. thin), and Abdomen (presence vs. absence of a protruding abdomen)), sex of participant (male vs female), nationality (USA vs Israeli), Rated participants' attractiveness (by interviewer)	Front and side views of male bodies (varying in head, shoulder positions and shape, neck and abdomen configuration)	Order 32 figures	Women showed virtually no difference in atlas (similar to mesomorph) and pillar shape (similar to average)
Maisey et al.	1999	F	M = 20.6, SD = 1.4	30	-	Regressions	Measured Waist-to-Chest Ratio (WCR), Waist-to-Hip Ratio (WHR) and Body Mass Index (BMI) - representing 1.7 SD deviation on either side of mean	Front views of male bodies (colour)	Only referred rating for attractiveness (no more details)	(M) WCR was the principal determinant of attractiveness - women preferred 'inverted triangle' shape (which is Mesomorphic)
Coy, Green & Price	2014	F	M = 34.50, Sd = 11.62	151	-	5(x3)x3 split	Rated physical, financial, and social dominance scales, perceived fitness and protection ability, relationship context (ST, LT and general attractiveness), WCR (0.72, 0.75, 0.77, 0.80, 0.83 - 3 images per ratio)	15 front-posed male avatars (varying in WCR)	Rating from 1 to 7	(M) Lower WCR = more attractive in all measures of attractiveness (which points to mesomorphic build)
Swami & Tovée	2005	F	Britain: M = 24.70, SD = 6.02; Kuala Lumpur: M = 24.43, SD = 5.32; Sabah: M = 24.67, SD = 4.88	95 (37 British, 30 Kuala lumpur, 28 Sabah	UK & Malasya	Regressions	Measured Waist-to-Chest Ratio (WCR), Waist-to-Hip Ratio (WHR) and Body Mass Index (BMI) - representing 1.7 SD deviation on either side of mean, participants (greek and british)	Front-view images of men	Rating from 1 to 9	WCR was the principal determinant of attractiveness in Urban population (British & Kuala lumpur) - preferring mesomorphic somatotype. For Sabahan population, Tubular body shape was most attractive and most important was BMI
Swami et al. (Journal of Soc. Psyc.)	2007	F	Greek: M = 25.90, SD = 5.30; British: M = 25.11, SD = 7.42	76 (40 Greek)	Greece & UK	Regressions	Measured Waist-to-Chest Ratio (WCR), Waist-to-Hip Ratio (WHR) and Body Mass Index (BMI) - representing 1.7 SD deviation on either side of mean, participants (greek and british)	Front-view images of men	Rating from 1 to 9	(M) WCR was the principal determinant of attractiveness - women preferred 'inverted triangle' shape, but greeks more than british (which is Mesomorphic)

Furnham & Radley	1989	F, M	M = 16.8, SD = 1.10	75 F	UK	2x2x12 split plot	Sex of participant (male vs female), sex of stimulus (male vs female), somatotype (extremely anorexic to extremely obese - in 12 increments), rating on several traits (16)	Front-view figures of men	Rating from 1 to 9	Highest attractiveness ratings for pictures in the middle (E, F ,G), G being the most attractive - it's in the 7h position in a 12 image gradient between anorexic and obese. (seems Average/mesomorphic somatotype)
Fan et al.	2005	F, M	age range: 20–30	23 F	China	Regressions	Measured Waist-to-Chest Ratio (WCR), Waist-to-Hip Ratio (WHR) and Body Mass Index (BMI), Volume to Height Index, and other ratios , sex of participant (male vs female)	3D wire-frame male body images (rotating 360 degress)	Rating from 1 to 9	WCR was the most powerful predictor of attractiveness (between WCR, BMI andWHR). But the best predictor overall was VHI
Honekopp et al.	2007	F	Attractiveness: M = 25.6, SD = 6.6; masculinity: M = 25.1, SD = 2.9	44 (27 attractiveness)	Germany	Regressions	Measured BMI, Hormonal levels, Physical Fitness score, Exercising (min/week), Smoking (cigarettes/d), Drug use, Number of sex partners, Number of extrapair copulations, Age at first sex, Rated masculinity, upper body v-shape	Photographs of male bodies (body front and body back)	Rating from 1 to 7	No relationship between attractiveness and upper body v-shape; there was a significant relationship with BMI
Lee et al. -1	2015	F, M	M = 23.62, SD = 6.43	238 F	80% from USA	5x5x2 split plot	Shoulder-to-hip ratio (+-1 or 2 inches to the width of the shoulders), WHR (+-1 or 2 inches to the width of the waist), sex of participants (male vs female), sex of stimuli (male vs female), Source bodies (5 that differed in normal range of BMI), results of Three domain disgust scale, and 1-item SES measure	Figures of front posed males (varying in SHR and BMI)	Rating from 1 to 100	(M) Women preferred men with higher SHR
Lee et al. -2	2015	F, M	M = 24.78, SD =7.20	124 F	80% from USA	5x2x2 split plot	Shoulder-to-hip ratio (+-1 inche to the width of the shoulders), WHR (+-1 inche to the width of the waist), sex of participants (male vs female), sex of stimuli (male vs female), Source bodies (5 that differed in normal range of BMI), results of Three domain disgust scale, and 1-item SES measure	Figures of front posed males (varying in SHR and BMI)	Forced choice from pairs w/ strength of preference (from 1 right much more attractive to 8 left much more attractive)	Women higher in pathogen disgust preferred higher SHR
Lucas et al.	2011	F	M = 20.1, SD = 1.4	95 Heterosexual	all group: Caucasian (61%), Asian American (19%), Mixed (11%), Latina (5%), and African American (3%)	4x7 within (for heterosexuals)	Body fat (thin - 1 - to heavy - 4), Muscularity (low - 1 - to high - 7), participants (heterosexual vs homosexual), relationship/rating context (ST, LT, Ideal man)	Figures of male bodies (varying in body fat and muscilarity)*not well described	Forced choice from 28 figures	Muscularity significantly more important in ST than LT. Ideal different from ST or LT selection. Greater preferences for fat in ST than ideal
Braun & Bryan	2006	F, M	All: M = 20.6, SD = 3.3	134 F	86% Caucasian, 5% Asian American, 3% Latino, 1% African American, and 5% ‘Other.’	2x2x3 within	Shoulder-to-waist ratio (0.56 vs 0.75), WHR (0.67 vs 0.81), Personality (high vs low agreeableness), rating context (date, ST, LT)	Photographs of male bodies (higher vs lower SWR	Rating from 1 to 7	for ST women preferred higher SWR. Agreeableness more important for women than men in all contexts. Agreeableness predicted women's preferences more strongly than body shape.
Garza, Heredia & Cieślicka	2017	F	M = 23.15, SD = 5.65	155	USA (mexican america)	4x3 within	WCR (small (0.7), medium (0.8), and large (0.9)), Hair (face only, chest only, both, or none), Measured conceptive risk	Images of a male (varying in WCR & hair presence)	Binary (yes/no) and rating from 1 to 6	Low WCR was rated as the most attractive

Price et al.	2013	F, M	M = 21.31, SD = 4.40	62	UK	Within	Measured WHR, WCR and VHI, relationship context (ST vs LT), measured Sociosexuality and self-perceived attractiveness	Videos of male bodies	Rating on a 100-mm scale	There was na optimal value of VHI - from which attractiveness decresed to both sides. And more attractiveness for lower WCR; with women with VHIs that are more attractive to men exhibiting stronger preferences for attractive male WCR
Lynch & Zellner	1999	F, M	Students: M = 19.11, range 18-20; adults: M = 45.22, range 34-58	101 (46 students)	USA	4x3 split plot (x '9' - continuum of muscularity)	Participants (female or male adults or students), Shape (a continuum with 9 male figure "landmarks" - one each 10 units, until 90 -, changing in musculature and consequent shape - from 0 to 100), rating context (most attractive for them, for other same-sex individuals, or opposite sex)	Figures of front-posed male bodies (varying in muscularity)	Forced choice from 11 figures	The mean rating for the students' ideal was of 60.55 - which corresponded to an individual a bit more muscular than average. The mean rating for adults was 58.55, thus slightly less muscular than the students' choices (however, both used the same figure -at 60 - to locate their preference. They did not differ significantly.

Table for systematic review (Height & LBR)

Study (authors)	Year	Sex of Participants (subjects)	Age of participants (years)	N	Nationality of Participants	Study Design	Independent Variables	Stimuli	Task (type of rating)	**Overall Preference** (white - not included in meta-analysis; dark - included in meta-analysis)
Sorokowski & Sorokowska	2012	F, M	M= 34.8, SD=7.6	53 F	Papua	2x6x5x5 split plot	Sexual Dimorphism in stature (SDS; 1.19, 1.14, 1.09, 1.04, 1.00, 0.96), sex of participant (male vs female), LBR (0.5, 0.475, 0.45 (average), 0.425, 0.40), WHR (0.60, 0.65, 0.70, 0.75, 0.80 - only women)	Silhouettes of opposite sex (couples, individuals varying in WHR or LBR)	Forced choice from the 6 (couples) or 5 images	Women's preferences did not differ significantly from chance. (slight preference for: 1.14, 1.09 and 1.00); post hoc test showed that women living in more remote villages (M=.45, SD=.03) preferred longer legged men than women living in Piliam (M=.43,SD= .03) (p<.05)
Sorokowski et al.	2012	F, M	M = 39.5, SD = 18.8	66 F	African	2x6 split plot	SDS (1.19, 1.14, 1.09, 1.04, 1.00, 0.96), Sex of participant (female vs male)	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 6 couples	Significant preference for 1.00 SDS (followed by 1.14); Women who chose the highest SDSs were shorter than others
Fink et al.	2007	F, M	all: M =26.34, SD = 9.11	646 F	Germany, Austria & UK	2x6x3 split plot	SDS (1.19, 1.14, 1.09, 1.04, 1.00, 0.96), Sex of participant (female vs male), Nationality (german, austrian, british), measured own height	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 6 couples	Height dependent preferences for SDS were found across the three countries (shorter women preferred higher SDS). The most selected pairs amongst women were 1.14 and 1.09
Pawlowski	2003	F, M	M = 25.1, SD = 6.9	363 F	Poland	2x6 split plot	SDS (1.19, 1.14, 1.09, 1.04, 1.00, 0.96), Sex of participant (female vs male), measured own height	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 6 couples	Height dependent preferences for SDS were found. The most selected pair was 1.09
Kordsmeyer	2018	F, M	video ratings, all: M = 24.1, SD = 6.1; body attractiveness, all: M = 22.9, SD = 5.7; voices, all: M = 19.7, SD = 4.0; faces, all: M = 27.3, SD = 8.8	80 (video), 21 (body), 30 (voices)	USA	Selection & mediation analyses and structural equation models	Measured levels of T, sexually dimorphic traits, SOI-R, mating successs (e.g. number of sexual partners), rated sexual attractiveness (female participants) and dominance (male participants)	Videos of males (as well as body, facial and vocal components separately)	Ratings from 1 to 7, 1 to 11	Positive selection under female choice was shown for body height in the selection analyses only; Pearson bivariate correlations show only relationshipps between sexual attractiveness and other attractiveness measures (vocal, body, face) or dominance measures - also with SOI-R and nr of partners
Sorokowski et al. - Tsimane	2015	F, M	of initial F group: M = 30.49, SD = 10.31	56 F	Bolivia	2x6 split plot	SDS (1.19, 1.14, 1.09, 1.04, 1.00, 0.96), Sex of participant (female vs male), measured own height	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 6 couples	The highest percentage of women chose a 1.00 SDS; no correlation between individual's height and SDS preference
Sorokowski et al. - Hazda	2015	F, M	55 initian women: M = 37.78, SD = 14.16	54 F	Tanzania	2x6 split plot	SDS (1.19, 1.14, 1.09, 1.04, 1.00, 0.96), Sex of participant (female vs male), measured own height	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 6 couples	The highest percentage of women chose a 1.19 SDS (the highest availible) and the least preferred was 1.09; no correlation between individual's height and SDS preference
Pawlowski & Jasienska	2005	F	M = 29.9, SD = 3.41	144 (110 measured & about which precise informatio n about cycle existed)	Poland	3x6x2 split plot	SDS (1.19, 1.14, 1.09, 1.04, 1.00, 0.96), Measured Height, BMI, WHR, Judgement context (in which SDS they would prefer to be in ST vs LT relationship, or just preferred), Cycle phase (luteal vs follicular)	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 6 couples	Women who chose the high SDS were shorter, on average, than women who chose low SDS; women who chose the average SDS were shorter than those women who chose the low SDS; women who were more prone to choose high SDS were relatively more often in their potentially fertile cycle phase (13 versus 11) than those who chose low SDS (8 versus 25); also: for short-term relationships women tended to prefer higher SDS and, therefore, taller partners than for the long-term relationship (but 50% of women didn't change their choice)
Courtiol et al.	2010	F, M	M = 27.4, SD = 6.9	95 F	France	2*x2 split plot	Height (silhouttes of opposite gender that differed only in height), sex of participant (male vs female)	Silhouettes of male bodies	Forced choice from pairs	Women demonstrated preferences for the tallest stimuli (women prefer a man who's tall above average); confirmed male taller norm rule. Preference for partner's height correlated with own height; when the judge's height increases, preferred dimorphism decreases in females
Shepperd & Strathman - photograph ratings	1989	F, M	students	60 F	USA	2x3 split plot	Height (picture of a male and female in which male was pictured 5" taller, same height, or 5" shorter), reported information on date preference and dating frequency, as well as self-reported information about past dates and height of partners	Photograph of male and female interacting (varying in size of male)	Rating from 1 to 9	When the male was taller, he was rated as more attractive

Ludwig & Pollet - 1	2014	F	M = 20.49, SD = 3.14	104	Eighty-seven participants (84%) were Dutch, five Moroccan (5%), five Turkish (5%), and seven other (6%)	3x3x6 split plot	Target (small - 90% of medium -, medium, large - 110% of medium), distractors (small - 90% of medium -, medium, large - 110% of medium), also: estimation of size of target, height, relationship status, self-perceived attractiveness, self-identified body type, ideal partner height	Images of 3 males (1 target and 2 distractors, varying in size)	Rating from 1 to 7	The medium target was judged as much less attractive when sorrounded by large distractors, being rated also as shorter, less dominant and less muscular in that condition. Higher appraisals of height = higher appraisals of attractiveness; The large target was judged the most attractive next to medium distractors; small distractor significantly more attractive next to small or medium distractors, compared with large distractors - fully mediated by height
Ludwig & Pollet - 2	2014	F	M = 20.99, SD = 2.28	80	Sixty-four participants (80%) were Dutch, three Greek (4%), and 13 other (16%)	3(x2)x6 split plot	distractors (small - 90% of medium -, medium, large - 110% of medium), also: estimation of size of target, height, relationship status, self-perceived attractiveness, self-identified body type, ideal partner height	Images of 3 males (1 target and 2 distractors varying in size)	Rating from 1 to 7	All conditions reveiled significant different height, dominance and muscularity; Target judged significantly less atractive when sorrounded by larger distractors, compared to medium or small; appraisal of attractiveness between larger and small was fully mediated by height, and between larger and medium was partially mediated.
Varella Valentova et al.	2016	F, M	all: range = 18 - 50	853 HtF	Brazil & Czech Republic	4x9 split plot	SDS (9 different, couple of equal hight in the center, and to each side 4 pictures, reducing in SDS to the right and augmenting to the left), Participants (Ht males, Ht females, hm males, hm females), Description of current partner	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 9 couples	Ht women described their partners as taller than themselves; none of the Ht-women (Fig. 2a) chose drawings that depicted women with shorter male partners; 1.1% (n = 8) preferred a man of the same height; and a vast majority (98.9%, n=303) of Ht-women preferred a man taller than themselves;
Sorokowski, Sabiniewicz & Sorokowska - 1	2015	F, M	M = 20.8, SD = 2.2	110 F	Poland	2x12 split plot	results of the Ray Directiveness Scale, SDS (changing in increments of more or less 0,02, from 0.96 to 1.21 - 12 increments)	Silhouettes of opposite sex couples (varying in SDS)	Forced choice from 12 couples	highest proportion of women indicated 1.09 (population average) as their preferred SDS; 2nd most preferred was 1.15; equal numbers of women (lower than the previous) preferred 1.19 and 1.17; NONE of the women preferred pictures in which the woman was slightly taller than the man; Less dominant women prefer taller men, and dominant women prefer shorter men
Versluys, Foley & Skylark - 1	2018	F	M = 39.02, SD = 12.78	341	79.8% of whom identified as White (i.e. White American or White Other), 8.5% as Black (i.e. Black/African American or Black Other), 6.7% as Asian and 5.0% as any other ethnicity	5x5x3 split plot (split by IR)	ABRs (−3, −2, 0, +2and +3 s.d. from baseline), LBRs (−3, −2, 0, +2and +3 s.d. from baseline), Intra-limb ratios - IRs (−3, 0 or + 3 s.d. from baseline)	Figures of male bodies (varying in ABR, LBR and IR)	Rating from 1 to 7	Main effect of LBR - preferred slightly above baseline (Ratio=0.50, 0,5 SD above population mean). However, no effects of other ratios - and no indication of the modulation of any of the ratios by the others.
Versluys, Foley & Skylark - 2	2018	F	M = 34.48, SD = 9.90	253	White (83.0%); Black (7.5%); Asian (4.7%); all others (4.7%)	7x3 split plot	ABRs (−3, −2, −1, 0, +1, +2or +3 s.d. from the baseline), LBRs (−3, −2, −1, 0, +1, +2or +3 s.d. from the baseline), Intra-limb ratios - IRs (−3, −2, −1, 0, +1, +2or +3 s.d. from the baseline)	Figures of male bodies (varying in ABR, LBR and IR)	Rating from 1 to 7	Estimated optimum LBR is 0.34 s.d. above the baseline; no effects of ABR, and peak attractiveness of IR in baseline ratio.
Versluys & Skylark - 1 & 2 combined	2017	F	study 1: M = 36.4, SD = 10.4; study 2: M = 37.8, SD = 11.6	186 (74 study 1)	White American (67.6%); White other (2.7%), Black/African American (14.9%), Asian (10.8%), Hispanic (2.7%), other (2.7%)	4x7 within	LBRs (0.447, 0.462, 0.477, 0.491, 0.506, 0.521 and 0.535), Image format (white, black, grey and silhouettes)	Figures of male bodies (varying in LBR and image format)	Rating from 1 to 7	Format of image (stimuli) alters preference for LBR (realistic vs silhouettes). In the most realistic images, the most attractive LBR was 0,5 SDs above the mean of the population - either in black, grey or white images
Kiire	2016	F, M	M = 18.9, SD = 0.95	40 F	Japan	11x2x2 split plot	LBRs (altered from average 100%, from 90% in steps of 2% until 110%), sex of rater (female vs male), sex of stimulus (female vs male), rated (‘‘attractiveness,’’‘‘healthiness,’’‘‘sexiness,’’‘‘youthfulness,’’‘‘popularity,’’‘‘desirability to go out with,’’‘‘desire to have a sexual relationship with,’’ and ‘‘desire to marry")	Figures of male bodies (varying in LBR)	Rating from 1 to 7	The most attractive LBR was the average (100%) (taken from table 1)

APPENDICES 3 - FIGURES

Figure Index

Note: in **bold** are all the figures included in the main text. All the rest are presented here, below.

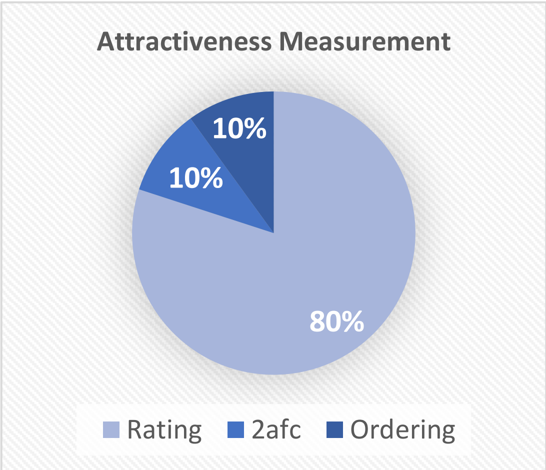


Fig. 3. Types of attractiveness measurement and their prevalence.

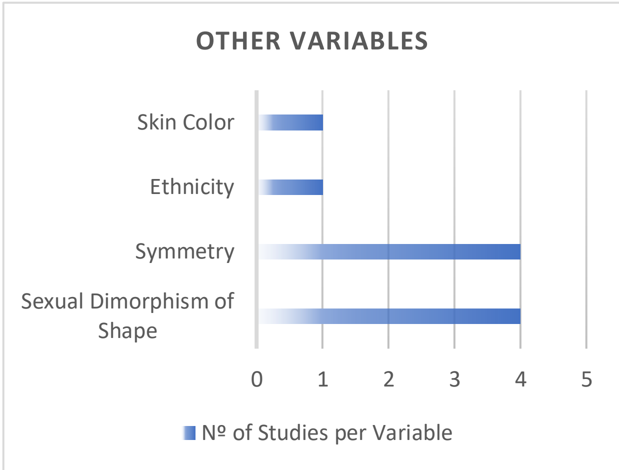


Fig. 4. Other variables present in the averageness studies and the number of studies in which they appeared.

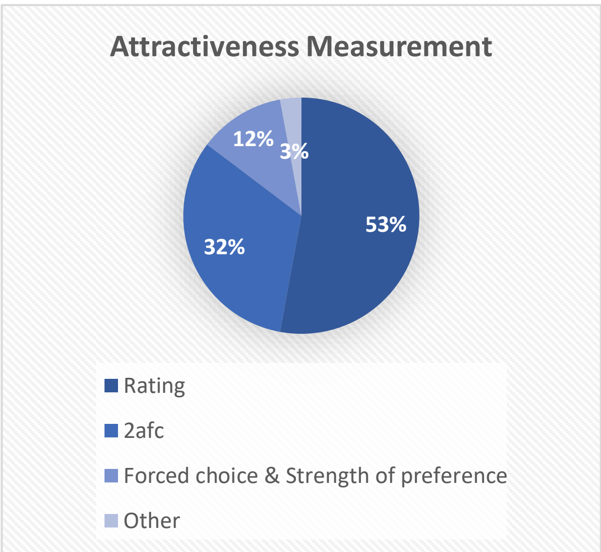


Fig. 7. Types of attractiveness measurement and their prevalence.

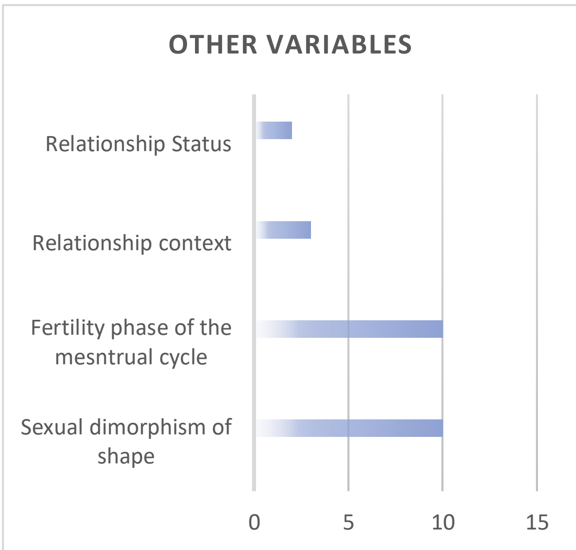


Fig. 8. Other variables present in the symmetry studies and the number of studies in which they appeared.

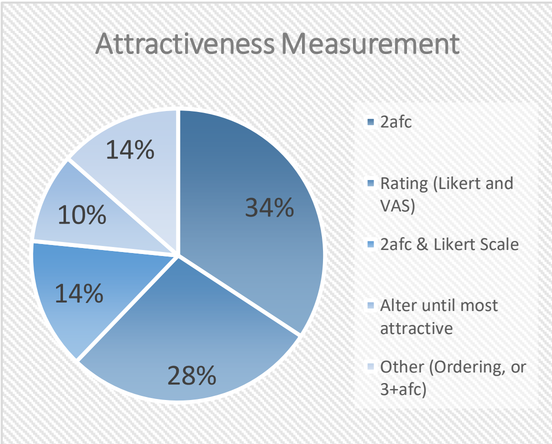


Fig. 10. Types of attractiveness measurement and their prevalence.

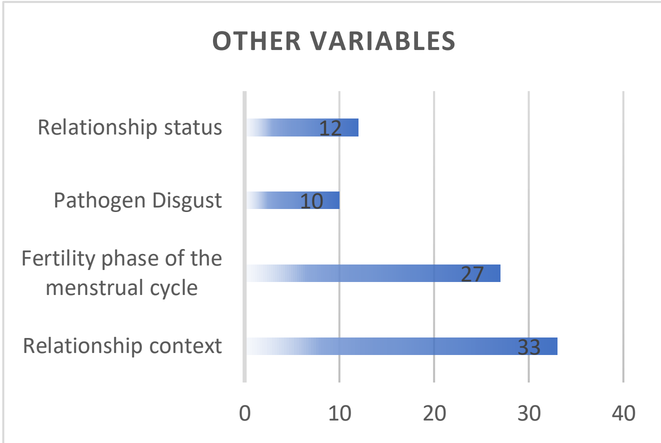


Fig. 11. Other variables present in the sexual dimorphism of face shape studies and the number of studies in which they appeared.

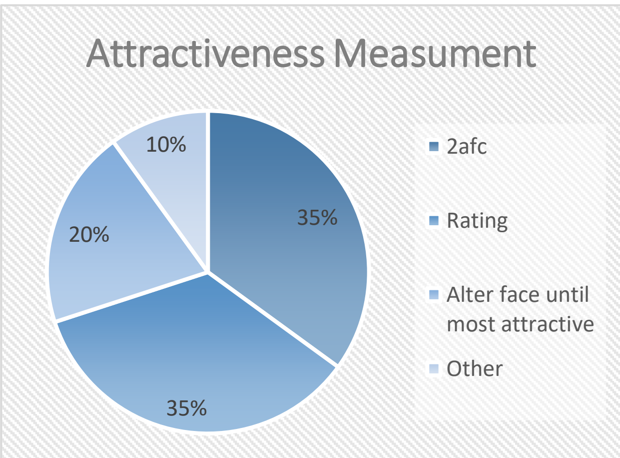


Fig. 12. Types of attractiveness measurement and their prevalence.

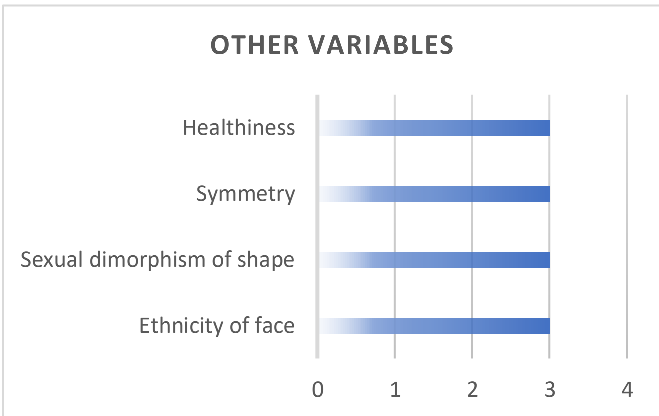


Fig. 13. Other variables present in the skin color studies and the number of studies in which they appeared.

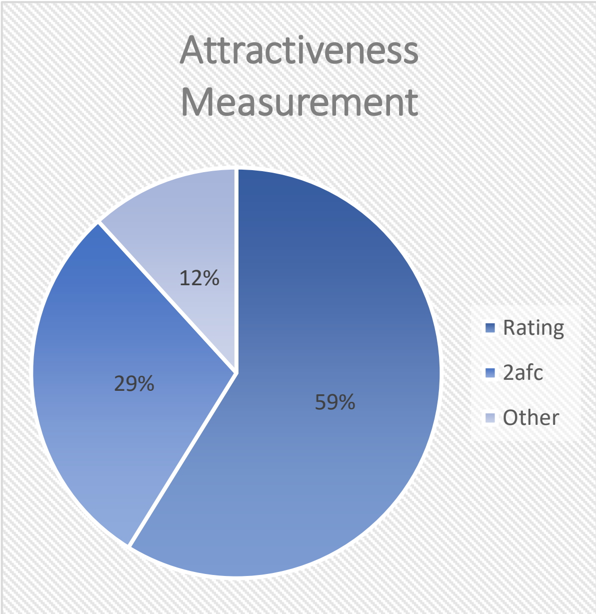


Fig. 14. Types of attractiveness measurement and their prevalence.

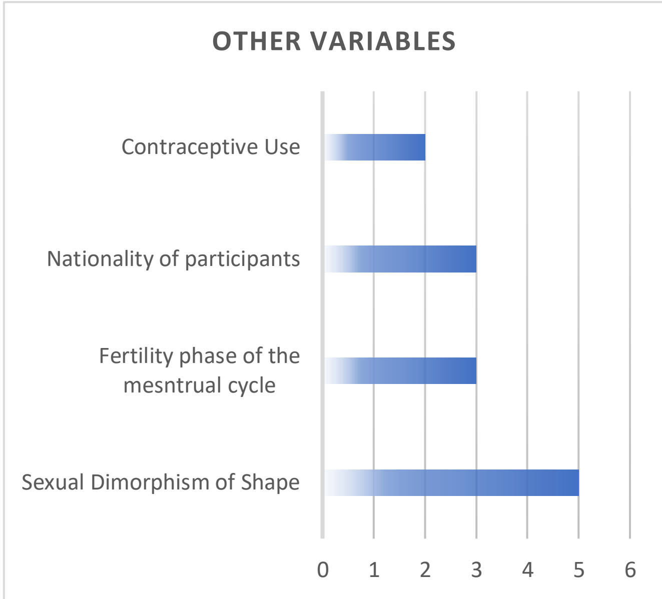


Fig. 15. Other variables present in the facial hair studies and the number of studies in which they appeared.

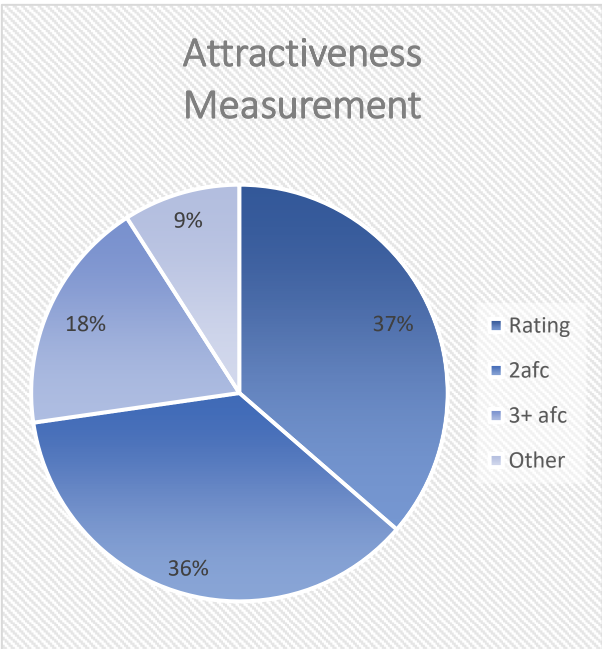


Fig. 16. Types of attractiveness measurement and their prevalence.

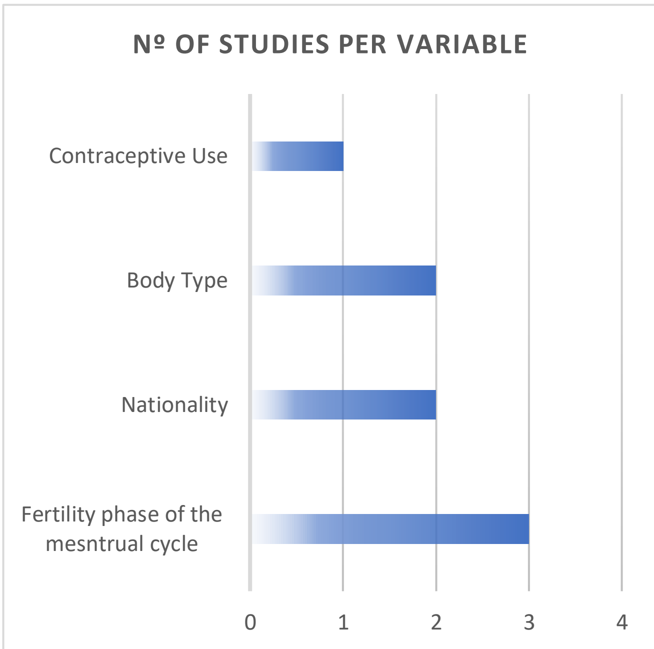


Fig. 17. Other variables present in the body hair studies and the number of studies in which they appeared.

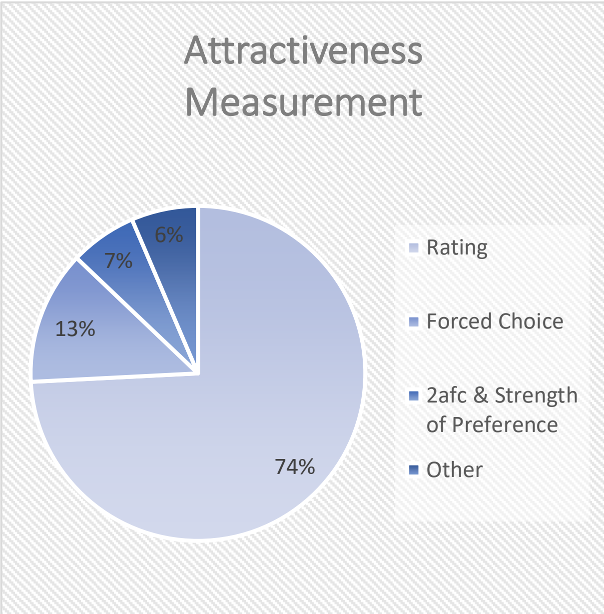


Fig. 19. Types of attractiveness measurement and their prevalence.

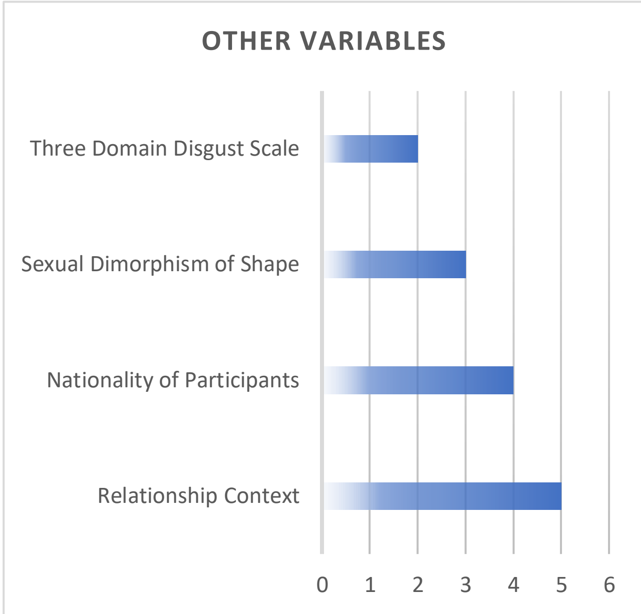


Fig. 20. Other variables present in the body type studies and the number of studies in which they appeared.

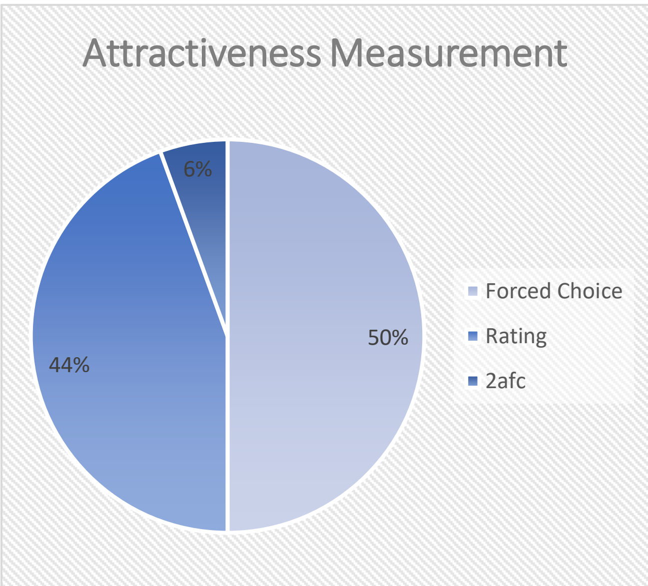


Fig. 22. Types of attractiveness measurement and their prevalence.

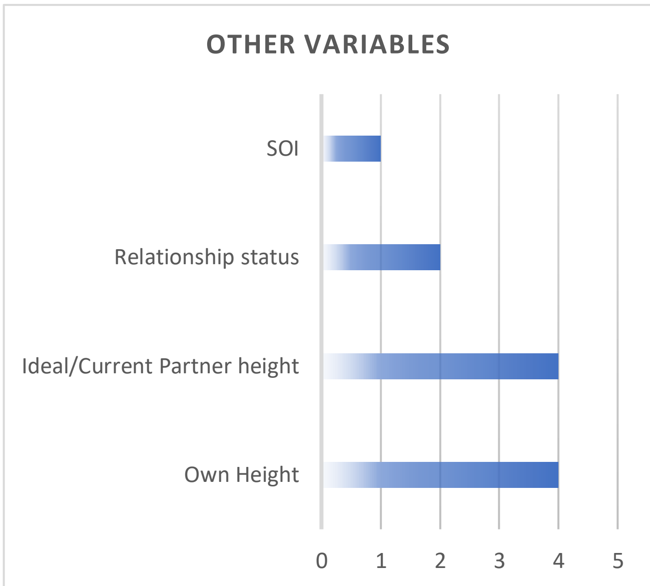


Fig. 23. Other variables present in the height studies and the number of studies in which they appeared.