Age Moderates Contrast Effects in Women’s Judgments of Facial Attractiveness

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Physical attractiveness is an important individual characteristic in most social situations. Contrast effects occur when the perceived attractiveness of an individual is lower in the context of highly attractive others or vice versa. We used mate-selection theory to predict the effects of raters’ age and age of rated faces on contrast effects in women’s attractiveness judgments. Younger (18–27 years) and older (50+ years) women rated the attractiveness of an average-looking younger or older female or younger or older male target person, after having rated a series of 5 other photos that were either highly attractive or average looking. Strong contrast effects were found for younger women rating images of younger men and women, and for older women rating images of older men, such that the same target face was rated more attractive when the context images were average looking than when they were highly attractive. Weak or nonsignificant contrast effects were found among younger women rating images of older men and older women, and among older women rating images of younger men. Contrary to predictions, no contrast effects were found for older women rating images of either younger or older women. The overall pattern of findings suggests that the salience of physical attractiveness cues may vary functionally between younger and older women and emphasizes the importance of motivational influences on evaluative processes.

Keywords: attractiveness, contrast effects, aging, mate-selection, social judgments

Around the world, physical attractiveness is a highly valued attribute (Patzer, 2006), leading to better outcomes in many important social realms for individuals who are judged attractive (Dion, Berscheid, & Walster, 1972; Eagly, Ashmore, Makhijani, & Longo, 1991; Langlois et al., 2000). As with other social judgments, however, attractiveness ratings are comparative in nature, and are made relative to a specific context (Mussweiler, 2003). That is, internal reference points are not static, but are subject to selection and alteration depending on the cognitive accessibility and salience of relevant information (Kahneman & Miller, 1986). Thus, although social norms of attractiveness are powerful, it is important to bear in mind that other social or environmental cues may influence the criteria used to make attractiveness appraisals. Further, the influence of these cues may wax or wane in relation to the motivations of the perceiver (Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010).

In the current study, we investigated the potential occurrence of such functional patterns in contrast effects on women’s ratings of the physical attractiveness of others. Although contrast effects on ratings of others’ physical attractiveness have been reliably reported in several studies using young participants rating young faces; no study to date has tested whether contrast effects occur among older participants rating young faces, or when younger or older participants rate older faces. We surmise that age-related variations in the occurrence or strength of contrast effects may arise from normal changes in reproductive status and motivation. If so, this would further support the potential for motivational states to influence basic cognitive...
processes across a range of ages and add to the literature on social cognition in older adults.

**Contrast Effects and Perceptions of Physical Attractiveness**

Contrast effects are observed when judgments of moderate stimuli in a group are displaced away from judgments of extreme stimuli. For example, a five-pound weight will be judged heavier after first lifting a one-pound weight than after first lifting a 10-pound weight (Helson, 1971). Effects of this nature have been reliably demonstrated for ratings of physical attractiveness, such that the face of a moderately attractive person is rated less attractive when raters have been first exposed to a group of highly attractive peers than when they are first exposed to moderately attractive or unattractive peers (Kernis & Wheeler, 1981; Melamed & Moss, 1975; Wedell, Parducci, & Geiselman, 1987). The same effect has been found when the attractive stimuli are photographs of beautiful models (Kenrick & Gutierrezes, 1980) or centerfolds (Kenrick, Gutierrezes, & Goldberg, 1989) rather than peers. Women’s self-perceived attractiveness also is susceptible to contrast effects (e.g., Gutierrezes, Kenrick, & Partch, 1999), as is their body image (Wade & Aetz, 1997).

It therefore appears that an individual rater’s criteria for physical attractiveness can be altered in the moment, depending on the attractiveness of recently perceived exemplars. The extent to which these internal standards can be shifted may depend both on rater characteristics and on the salience of contextual information (Mussweiler, 2003). As a result, the magnitude of contrast effects in facial attractiveness judgments may serve as an implicit indicator of the degree to which individuals are attending to attractiveness cues and placing importance on attractiveness-related information about other individuals. Further, previous studies have suggested that such basic cognitive mechanisms may be modulated by fundamental motivations such as mating or self-protection (Kenrick et al., 2010). For example, women’s allocation of attention to attractive faces has been functionally related to their relationship status and commitment (Maner et al., 2003) and to their relative risk of conception (Anderson et al., 2010). The current study is the first to test the notion that the comparison and evaluation processes underlying the contrast effect may be similarly affected by motivational states.

**Motivation-Related Influences on the Salience of Physical Attractiveness**

Although physical attractiveness clearly is important in most social contexts, it is arguably most salient to individuals who are seeking romantic partners, and research confirms that attractiveness is highly influential in the initiation of romantic relationships (Lee, Loewenstein, Ariely, Hong, & Young, 2008). As with many other animals, humans evaluate the desirability of potential mates based to a large extent on their appearance, and there is broad cross-cultural consensus on the attractiveness of many features (Little, Jones, & DeBruine, 2011). Aspects of facial attractiveness among men have been linked to higher genetic quality that may enhance the reproductive success of female partners by, for example, conferring better pathogen resistance on their children (Thornhill & Gangestad, 1999; but see Weeden & Sabini, 2005). A number of attractive female facial features are linked to youth (Grammer, Fink, Möller, & Thornhill, 2003) and higher estrogen levels (Law Smith et al., 2005), and may therefore signal higher fertility (Ellison, 1991).

Both men and women compete intrasexually to attract and retain desirable mates. Women in particular are likely to compete in the realm of physical attractiveness (Buss, 1988). It therefore follows that young adults at or near their peak reproductive age should be acutely attuned to the relative attractiveness of both potential mates and potential competitors in the relevant population. On the other hand, older adults who are unlikely or unable to reproduce may be expected to place less importance on attractiveness. If contrast effects reflect the salience of attractiveness cues, and the salience of such cues is highest when mate selection is most important, such effects might be expected to be strongest among young adults rating other individuals within the relevant age range for mates and potential competitors. Prior research has demonstrated reliable contrast effects under these conditions (e.g., Kenrick & Gutierrezes, 1980). However, interesting questions remain regarding how the age of both the perceivers and the perceived may influence contrast effects.
in physical attractiveness ratings. In the current study, we examined the influence of age on contrast effects in women’s attractiveness ratings of male and female facial images, by asking both younger and older women to rate the attractiveness of both younger (mid-20s) and older (mid-50s) faces. We chose to study women primarily because female reproductive capacity declines steeply and ends at midlife, providing an ideal opportunity to investigate how contrast effects might vary according to reproductive motivation.

Predictions

Previous research suggests that young women prefer to mate with men who are only 2 to 3 years older (Buss, 1989). Higher likelihood of health and fertility, lower mortality rate, and cohort-based similarities in cultural experience and perspective all may contribute to this preference (Kenrick & Keefe, 1992). We therefore expected contrast effects to be strongest among young women rating images of young men. Because men remain fertile and may accrue more resources with increasing age, older men also may be viewed as viable mates by younger women, leading us to predict weaker, but still significant, contrast effects among young women rating images of older men.

Although older women remain interested in romantic partnerships (Alterovitz & Mendelsohn, 2009; Sassler, 2010), those who are past reproductive age should not be concerned about potential genetic contributions to offspring. Older women may therefore prefer older men over younger men, both for the quality of their companionship (e.g., shared generational perspectives and overall greater life experience) and for their greater likelihood of possessing significant resources. Although lack of concern about men’s genetic contribution to offspring might in turn lead to reduced attention to their physical attractiveness, we expect that older men’s attractiveness would still be relevant to older women due to its real and perceived associations with health (Grammer, Fink, Möller, & Thornhill, 2003), social competence (Eagly et al., 1991), and access to resources (Hamermesh, 2011). These considerations led us to expect significant contrast effects for older women rating images of older men, but weaker or non-significant effects for older women rating images of young men.

With regard to competitors, evolutionary theorists suggest that for men of all ages, young women are more desirable mates than older women because they are more fertile (Buss, 1989; Kenrick & Keefe, 1992). In addition, the social value placed on youth, particularly for women (Kite, Stockdale, Whitley, & Johnson, 2005), makes it unlikely that younger women would view older women as strong competitors for mates. We therefore predicted strong contrast effects among young women rating images of other young women, but nonsignificant effects for young women rating images of older women. On the other hand, older women may reasonably consider both younger and older women to be competitors, leading us to predict significant contrast effects for older women rating images of both young and older women.

Method

Participants

A total of 461 women participated. The younger group comprised 317 college students and ranged in age from 18 to 27 years ($M = 19.8$ years, $SD = 2.2$). This age group was chosen to represent women near peak reproductive age (Soules et al., 2001). They received credit toward a course requirement in exchange for participation. The older group comprised 144 volunteers recruited from university staff, community centers, churches, and retirement homes, who were not compensated. They ranged in age from 50 to 97 years ($M = 72.8$ years, $SD = 12.3$). This group was chosen to represent a wide age range of postreproductive women (Soules et al., 2001). All participants were European American. The study was approved by the institutional review board of Arizona State University.

Materials

Stimulus photographs. We selected 288 photographs of men and women from modeling agencies, magazines, and yearbooks, all of which depicted European Americans without glasses. The photographs were rated for perceived age and attractiveness by 83 raters ranging in age from 20 to 76 years. Attractiveness
was rated using a scale ranging from 0 (not at all attractive) to 6 (extremely attractive); perceived age was open-ended. We categorized images as younger (M perceived age 18–27 years) or older (M perceived age over 50 years), excluding those in between. Based on mean attractiveness ratings, we selected five photographs each of highly attractive older men and women (attractiveness, M = 3.72, SD = 1.32 for men; M = 4.16, SD = 1.13 for women) and highly attractive younger men and women (M = 4.70, SD = 0.91 for men; M = 5.13, SD = 0.92 for women) and five each of moderately attractive older men and women (M = 1.93, SD = 1.19 for men; M = 2.48, SD = 1.16 for women) and moderately attractive younger men and women (M = 2.51, SD = 1.16 for men; M = 2.17, SD = 1.18 for women), giving us 40 context images. Perceived ages for these eight groups of photographs were as follows: highly attractive older men and women (M = 58.5, SD = 7.7) and M = 54.9, SD = 6.3, respectively), highly attractive younger men and women (M = 24.3, SD = 2.8 and M = 23.2, SD = 4.1, respectively), moderately attractive older men and women (M = 59.6, SD = 6.3 and M = 56.7, SD = 6.0, respectively), and moderately attractive younger men and women (M = 24.5, SD = 3.6 and M = 25.7, SD = 6.1, respectively). Four additional photographs (older man, older woman, younger man, younger woman) were selected from the moderate attractiveness group to serve as target images (attractiveness M = 2.24, SD = 1.43; M = 2.52, SD = 1.35; M = 2.55, SD = 1.01; and M = 2.14, SD = 1.21, respectively; age M = 58.7, SD = 6.6; M = 58.9, SD = 6.5; M = 24.3, SD = 3.9; and M = 27.7, SD = 5.4, respectively). Because the majority of the photos selected were black and white photos from modeling agencies, all photos were converted into black and white slide images.

Other materials. Rating scales comprised 14 characteristics, including the dependent variable: physical attractiveness. The other items were used to support the cover story, which was that the experiment was intended to determine how people form first impressions. The scales included both positive and negative dimensions of the 14 descriptors such as “physically attractive” and “physically unattractive,” “warm” and “cold.” Each item was rated on a 7-point scale ranging from 0 (not at all) to 6 (extremely). A demographic questionnaire included age, gender, relationship status, and years of education.

Procedure

Participants were run in groups of two to 10, which were randomly assigned to context-attractiveness, photo age, and photo gender conditions. After informed consent, the experimenter explained in detail the cover story, questionnaires, and rating procedure. Participants were then shown the six slide images, one at a time. Each slide was viewed and rated for 2½ min, images were always presented in the same order, and the target image was always shown last. Pilot data collected prior to the beginning of the study suggested that some of the older participants needed this amount of time to complete the questionnaires. Participants were asked not to converse during the presentation and to make independent ratings. After the ratings, participants completed the other questionnaires and then were debriefed.

Results

Preliminary Analyses

To confirm that the two sets of context images were perceived as different in physical attractiveness by the current participants, we conducted a 2 (high vs. moderate context-attractiveness; between-subjects) × 5 (individual image; within-subjects) mixed analysis of variance (ANOVA) on the attractiveness ratings of the context images. The main effects of context-attractiveness were significant, F(1, 442) = 210.34, p < .001, η² = .32. The high context-attractiveness images were rated as more physically attractive (M = 3.48, SE = 0.08 and M = 1.86, SE = 0.08, respectively) than the moderate context-attractiveness images. The individual image factor was marginally significant, indicating that images within each context-attractiveness condition differed somewhat in rated attractiveness; however, post hoc tests found that each successive image in the high context-attractiveness condition was rated as more attractive than the corresponding successive image in the moderate context-attractiveness condition, ps < .001.

As an indicator of relationship status, we computed a variable to reflect single (single,
divorced, widowed) versus partnered (steady dating or living with significant other, married) condition. Relationship status did not differ between younger and older participants, $\chi^2(1) = 0.01, p = .920$.

**Contrast Effects in Attractiveness Ratings: Predictions**

We analyzed male and female target image attractiveness ratings separately. Initial ANOVA models included attractiveness of the context photos (high vs. moderate), photo age group (younger vs. older), participant age group (younger vs. older), and participant relationship status (single vs. partnered), plus all interactions with the context-attractiveness variable. Relationship status did not contribute to any significant effect, so it was dropped. No two-way interactions were significant, $F$s < 2.00. The three-way interaction, however, was significant for physical attractiveness ratings of both male and female images, $F(2, 250) = 7.71, p = .001, \eta^2 = .06$, and $F(2, 193) = 6.70, p = .001, \eta^2 = .07$, respectively. Simple effects tests (with Bonferroni corrections) of the differences between the two context-attractiveness conditions in ratings of the target image were used to probe these interactions and test the predictions.

The first prediction was that contrast effects would be relatively strong among young women rating both younger male and younger female images. Simple effects tests supported this prediction, revealing strong contrast effects among young women rating both young male images, $F(1, 250) = 13.03, p < .001, \eta^2 = .05$, and young female images, $F(1, 193) = 13.28, p < .001, \eta^2 = .06$ (see Table 1 for means). These findings are similar to previously documented contrast effects on physical attractiveness ratings of young female images made by young female participants (e.g., Kenrick & Gutierres, 1980), and extend that effect to ratings of young male images.

We next predicted a weaker but still significant contrast effect among younger women viewing older male images. In this case, the simple effects test approached significance, $F(1, 250) = 3.75, p = .054, \eta^2 = .02$. We expected young women rating older female images to show no contrast effect. This contrast was marginally significant, $F(1, 193) = 2.91, p = .090, \eta^2 = .01$. For older participants, we predicted a significant contrast effect for rating images of older men. A simple effects test supported this prediction, $F(1, 250) = 7.53, p = .007, \eta^2 = .03$. We predicted weaker effects for older women rating images of younger men. This prediction also was supported, as this simple effect was only marginally significant, $F(1, 250) = 2.86, p = .092, \eta^2 = .01$. We also expected to find significant contrast effects for older women rat-

### Table 1

*Means and Standard Errors for Physical Attractiveness Ratings by Age of Rater, Age of Photo, and Gender of Photo*

<table>
<thead>
<tr>
<th>Rater and photo condition</th>
<th>High context-attractiveness</th>
<th>Moderate context-attractiveness</th>
<th>$p_{\text{diff}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SE$</td>
<td>$M$</td>
</tr>
<tr>
<td>Younger raters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Younger female photos</td>
<td>1.35</td>
<td>.22</td>
<td>2.52</td>
</tr>
<tr>
<td>Older female photos</td>
<td>1.23</td>
<td>.24</td>
<td>1.82</td>
</tr>
<tr>
<td>Younger male photos</td>
<td>1.60</td>
<td>.26</td>
<td>2.80</td>
</tr>
<tr>
<td>Older male photos</td>
<td>0.83</td>
<td>.19</td>
<td>1.35</td>
</tr>
<tr>
<td>Older raters</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Younger female photos</td>
<td>2.12</td>
<td>.32</td>
<td>2.50</td>
</tr>
<tr>
<td>Older female photos</td>
<td>3.26</td>
<td>.27</td>
<td>3.52</td>
</tr>
<tr>
<td>Younger male photos</td>
<td>2.11</td>
<td>.34</td>
<td>2.94</td>
</tr>
<tr>
<td>Older male photos</td>
<td>2.22</td>
<td>.34</td>
<td>3.56</td>
</tr>
</tbody>
</table>

*Note.* $p_{\text{diff}}$ = significance (two-tailed) of the difference in target photo attractiveness ratings between context-attractiveness conditions (i.e., the contrast effect). $n$ for younger raters = 317; $n$ for older raters = 144.
ing both younger and older female images. These predictions were not supported, as both simple effects were nonsignificant; for younger female images, $F(1, 193) = 0.53, p = .466, \eta^2 = .00$, for older female images, $F(1, 193) = 0.47, p = .495, \eta^2 = .00$.

**Discussion**

The current study is the first to explore the effects of age on contrast effects in perceptions of physical attractiveness. Both younger and older women showed contrast effects in attractiveness judgments of facial photographs, but in functionally different ways. The pattern of findings largely supported our predictions, suggesting that as with other cognitive and attentional phenomena, contrast effects may be sensitive to motivation-related influences. As we expected, both younger and older women showed significant contrast effects in physical attractiveness ratings when viewing age-congruent male photographs. This suggests that attractiveness information about age-congruent men was salient to both groups and influenced their judgments of the target photos. The effect was slightly weaker for older than for younger raters, perhaps reflecting less attunement to a potential partner's physical attractiveness when genetic contributions to offspring are not a consideration. The contrast effect shown by younger women rating images of older men was somewhat smaller than we predicted, but nevertheless suggested that the images had some effect on young women's standards of comparison. We also reasoned that despite their postreproductive status, older women would remain interested in male companionship and resources, for which they would likely prefer older men. We therefore predicted that the contrast effect would be weak or nonsignificant when older women rated younger men. This prediction was also supported.

Congruent with the notion that women would attend more strongly to the attractiveness of other women if they were concerned with finding or retaining partners, we found strong contrast effects for young women rating photographs of other young women. We also found only a weak effect among young women rating images of older women, who are likely not viable competitors for mates. Contrary to expectation, however, we also found no significant contrast effect in attractiveness ratings among older women judging images of younger women, who should be viewed as competitors for male partners. Nor did we find contrast effects in older women's ratings of other older women. Given the demographic shortage of available older men compared to older women (U.S. Department of Health & Human Services, Administration on Aging, 2013), these last findings were surprising. We had reasoned that because older women want companionship and security even without a strong reproductive motive (Sassler, 2010), they would continue to view other women as rivals, and therefore would remain attuned to their attractiveness.

The results for older participants suggest that although older women are still interested in men as partners, their perception of other women as competitors may be diminished, or the physical attractiveness of potential competitors may simply become less salient in later life. These effects may be partially explained by hormonal or other changes that accompany menopause. Previous research has indicated that after menopause, women are less motivated to derogate the appearance of other women (Jones, Vukovic, Little, Roberts, & DeBruine, 2011; Vukovic et al., 2009). Given that derogation of other women has been conceptualized as a form of intrasexual mate competition (Buss & Dedden, 1990), this finding suggests a reduction in competitive motivation. Further, Hawkes, O'Connell, Jones, Alvarez, and Charnov (1998) suggested that across evolutionary history, it was adaptive for postmenopausal women to turn their attention to provisioning, socializing, and otherwise caring for their grandchildren. These activities may further promote a shift from competition to cooperation with other women, which may in turn lessen attention to their physical attractiveness. We speculate that the absence of contrast effects in older participants when rating other women may result in part from such a change in perspective.

Sociocultural factors also may influence contrast effects in ratings of attractiveness. For example, another potential explanation for the absence of a contrast effect for older women rating other women involves coping mechanisms that they may employ as they age. Norms of physical attractiveness dictate that all else being equal, attractiveness wanes as age increases (Teuscher & Teuscher, 2007), particularly for...
women (Deutsch, Zalenski, & Clark, 1986; Henss, 1991; Kite et al., 2005; McLellan & McElvick, 1993). Studies have suggested that many older women respond by reprioritizing, such that physical attractiveness becomes less salient to their self-evaluation (Clarke & Korotchenko, 2011). The shift in priorities may lead older women to cognitively tune out information pertaining to their physical attractiveness. This blunting effect might then extend to same-sex others, contributing to a decreased sensitivity to physical attractiveness cues in other women.

Several potential limitations of this study should be considered. First, we did not ask the younger participants about their current menstrual cycle stage or use of hormonal contraceptives, nor did we ask the older participants about their menopause status or use of hormone replacement therapy. Thus, we can make no definitive statement about endocrine mechanisms underlying the results. We note, however, that the presence of any of these factors would decrease endocrine differences between the younger and older participants. Therefore, if the effects are hormonally mediated, they are robust. Second, because the photographs we used in the two context-attractiveness conditions were of different individuals, they differed by more than their attractiveness. Although it is difficult to predict exactly how this might affect the findings, it may be the case that particular features of any one of the individual faces could influence participants’ ratings in an idiosyncratic way. Third, although the relationship status of our participants was not associated with contrast effects, our questionnaire did not include a measure of relationship commitment, which has been shown in previous research to influence attention to others’ attractiveness (Maner et al., 2003). Future research should include this information before the influence of relationship characteristics on contrast effects can be ruled out.

In addition, the sample for the current study was demographically limited. All participants were women. Although no gender differences have been reported in previous studies of contrast effects on facial attractiveness ratings, this possibility deserves more study, especially if mate-selection concerns contribute to contrast effects. A future study should include a sample of younger and older men viewing images of younger and older women and men. Moreover, participants were exclusively European American. Although studies suggest little diversity in attractiveness ratings between ethnic groups (Cunningham, Roberts, Barbee, Druen, & Wu, 1995), it is possible that contrast effects on attractiveness might vary based on the ethnicity of the perceiver or the images, or as a function of ethnic match or mismatch between perceiver and image. Finally, the average age of the older group was approximately 73 years. A sample of women in their 50s and 60s might respond differently, particularly if their attention to other women is influenced by lingering reproductive concerns.

This study provides important new information about the effect of context on attractiveness ratings across the life span. Although past studies have shown reliable and robust contrast effects in physical attractiveness for individuals judging others, the current study suggests that the aging population may be differentially influenced or differentially motivated when making these judgments. Furthermore, contrast effects in attractiveness judgments appear to be consequential, at least for young people. For example, in two studies, Kenrick and colleagues (Kenrick et al., 1989; Kenrick, Neuberg, Zierk, & Krones, 1994) found that when young adult men viewed and rated images of beautiful young women, their feelings about their current romantic relationships were adversely affected. Contrast effects also can influence women’s perceptions of their own attractiveness and desirability as a romantic partner (Gutierres et al., 1999; Wade & Abetz, 1997). Gutierres and colleagues (1999) found young women’s, but not young men’s, self-assessments of their mate value were negatively affected after exposure to images of highly attractive same-sex others, whereas Wade and Abetz (1997) found improved body satisfaction after exposure to images of unattractive individuals. Little and Mannion (2006) reported that women exposed to images of attractive women exhibited both a decline in self-ratings of attractiveness and a preference for more masculine-looking male images. All of these findings may be a result of altered perceptions of the attractiveness of the relevant pool of potential mates and competitors. To date, no research has examined whether, or how, exposure to highly attractive persons or media images may affect older individuals’ perceptions of their romantic partners or themselves. Given the aging population and the increasingly pervasive role of media in society, we
believe these issues will only become more relevant as time goes on.

References


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