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Differential Trajectories in the Development of Attractiveness Biases Toward Female and Male Targets

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Abstract

Across the first year, most infants have approximately 2.5 times more social interactions with women than men. There is evidence that because of this differential experience, infants develop a cognitive representation for human faces that is weighted toward female-like and attractive. Subsequently, attractiveness is more salient when infants process female relative to male faces. These early asymmetries in facial experience and the greater saliency of attractiveness for female and male targets persist into early childhood, which contributes to attractiveness influencing children's categorization and judgments of females more strongly than for males. During middle childhood, children's facial representations become more differentiated, which might explain increases in children's attractiveness biases for male targets during this developmental period. By adolescence, mating interests seem to combine with these developing facial representations to influence attractiveness preferences. This chapter reviews asymmetries in the saliency of attractiveness for female and male targets from infancy to adolescence and focuses on how cognitive facial representations likely guide how attractiveness influences children's processing of female and male targets.

Keywords: development, face processing, attractiveness bias, sex differences, stereotyped attitudes

1. Introduction

Socialization and mate selection theories propose that perceivers value attractiveness more when the target is female than male targets [1–5]. Specifically, socialization theories posit that humans learn to value females' attractiveness more than males' attractiveness and this differential valuation is reflected in how individuals judge and treat females and males based on appearance [2, 3, 5]. Mate selection theories posit that attractiveness is more strongly related to

females' health and reproductive value as compared to males' [1, 4], so attractiveness should be a more salient and valued attribute among women than men. In contrast to these theoretical viewpoints and adults and children's beliefs that physical appearance is more important for females than males [6–8], meta-analytic reviews of the attractiveness literature suggested there were no differences in how attractiveness affected individuals' ratings, impressions, and treatment of female and male targets [9–11]. It was noted, however, that studies including both female and male targets or comparisons between reactions to female and male targets were lacking, making it difficult to conclude whether there are truly differences in the importance of attractiveness for the two sexes [11].

In this chapter, we take a different theoretical approach to understanding the importance of attractiveness for female and male targets. Specifically, we discuss how cognitive representations for faces (i.e., how individuals mentally represent human faces) guide preferences for attractiveness. A seminal study demonstrated that adults perceive summary representations of faces (i.e., faces mathematically averaged together) as attractive [12]. Since its publication, empirical studies have supported the notion that facial *averageness* (the average value of the population of faces to which one is exposed) is attractive [13–16] and affectively rewarding [17]. Yet, early in development, infants and children have predominant experience with females [18–22], so the population to which they are exposed is more heavily weighted toward females than males, which impacts their cognitive representation of faces [23]. With changes in social experience and how individuals represent faces between infancy and adolescence, there are also developmental changes in the saliency of attractiveness for female and male targets. This chapter thus proposes a cognitive developmental perspective for understanding differential trajectories in the development of children's attractiveness preferences and biases for female and male targets.

2. Infancy

Survey data provided by parents in the U.S. regarding their 2-, 5-, 8-, and 11-month-olds' experience with people over the course of one week demonstrated that the majority of their infant's time was spent interacting with adult females (2/3 of their time at 2 and 5 months of age and 3/4 of their time at 8 and 11 months of age). Moreover, these infants also attended more to female than male faces during actual social interactions, thus augmenting their already greater experience with female than male faces [18]. Data collected from videos obtained via head-mounted cameras on 1- and 3-month-olds in Canada over the course of two weeks also showed that infants' exposure to faces was with females 70% of the time [19]. See **Figure 1**. This predominant exposure to female faces facilitates infants' ability to mentally represent female face exemplars and form summary representations of female faces, but hinders their ability to do the same with male faces [23–26]

To illustrate, 3-4-month-olds with a female primary caregiver were familiarized to eight different faces and then shown one of the familiarized faces paired with a novel face. They looked longer at the novel than familiar face when the faces were female, but showed no difference in looking when the faces were male, suggesting infants could recognize and discriminate between the female face exemplars, but not the male face exemplars [24]. Similarly,

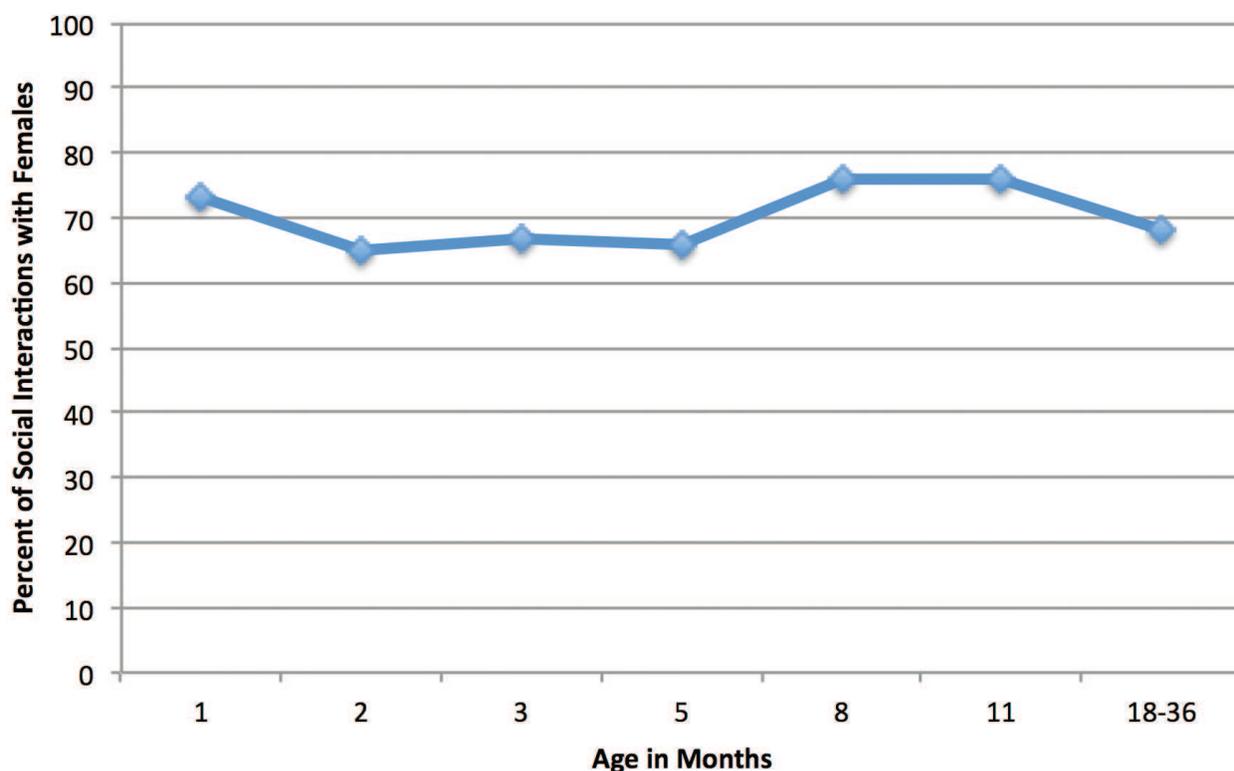


Figure 1. The percentage of social interactions infants and toddlers have with female faces across the first three years. Percentages reflect data from Refs. [18, 19, 21].

10-, 14-, and 16-month-olds with a female primary caregiver who were familiarized to a video of a person speaking and then needed to locate an image of that person among three other distractor faces more easily located female than male faces. Caregiving experience seems to be important because same-aged infants with alternating experience with a female and male primary caregiver were equally successful at locating female and male faces in this task [27]. Results demonstrate predominant experience with female caregivers facilitates infants' ability to more easily represent and recognize female than male adult face exemplars, presumably due to their cognitive representation for human faces being weighted toward female adults.

Similar findings are evident among studies assessing infants' ability to summarize represent female and male faces. Six-month-olds were familiarized to eight different female faces and then saw three different face pairings: (1) an averaged female face (i.e., a face created by mathematically averaging the eight female faces) paired with a novel face; (2) an averaged female face paired with a familiar face; and (3) a familiar face paired with a novel face. If infants form summary representations of female faces, the averaged face should seem more familiar than the novel or familiar face even though they should recognize the familiar face. Indeed, infants looked more at the novel and familiar faces when each was paired with the averaged face, suggesting the averaged face was most familiar. They also looked more at the novel than familiar face when paired together, suggesting they did recognize the familiar face [25]. Infants' ability to summarize represent female faces is evident as early as 3 months of age [26] and might be present even earlier in development [28].

Additional studies using a paradigm similar to the one just described, but with male faces, showed no evidence of 6-month-olds' ability to summarily represent male faces. Manipulations to the paradigm, such as an increase in 6-month-olds' exposure to male faces through additional familiarization or testing of older infants (8-month-olds), still found that infants were unable to summarily represent male faces. Null results are difficult to interpret, but 11 different studies failed to provide evidence of infants' ability to mentally represent an average of the male faces to which they were exposed [23]. Taken together, the findings suggest most infants' initial representation for human faces is female-like (**Figure 2**).

Infants' ability to summarily represent female, but not male, faces is important because adults perceive summary (averaged) representations of faces as attractive [12, 14]. Thus, most infants' representation for human faces is not only female-like, but attractive. Faces most similar to this representation should be fluently processed and preferred [17, 23, 29]. Indeed, 6-month-olds preferred to look more at an averaged female face relative to an unattractive female face when paired together. These results suggest that, like adults, they perceive averaged female faces as attractive [12, 25].



Figure 2. Using data from infants' average experience with faces across the first year [18], we created a simulation of a cognitive representation of faces weighted toward female-like. This morphed face includes 12 female and 7 male faces and was created so that female faces represent 70% of the morph and male faces represent 30% of the morph and thus mirrors most infants' typically greater facial experience with females than males [18, 19].

Although infants perceive averaged female faces as attractive, they do not necessarily prefer faces altered to be *more average* to those altered to be *less average*. To create such faces, researchers morph a face to be 50% closer to the averaged face or 50% further away from the averaged face. Despite these manipulations, 5- to 8-month-olds showed no overall differences in total looking toward the *more* and *less average* faces, although their longest look was toward the face made to be *less average* [30]. In another study with 12- to 24-month-olds, they looked more at the *less average* face than *more average* face [31]. Both sets of researchers suggested the less average faces might be particularly unusual or distinctive looking, thus drawing infant attention due to novelty rather than attractiveness. Even though faces were created to be *more average*, the 50% manipulation toward the averaged face might not have been sufficient to convey averageness (i.e., similarity to an averaged facial representation) and elicit a visual preference. Subsequently, as these researchers proposed, the 50% manipulation away from the average made faces appear atypical and elicited a novelty preference instead.

Taken together, studies suggest most infants' initial representation for human faces is weighted toward adult females and is attractive. Attractiveness should, therefore, be more salient among female than male faces. Attractiveness does seem to guide infants' visual interest in adult female faces, but does not consistently influence their interest in adult male faces. For example, across several studies, infants ranging in age from a few days old to 8 months looked longer at high attractive relative to low attractive female faces [32–35]. In two other studies that included both female and male face pairs, 3- to 6-month-olds showed a preference for the high attractive faces regardless of face pair gender—there were no effects or interactions involving stimulus gender [36, 37]. In another study, however, when the babyfacedness of the high and low attractive faces paired together was held constant, 4- to 6-month-olds showed a preference for high attractive female faces, but not for high attractive male faces [38]. Also, when 6- and 12-month-olds saw pairs of male faces who differed in attractiveness, but were similar in masculinity, 6-month-olds showed no preference for high attractive males. The 12-month-olds, however, did show a visual preference for high attractive males, but only when the face pair was low masculine [39].

To summarize, when cues such as babyfacedness and masculinity are held constant within face pairs, young infants show no visual preference for attractive males [38, 39]. By the end of the first year, however, they visually prefer high attractive males, but within low masculine face pairs only. High attractive, low masculine males should be most similar to an attractive, female-like facial representation, so this similarity might cause infants to overgeneralize their visual preference for high attractive female faces to high attractive, low masculine male faces toward the end of the first year [39].

An attractive, female-like facial representation also seems to guide how infants categorize adult female and male faces. To test infant categorization, infants view several exemplars of faces from a particular category (e.g., low attractive females) and then see a novel exemplar from the familiarized category paired with a novel exemplar from a different category (e.g., a high attractive female). If they have formed a category, the novel exemplar from the familiarized category should seem more familiar than the novel exemplar from the novel category—thus, if infants are able to categorize the faces, they should look more at the novel category face than familiar category face even though both faces are novel to the infant.

Using this paradigm, infants show an ability to categorize adult female faces based on attractiveness by 6 months of age. They show this ability regardless of whether they are familiarized to low attractive or high attractive females. Importantly, 6-month-olds also showed an ability to discriminate between the category exemplars, demonstrating they individuated the female faces, but still grouped faces together based on attractiveness level [40]. In contrast, 12-month-olds attend more to males' facial masculinity than attractiveness when categorizing adult male faces—they group together low masculine males and exclude high masculine males from the category. Low masculine males' perceptual similarity to the infants' female-like facial representation might be what facilitates infants' ability to categorize these faces by 12 months of age [39].

Attractiveness, therefore, seems to be a more salient cue when infants view female relative to male faces and it guides their visual preferences for and categorization of adult females, but not necessarily adult males. This early asymmetry is important to consider because how children functionally group people in their social world serves as a precursor to the development of biases and stereotypes [41]. Also, beyond the first year, toddlers continue to have predominant experience with females. Survey data provided by parents regarding their 18- to 36-month-olds' facial experience over the course of one week showed that approximately 68% of their toddlers' social interactions were with females (**Figure 1**) and they allocated a significantly greater percentage of time attending to female than male faces during these interactions [21]. Given the substantial brain growth that occurs during the first three years of life [42], these experiences likely not only maintain, but strengthen, children's attractive, female-like facial representation and greater attention toward females' than males' attractiveness. Such differential attention should subsequently influence categorization and person perception during early childhood.

3. Early childhood

Parental estimates of their 5- to 6.5-year-olds' experience with others showed that children at this age typically had more interactions with females than males as well [22]. Also, attractiveness continues to be a more salient cue among female than male adult targets. When 4- to 5-year-olds saw faces that varied in attractiveness and sex-stereotypicality (femininity for women; masculinity for men), children more quickly and accurately identified the sex of high attractive than low attractive women. In contrast, attractiveness did not facilitate how quickly or accurately children identified the sex of male faces, whereas masculinity did [43]. These data suggest 4- to 5-year-olds more fluently process high relative to low attractive women as female, but attractiveness does not significantly affect their fluency in classifying men as male. Such processing fluency is important because when adults easily process or classify an object, they briefly experience positive affect [17, 44]. Adults' processing fluency is also linked to positive evaluations of individuals [45]. If children also experience positive affect due to ease in processing, the fluency with which children process attractive female faces should affect their evaluations and information processing more so for attractive females than for attractive males. Indeed, such data are evident in studies looking at their attractiveness biases and recognition memory.

In a study assessing 3- to 11-year-olds' biases based on facial attractiveness, gender, and race, children assigned positive and negative attributes (e.g., "Who do you think is nice/mean?") to one of two unfamiliar peers (forced choice condition) or had the option to choose one of the targets, both targets, or neither target (non-forced choice condition). The target faces paired together were similar in age, sex, and race, but differed in attractiveness. When the targets were girls, children assigned significantly more positive attributes and less negative attributes to high attractive than low attractive girls than would be expected by chance, regardless of whether they were in the forced choice or non-forced choice condition. When the targets were boys, however, this discrepancy in assignment of more positive and less negative attributes to the attractive than unattractive boy was evident in the forced choice condition only. Thus, even when children were not forced to choose only one target for assignment of positive or negative attributes, they still highly favoured attractive girls, but showed similar allocation of positive and negative attributes to attractive and unattractive boys [46]. Interestingly, these same children were also likely to believe that attractive girls would think positively of them (i.e., that attractive girls would reciprocate these positive biases). Such dual beliefs might contribute to strengthening and maintaining attractiveness biases [47].

Additionally, the effect sizes for children's positive attribution biases were substantially higher when directed at female relative to male peers (1.57 vs. 0.80 in the forced choice condition and 1.18 vs. 0.47 in the non-forced choice condition). A similar discrepancy was found in the effect sizes for children's negative attribution biases when directed at female versus male peers (1.69 vs. 1.05 in the forced choice condition and 1.19 vs. 0.35 in the non-forced choice condition) [46]. Thus, attractiveness influenced children's attributions for both female and male peers, which is similar to other research showing attribution scores did not significantly differ based on sex of stimulus [48]. The larger effect sizes based on female attractiveness, however, suggest attractiveness has more practical and social significance for female than male targets.

Indeed, attractiveness significantly influenced how 3- to 7-year-olds processed information about female, but not male, adult and child characters when hearing stories in which two characters' actions and appearance were either consistent or inconsistent with the "beauty is good" stereotype [49]. For example, children heard stories in which one character displayed positive attributes (liked, friendly, smart, or prosocial) and the other character displayed negative attributes (disliked, unfriendly, not smart, or aggressive). In stereotype-consistent versions, an attractive character displayed the positive attributes and an unattractive character displayed the negative attributes. For stereotype-inconsistent versions, it was the reverse. After hearing the story and seeing a picture depicting the characters displaying their attributes, the experimenter showed children facial images of the two characters and asked children to identify the person who displayed the positive attribute. Children made significantly more errors on this question when the story was stereotype-inconsistent than stereotype-consistent, but only when the characters were female. Their performance on this question for stereotype-consistent and stereotype-inconsistent stories was relatively similar when the characters were male. Importantly, children accurately recalled other story details, indicating they were attending to the story. Despite allocating appropriate attention to the story, children made almost twice as many errors identifying female characters when the story

was stereotype-inconsistent vs. stereotype-consistent—they erred in choosing the attractive female character as the one possessing the positive attributes when it was actually the unattractive female character. Thus, young children are more likely to process information to be consistent with the “beauty is good” stereotype when observing females, but not necessarily males [49].

Young children’s schemata for the “beauty is good” stereotype (i.e., cognitive structures that include knowledge of the stereotypes, beliefs, and expectations regarding a given group) might include the belief that attractiveness is more important for females than males. If such a belief is readily accessible, it could explain why attractiveness more significantly influenced their identification of female than male characters [49]. Children do seem to believe that appearance is more important for girls than boys. To learn about gender stereotypes that children spontaneously produced, an experimenter prompted pre-schoolers, kindergartners, first graders, and fourth and fifth graders to, “Tell me what you know about girls/boys. Describe them.” Children’s most frequent first response to this question related to statements regarding appearance (e.g., being pretty) when discussing girls and to traits (e.g., plays rough) when discussing boys. Overall, children made more appearance-based comments about girls compared with comments regarding traits and activities, whereas they made more trait and activity-based comments about boys compared with comments regarding appearance. These results demonstrate that children’s appearance-based stereotypes are more readily accessible when thinking about girls than when thinking about boys [8]. Children’s greater emphasis on the importance of females’ appearance is evident in other studies as well—first graders’ ratings of other children’s cuteness decreased when the targets wore glasses, but the decrease was much greater for girl than boy targets [50].

During early childhood, children show stronger biases based on female peers’ than male peers’ attractiveness. They also are more likely to process information about female than male targets to be consistent with the “beauty is good” stereotype. Finally, they are more likely to naturally produce comments related to appearance when discussing girls relative to boys. It is plausible that having a facial representation that is still predominantly weighted toward female and attractive results in their attending to females’ appearance more so than males’ appearance and subsequently displaying these disparate behaviours in relation to female and male targets. Faces similar to this representation should be most easily processed, and ease in processing is related to experiencing positive affect [17, 44]. In addition to this proposed automatic affective processing of attractive female faces, children also likely learn that females’ attractiveness is valued from peers, parents, television, and fairy tales [51–55]. Both this implicit processing and explicit knowledge could explain the differences found in the studies discussed.

4. Middle childhood

There is evidence to suggest that attractiveness might become a more salient cue for male targets starting around 7–8 years of age. In the study examining 3- to 11-year-olds’ attractiveness biases, children’s biases based on boys’ attractiveness significantly correlated with age—they showed an increase in their assignment of positive attributes to high attractive boys and negative

attributes to low attractive boys with age. Although a similar increase was also seen in their biases based on girls' attractiveness, only the correlations between age and children's biases based on boys' attractiveness were significant [46].

Older children's increase in attention toward boys' attractiveness might be due to children's facial representations becoming more differentiated between 5 and 8 years of age. More specifically, 5-year-olds do not appear to have separate facial representations for female and male adult faces (or child and adult faces, or faces from different racial groups) [56]. By 8 years of age, however, there is evidence to suggest children's facial representations are becoming more differentiated and that they have separate facial representations based on race (and possibly based on sex and age) [57]. In other words, the early emerging attractive, female-like facial representation infants and young children have for human faces gradually becomes more differentiated with development. By 8 years of age, children might have separate rudimentary representations for female and male faces [46, 56] that are presumably attractive [12] and guiding processing of female and male targets' facial attractiveness (**Figure 3**). Such a transition would explain why increases in age correlated with significant increases in children's attractiveness biases for male peers. It could also explain why there were slight, albeit not significant, increases in children's attractiveness biases for female peers—they are now developing an average representation for female faces as opposed to having a female-like facial representation for human faces [46].

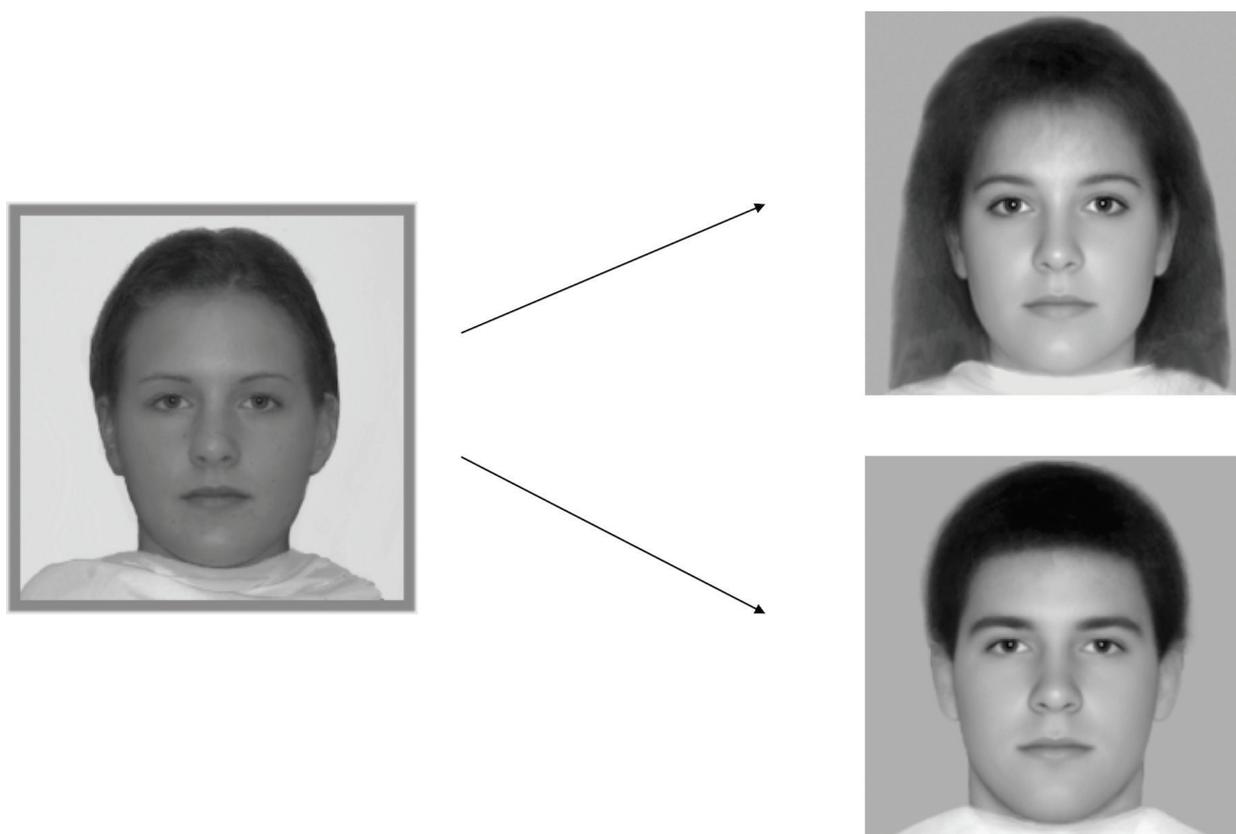


Figure 3. A depiction of the potential transition from a weighted female-like facial representation to separate representations for female and male faces. Note that the literature suggests that although differentiated representations begin to form during early childhood, it takes several years for these representations to fully form and become adult-like.

There is other evidence to suggest that facial representations become more differentiated with age and affect preferences for averageness. Like the infant studies described earlier [30, 31], 5-year-olds, 9-year olds, and adults viewed pairs of faces that included two images of the same person—one image was morphed to be 50% closer to the group average (*more average* face) and the other was morphed to be 50% away from the group average (*less average* face) [58]. Participants indicated which face was more attractive. Unlike the infants, all three age groups showed a significant preference for *more average* faces, with the effect becoming stronger with age—adults more often chose *more average* faces than 9-year-olds and 9-year-olds more often chose *more average* faces than 5-year-olds. These findings support the idea of development and refinement of separate representations for male and female faces with age. Results also revealed that participants more often selected *more average* adult female faces than *more average* adult male faces, but that target sex difference was not consistently observed for 5-year-old and 9-year-old target faces [58]. This discrepancy might have occurred because children are in the process of forming more distinct representations for female and male faces and for adult and child faces [56, 57]. Given early predominant experience with adult females for most children [18–22], the adult female face category average should be more established than the adult male face category average or child categories and thus most greatly influence averageness preferences for adult female faces.

The developmental change in children's facial representations might also explain why only 8-year-olds, and not 5- to 7-year-olds, could accurately judge the physical attractiveness of older aged, post-pubertal males (i.e., 17-year-olds) [59]. It might be necessary for children to develop separate facial representations for pre-pubertal and post-pubertal males for them to more accurately judge older males' attractiveness. Pre-pubertal girls' and boys' faces are relatively similar looking to one another and are more similar looking to adult female faces than adult male faces. Post-pubertal males' faces, however, are quite differentiated from adult females' faces due to males' development of secondary sex characteristics [60]. Subsequently, it is more difficult for both 7- to 10-year-olds and adults to classify the sex of pre-pubertal faces compared with adult faces, especially when only internal facial features are available to make the judgement [61]. Starting around 8 years of age, therefore, children's more differentiated facial representations should start to more strongly impact their attractiveness judgments and biases for male targets. Given the greater saliency of females than males' attractiveness in the years prior, however, and the likelihood that separate representations for female faces are established earlier in development than separate representations for male faces, attractiveness might continue to have a stronger influence on perceptions and processing when observing female relative to male targets. For example, 12-year-olds and undergraduate students rated the musical performance of 6th grade pianists more positively when they also perceived that person as attractive, but this effect was limited to female pianists only [62].

Perhaps not surprisingly, girls seem to understand the concept of attractiveness and its importance for their gender earlier in development than boys. For example, when 3- to 6.5-year-olds were asked what it means to be pretty or cute, the oldest aged girls provided the most detailed descriptions [48]. Similarly, when 3- to 11-year-olds were asked to sort and label pictures of peers based on attractiveness, girls were significantly more accurate at this task than boys [63]. In the study where children spontaneously produced information about girls and boys, the

appearance-based comments about girls increased with age, particularly for girl participants—almost half of the statements 4th and 5th grade girls made about girls related to appearance [8]. It, therefore, appears that the greater saliency and importance of attractiveness for females than males become internalized by girls early in development and this conceptual knowledge increases with development. Such beliefs might get reinforced via television shows aimed at school age children and teenagers by having female characters mention beauty or attractiveness in nearly every episode [64].

5. Adolescence

Adolescence may be a time of significant development in terms of attractiveness judgments. As adolescents reach puberty, males' and females' faces become more divergent as they increase in sexual dimorphism—male faces become more masculine and female faces become more feminine [65]. Puberty leads to heterosexuals' increased interest in opposite-sex interactions and dating [66, 67]. Thus, much of the literature regarding attractiveness preferences in adolescence focuses on mating preferences. The emergence of mating choice motives may lead to increased attention to physical appearance. For example, both male and female 14- to 16-year-olds preferred attractive mates for casual sexual relationships [68].

In addition to these changes, adolescents' facial representations are becoming even more differentiated as reflected in continued improvements in face recognition and perception between early and late adolescence [69]. These changes also affect their attractiveness preferences. In studies examining 11- to 16-year-olds' preferences for certain characteristics of male and female faces, participants viewed face pairs consisting of the same face manipulated to be more or less average, symmetrical, or feminine [70, 71]. Manipulations involved morphing techniques like those used in the infant and child studies [30, 31, 58]. Both male and female adolescents showed a preference for faces that were manipulated to be more average, feminine, or symmetrical. Like the findings from middle childhood, the preference for averageness increased with age. Older aged adolescents (13 + years-old) showed a stronger preference for *more average* faces than the younger aged adolescents [70, 71], likely due to their having developed more differentiated summary representations for female and male faces. Thus, the transition from a singular representation of human faces (i.e., a representation that is weighted toward adult females and attractive) to more differentiated averaged representations of face categories based on gender, age, and other attributes is quite protracted and takes several years to develop. It is currently unclear when it becomes adult-like, but increased interactions with same- and other-sex peers during adolescence [66, 67] should facilitate the transition and cause similarity to a facial category average to become increasingly more important when making attractiveness judgments.

Interestingly, 11- to 16-year-olds also showed a preference for both female and male faces altered to be more feminine [70, 71]. An exception to this finding was that males who had completed pubertal development (as measured via underarm hair growth and voice change) preferred significantly fewer feminized male faces compared with pre-pubertal and mid-pubertal boys [71]. The general preference for feminized faces suggests that perhaps the early emerging positive biases associated with faces similar to a female-like facial representation

continue to influence preferences in adolescence. For the post-pubertal males, experience with their own face and faces of other post-pubertal male peers should shape their representation for this face category and subsequently influences preferences [71].

There are other discrepancies in the literature regarding whether female adolescents prefer facial femininity or masculinity when judging males' attractiveness. For example, pre-pubescent females (11- to 14-year-olds) displayed significantly lower preferences for a masculinized than feminized version of a male face compared with mid- and post-pubescent females (15- to 25-year-olds [72]. It is possible that like the post-pubescent males in the other study [71], the post-pubescent females are developing a more masculine representation for male faces due to their greater experience with post-pubertal males at this age. Yet, discrepancies exist regarding female preferences for male facial masculinity or femininity in other studies as well [65], leading to suggestions that preferences for masculine or feminine male faces may be context-dependent [71, 73, 74]. For example, adolescent and adult females (aged 16–39) preferred masculine faces when they were considering a short-term relationship or were already in a relationship [73]. Females may prefer feminine male faces due to their cuing of prosocial and other desirable traits, such as warmth, honesty, and cooperativeness [75], but prefer masculine male faces for cues related to dominance and genetic quality [76, 77]. In line with this theory, when women saw pairs of male faces and were asked to select which face better represented different traits, they rated masculine male faces as more dominant but less warm and less faithful than feminine male faces [78].

It is possible that discrepancies in preferences for masculine and feminine male faces stem from conflicting developmental processes. Recall that masculinity was a more salient cue than attractiveness when infants and children categorized male faces. If 12-month-olds categorized low masculine male faces due to an overgeneralization of their ability to categorize female faces [39], it might serve as a precursor to linking feminine attributes to low masculine males. Similarly, 4- to 5-year-olds' slower reaction time and higher error rate when classifying the sex of low than high masculine male faces [43] might persist throughout development. Indeed, adults' initial reaction upon viewing a low masculine male and selecting a gender-related attribute was to initially move their computer mouse toward the side of the screen with a feminine attribute (e.g., caring) before moving it toward the side of the screen with a masculine attribute (e.g., aggressive) [79]. Prosocial qualities often associated with women, therefore, seem to be instinctively overgeneralized to low masculine male faces. During adolescence, such qualities should be preferred in certain contexts more than others. More research is needed, however, to understand whether and how early emerging attention to facial masculinity interacts with the developmental issues adolescent females encounter to influence their preference for low or high masculine males.

What is clear during adolescence is that attractiveness continues to more significantly impact female than male targets. Thirteen- to 19-year-old males rated young adult females who were high attractive more positively than low attractive females, whereas 13- to 19-year-old females did not significantly differ in their evaluations of high versus low attractive young adult males [80]. The emergence of mating motives in adolescence, in combination with early experiences that bias preferences toward attractive female faces, might account for males' strong attractiveness biases for female targets [81].

Male and female adolescents' self-appraisals and ideas about attractiveness also support the conclusion that males may place more emphasis on females' attractiveness than females place on males' attractiveness. Adolescents aged 13–15 answered questionnaires relating to their self-perceived attractiveness and indicated their level of agreement with statements suggesting attractive people display positive and prosocial traits (e.g., friendly and sociable) and unattractive people display negative traits (e.g., unreliable). Adolescent males reported higher self-ratings of how good looking and physically appealing they were compared with adolescent females, and showed higher agreement with attractiveness stereotypes than did females [82]. Because female adolescents rated themselves as less attractive and appealing than male adolescents, it suggests they internalized the importance of female attractiveness and were subsequently more critical of themselves. These self-ratings were related to attractiveness biases, suggesting that females may be less inclined to stereotype others based on attractiveness during adolescence compared with earlier in development [46].

In sum, a variety of developmental changes occur during adolescence that motivate and increase teens' attention toward and interactions with other-sex peers. These social experiences likely facilitate further differentiation of their facial representations. Moreover, early emerging preferences for attractive females align with heterosexual males' increased interest in females, which might augment the importance of attractiveness when adolescent males judge females. In contrast, although heterosexual females also prefer attractive partners, their bias for males' attractiveness might not become as strong because it does not align as well with early emerging preferences for attractive females. Male facial masculinity or femininity, however, should indicate similarity to a female face and might subsequently advertise traits that females consider attractive within different contexts. Longitudinal research is needed, however, to understand if and how early categorization of and preferences for certain facial cues in female and male faces contribute to later development of adolescents' attractiveness preferences.

6. Conclusions

Infants with predominant female facial experience develop summary representations for faces that are female-like and attractive, which results in greater saliency of attractiveness cues for female than male targets early in development. With the maintenance of this greater experience with female than male faces beyond infancy, several studies suggest cascading effects of having an attractive, female-like facial representation on children's person perception— attractiveness more strongly influences how they judge and process information about females than males. Despite developing more differentiated facial representations later in development, older children and adolescents still seem to be more influenced by females' than males' attractiveness, perhaps because of the prolonged period of having an attractive, female-like facial representation earlier in development.

More research is needed, however, that examines children with predominant male facial experience or more equally distributed experience with females and males to understand the role early facial experience plays in the development of salient social cues and the resultant impact on person perception. It is also critical to conduct more research directly comparing responses

to female and male targets beyond attribution tasks, so the impact of attractiveness and target gender is understood across various contexts. Work is also needed to understand whether the differences in how female and male targets are judged based on attractiveness are more evident when adults versus peers' faces are used as targets. Whereas all the infant research included adult faces as stimuli, studies with children typically include peers' faces. If the attractive, female-like facial representation is also adult-like and children's faces are more like female adult than male adult faces, the discrepancies in how attractiveness affects judgments of female and male targets might be more evident for adult than child faces. Last, longitudinal research is needed to determine how early emerging face processing abilities predict later biases and processing of females and males based on attractiveness. Developmental researchers have investigated different types of research questions during different developmental periods, making it difficult to provide a complete picture of whether and how attractiveness influences children's responses for female and male targets in a similar or different manner across development.

Despite the need for more research, the data presented in this chapter demonstrate the importance of early facial experience in shaping attention toward faces. Most children's early predominant female facial experience seems to lead to attractiveness becoming a more salient cue for female than male targets. The greater saliency of female than male attractiveness means that it has more practical and social implications for female targets in terms of how others judge and treat them and ultimately how females behave during social interactions. It is critical to better understand the development of attractiveness biases, so as to raise awareness of such biases and create ways to reduce negative outcomes.

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