

Chapter 6

How Early Experiences Shape Attraction, Partner Preferences, and Attachment Dynamics

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One of the curious things about human relationships is that people sometimes fall in love with individuals who bear a striking resemblance to their parents—a phenomenon that has piqued the interest of psychoanalytic, evolutionary, and attachment scholars. Take Alison, for example (Perron 2009). Alison is married to a man who resembles her father in many ways. Both men are interested in politics and the stock market, and they both share the name *Mike*. They also physically resemble one another. Alison acknowledges the similarities between the two men, “I have a great relationship with my father, so I suppose I looked for a partner who shares some of his good qualities.”

Why is it that people sometimes fall in love with others who resemble their caregivers?¹ In this chapter we review research from multiple disciplines that is designed to answer this question. Based on our review, we present a template-matching model that we believe can shed light on the formation and development of attachment bonds. Specifically, we discuss how early experiences can shape mate preferences. According to our model, individuals construct a mental representation of a prototypical person (a template) based on early caregiving experiences, and this mental representation is used as a standard against which potential mates are to be evaluated. We argue that, once initial attraction is established, the formation of an attachment bond is facilitated by the psychological match between early attachment figures and the new partner. We suggest that psychological transference may be a normative mechanism underlying this process. Thus, attraction and the

¹ In this chapter we will often claim that people are attracted to others who resemble their parents. Just to be clear: We mean that Person A is attracted to someone who resembles Person A’s parents. We do not mean that Person A is attracted to someone (i.e., Person B) who resembles Person B’s parents.

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development of an attachment bond are maximized when a potential mate matches an individual's physical and affective template.

We begin by reviewing theoretical perspectives that are designed to explain the way in which early experiences influence the traits that people find physically attractive. Next, we discuss how early experiences may impact the formation of an attachment bond in adulthood, beyond the effects of physical attraction *per se*. Finally, we present a template-matching model that integrates many of the theoretical ideas that have been discussed in the literature and that helps to explain how early experiences impact both mate preferences and attachment dynamics in adulthood.

We should note from the outset that although our theoretical interest is in understanding how early experiences might shape both what it is that people find attractive as adults and how those experiences might impact the development of an attachment bond, the majority of our discussion will highlight research and theory on the dynamics of physical attraction. There are two reasons for the emphasis on physical attraction. First, there is more empirical data on attraction than on attachment. Moreover, many of the interesting theoretical debates have emphasized feelings of attraction rather than attachment *per se*. Second, we consider physical attraction to be the first step in the development of romantic attachments. Although it is possible for people to become attached to one another in the absence of romantic interest (e.g., Diamond 2004), we assume that in many romantic relationships physical attraction often functions as a precursor to the development of attachment (e.g., Hazan and Zeifman 1994). Thus, investigating the dynamics of physical attraction may prove useful in advancing our understanding of the development of attachment relationships more generally.

Alternative Explanations for Associations Between Early Experiences and Partner Preferences

We opened with a colorful anecdote concerning Alison and Mike. Although Alison's situation is unusual, it is not necessarily outlandish. Indeed, there is a growing body of systematic, empirical research that suggests that people tend to fall in love with partners who resemble their caregivers.² For example, researchers have found that people who were born to older parents are more attracted to older faces than people who were born to younger parents (Heffernan and Fraley 2013; Perrett et al. 2002). In addition, researchers have demonstrated that individuals are more likely to marry and are more attracted to people of their parents' ethnicities (Heffernan and Fraley 2014; Jedlicka 1980) than to people of other ethnicities. In our own work, we found evidence that nonparental caregivers may also impact preferences.

² We should point out that in much of the research we review, the "caregivers" are parents, but we do not wish to restrict our discussion to parents. Other people such as nannies, grandparents, teachers, and siblings also play an important role in early social and emotional development and are potential candidates for the ideas we discuss in this chapter.

Participants who had a nanny when growing up showed a preference for faces of the nanny's ethnicity over other ethnicities, even after taking into account whether participants were the same ethnicity as their nannies (Heffernan and Fraley 2014).

Additionally, research on mate selection indicates that people are more likely to select partners who share the same hair and eye color as their parents. Little et al. (2003) assessed the hair and eye color of participants, participants' romantic partners, and participants' parents. They found that for women, paternal eye color was the best predictor of partner eye color and there were no significant predictors of partner hair color. For men, maternal eye color was the best predictor of partner eye color, and maternal hair color was the best predictor for partner hair color.

Finally, experiences with caregivers may also play a role in female preferences in partner body hair. In a study originally designed to test women's changing preferences across the menstrual cycle (Rantala et al. 2010), researchers first obtained images of men's torsos. Front-view and back-view photographs were taken of 20 shirtless men. Then, the men were given shaving cream and a razor (and a bottle of vodka, as compensation), and were asked to shave their entire torso. A second set of front-view and back-view photographs were taken. Next, 299 female participants engaged in a forced-choice task in which they were presented with two images of the same man's torso: one in which he had natural body hair, and one in which he was shaven. The women selected the image that they found most sexually attractive. Women also provided information about the hairiness of their romantic partner and father. Consistent with the hypothesis that caregivers may influence adult mate preferences, results indicated that women who had hairier fathers showed greater preference for the hairier torso photos, and were more likely to have a hairy romantic partner. Taken together, these results suggest that one's developmental experiences have the potential to influence the kinds of features that an individual considers attractive in adulthood.

Why is it the case that early experiences predict what it is that people find physically attractive as adults? There have been at least three explanations that have been discussed extensively in both the social psychological and the ethological literatures. First, there is evidence that a process similar to *sexual imprinting* occurs in humans by which adult sexual preferences are acquired during a sensitive period in childhood. During this time, an individual's social experiences subtly influence his or her expectations (or "search images") concerning desirable mates. Second, early caregiving experiences could influence later preferences through *mere exposure* or *familiarity* effects. For instance, caregiver-resembling others may seem more familiar, leading them to be evaluated more positively relative to others who do not resemble one's caregiver. Ultimately, this positivity bias lowers the threshold for what is judged as attractive or unattractive. Finally, the *optimal outbreeding* perspective combines both imprinting-like learning processes and habituation. According to this perspective, people acquire sexual preferences early in life through a learning process in which early caregiving experiences shape one's search image for a future mate. But a second process, habituation, weakens attraction to those specific individuals with whom one was raised. Next, we discuss each of these explanations in more depth.

Sexual Imprinting

Sexual imprinting is phase-sensitive learning that takes place in early life during which sexual preferences are shaped through social experience (Aronsson 2011). Konrad Lorenz (1937, 1970) pioneered research on this topic via the study of geese. He found that goslings raised by humans would imprint on humans. Moreover, once the goslings reached sexual maturity they would direct their sexual advances toward humans (rather than other geese). More recently, researchers have used cross-fostering experimental designs to study sexual imprinting in animals. In a typical cross-fostering experiment, young animals of one species are raised by adults of a different species. Using this method, researchers have found, for example, that zebra finches raised by Bengalese finches later preferred Bengalese finches as mates over zebra finches (Immelmann 1969). Similarly, sheep and goats that were cross-fostered preferred to mate with animals of their foster parents' species rather than their own species (Kendrick et al. 1998). Other researchers have shown that young animals will even imprint on artificial markings on their parents (ten Cate and Bateson 1989; Witte and Caspers 2006). For instance, ten Cate and Bateson (1989) exposed young Japanese quail to adult quail caregivers who had black dots painted on them with hair dye. When the young quail reached sexual maturity, they preferred to mate with adults who were also painted with dots rather than wild-type quail. Zookeepers' anecdotes provide additional evidence for sexual imprinting. Zoo animals often direct their sexual attention toward zookeepers (Wilson 1987) and human-raised chimpanzees direct sexual attention toward humans (Morris 1969).

In addition to the multitude of evidence for sexual imprinting in animals, a growing body of evidence has supported the possibility of an imprinting-like phenomenon in human attraction. Specifically, features that characterize people's caregivers are more likely to be considered sexually attractive in others in adulthood. Researchers have found evidence for imprinting-like effects with caregiver characteristics such as smoking habits (Aronsson et al. 2011), and maternal pregnancy and lactation (Enquist et al. 2011). Aronsson et al. (2011) assessed participants' sexual attraction to people who smoked, and also assessed the smoking habits of participants and their parents. Participants who had a parent who smoked when they were growing up were more likely to report being sexually attracted to people who smoked. Importantly, participants' own smoking habits were not associated with their sexual preference for smoking.

One of the assumptions of sexual imprinting is that a sensitive period exists in early life during which sexual imprinting occurs. There is evidence for a sensitive period for sexual imprinting in animal species, but the evidence in humans is limited. The only study to provide evidence of a sensitive period for sexual imprinting in humans of which we are aware examined the impact of maternal pregnancy and lactation on adult mate preferences (Enquist et al. 2011). Participants reported on their sexual attraction to pregnant and lactating women, and reported whether they were an older or younger sibling. Results indicated that older siblings were more likely to report sexual attraction to pregnancy and lactation than younger siblings.

The researchers reasoned that older siblings were more likely to have been exposed to maternal pregnancy and lactation in their childhood compared with younger siblings. Importantly, exposure to maternal pregnancy and lactation was only associated with adult preferences if the exposure occurred between 1.5 and 5 years of age, providing preliminary evidence that there may be a sensitive period during which caregiver characteristics and attachment experiences have the greatest impact on sexual preferences. The issue of sensitive periods remains an important one for future work on sexual imprinting.

Finally, research has suggested that the quality of the caregiver–child relationship (specifically, the father–daughter relationship) moderates the impact of early experiences on future mate preferences (Wiszevska et al. 2007). For instance, Wiszevska and colleagues recruited female participants and their fathers. The women rated target faces for attractiveness and their fathers' faces were photographed. The researchers took facial measurements of the target faces and the father faces, and used factor analytic techniques to derive factor scores for different facial regions. These factor scores were then used to correlate each woman's highest rated target face with her father's facial features. The women also reported on their relationships with their fathers during early childhood. Women who rated their relationship with their father as more positive showed a correlation between their father's central facial characteristics and the facial characteristics of their most highly rated target face. Women who reported less positivity in their relationships with their father did not show a correlation between father face and most highly rated target face. The authors reasoned that the central region of the face may be particularly important either because women paid most attention to this area or because these areas of the face are the least prone to change over time, due to weight gain or loss, for example. Although the quality of the father–daughter relationship was assessed retrospectively, these results suggest the possibility that the quality of the caregiver relationship may moderate the effects of sexual imprinting, such that a positive relationship with a caregiver increases one's attraction to caregiver-resembling others, whereas a negative relationship with a caregiver decreases one's attraction to caregiver-resembling others. However, the results of Wiszevska et al. cannot rule out two possible alternative explanations: first, that women who had good relationships with their fathers inherited the same preferences as their mother to a greater degree; and second, that women who had good relationships with their fathers were more physically similar to their fathers and rated the target photographs based on self-similarity. We will discuss these two alternative explanations shortly.

In summary, the sexual imprinting hypothesis suggests that people acquire sexual preferences during a sensitive period in early life when they learn the characteristics of their caregivers. A number of research studies support this hypothesis. However, the issue of sensitive periods, a critical component of this hypothesis, remains largely untested. Only one study has examined this issue in humans (Enquist et al. 2011). More research is needed to determine if the acquisition of sexual preferences occurs during a sensitive period, and if so, to determine the onsets and offsets of these periods across people. Next, we briefly present two alternative explanations

that have been offered for the imprinting-like effects mentioned above, namely inherited preferences and phenotypic matching.

Inherited Preferences Inherited preferences is the idea that one may inherit mate preferences from one's parents, resulting in attraction to people who resemble one's parents. For instance if a young man's father had a preference for and married a green-eyed woman (the young man's mother), the young man may inherit this preference from his father and end up partnering with a green-eyed woman who resembles his mother in eye color, not because his mother helped set his search image for a future mate, but because his preferences were passed down genetically from his father.

This particular explanation is difficult to test because people tend to share genes with the people with whom they were raised. However, by studying natural variation in biological relatedness, it is possible to partly tease apart the role of potential learning processes (e.g., sexual imprinting) from inherited preferences. Studies of twins and their spouses have offered conflicting support of inherited preferences. Lykken and Tellegen (1993) examined 901 twin pairs and 1052 of their spouses and assessed the degree to which spouses of twins were similar to one another in personality, attitudes, and interests. If mate preferences were inherited, the spouses of monozygotic (MZ) twins (who share 100% of their DNA) would be expected to be more similar than spouses of dizygotic (DZ) twins (who share only 50% of their DNA). However, the authors found that the spouses of MZ twins were no more similar than the spouses of DZ twins, and only slightly more similar than randomly paired same-sex strangers. This suggests that whatever criteria people use when selecting a spouse, it was not more similar for MZ twins than DZ twins. Additionally, the authors surveyed 547 twin pairs about their cotwin's choices in areas such as clothing and vacation activities, and importantly, about their cotwin's choice of spouse. They found that MZ twins reported more positivity about their cotwin's choice of clothing and vacation than DZ twins. However, MZ twins did not approve of their cotwin's choice of spouse more than DZ twins. Finally, Lykken and Tellegen surveyed the spouses of twins about their feelings regarding their twin-in-law. The wives of MZ twins reported no special attraction to their husband's cotwin. The husbands of MZ twins were more likely to report that they found their wives' cotwin attractive than unattractive, but 25% reported that they disliked their wives' cotwin. For spouses of DZ twins, both sexes reported more negative than positive attitudes toward their spouse's cotwin. If spouses' preferences were determined genetically, their attitudes toward their twin-in-law would be expected to be positively biased, rather than overwhelmingly negative.

However, in another twin study, researchers found greater similarity between the spouses of MZ twins than between the spouses of DZ twins. Rushton and Bons (2005) surveyed approximately 300 twin pairs, their spouses, and the twins' same-sex best friends on personality variables, social attitudes, and physical characteristics. Across these various attributes, they found that spouses of MZ twins were more similar to each other than spouses of DZ twins ($r=0.23$ vs. $r=0.14$), and friends of MZ twins were more similar to each other than friends of DZ twins ($r=0.22$ vs.

$r=0.18$). Correlational and model-fitting techniques suggested that 10–30% of the variance in partner choice was due to genetic factors. It is worth noting that Rushton and Bons (2005) used a smaller sample size and item pool than Lykken and Tellegen (Study 1, 1993), which could, in part, explain the differences in their results.

The evidence for inherited preferences is mixed, but even the evidence in support of this alternative hypothesis suggests that other factors account for the majority of the variance in partner choice.

Self-Referential Phenotype Matching Another alternative explanation that has been offered for the imprinting-like effects mentioned in this section is self-referential phenotype matching. This is the idea that people are attracted to others who resemble the self. According to the self-referential phenotype matching explanation, people are attracted to and select mates based on how similar potential mates are to the self, rather than on similarity to a caregiver. For example, a redhead may prefer to date other redheads on the basis of phenotypic similarity. Indeed, a recently launched internet dating site, findyourfacemate.com, is premised on the idea that people are particularly attracted to others who resemble themselves.

A great deal of work in the animal literature has attempted to distinguish between self-referential phenotype matching and sexual imprinting. Research on a variety of species (e.g., finches: Immelmann 1969; sheep and goats: Kendrick et al. 1998) has suggested that when the young animals reach sexual maturity, they prefer to mate with animals of their foster parents' species rather than their own species, supporting a sexual imprinting hypothesis rather than a self-referential phenotypic matching hypothesis. Cross-fostering designs not only rule out the phenotypic matching explanation, but also help to rule out the inherited preferences explanation because the young animals are raised by adults with whom they share no genetic material, so their preference for the foster parents' species cannot be inherited. As one might expect, distinguishing between these alternative explanations in human studies is more difficult.

One way to address these alternative explanations in humans is to use adoptive samples. In adoptive samples, children do not share any genetic variance with their adoptive parents, so the inherited preferences account is not a potential explanation. Furthermore, adoptive studies are able to tease apart the effects of self-referential phenotype matching and imprinting-like effects because researchers can determine if a participant's romantic partner more closely resembles (1) the participant, supporting a self-referential phenotype matching hypothesis; or (2) the participant's adoptive parent, supporting an imprinting-like explanation.

Bereczkei et al. (2004) used this logic in a study of facial similarity among adopted women, their husbands, and the women's adoptive parents. First, the researchers collected photographs of adopted women, their husbands, and the women's adoptive parents when the parents were young (e.g., when their adopted children were growing up). Then the researchers had three separate samples of undergraduates provide facial similarity ratings. In the first study, participants were presented with tables of five photos. Each table contained one photo of a woman's adoptive father, her husband, and three other similar aged men. Participants ranked the photos of the

woman's husband and the three other men on the basis of similarity to the adoptive father (participants did not know which of these photos was the woman's true husband). In a second study, participants were shown a picture of a woman's adoptive mother, the adopted woman's husband, and three similar aged men. Participants ranked the photos of the woman's husband and the three other men on the basis of similarity to the adoptive mother. And in a third study, participants were shown a photo of an adopted woman, her husband, and three other similar aged men. Again, participants ranked the woman's husband and three other men based on similarity to the adopted woman. The results of all three studies suggested that participants were more accurate in matching husbands with their wives' adoptive fathers than with the wives themselves, or with the adoptive mothers. This suggests that women's husbands more closely resembled the women's adoptive fathers than the women themselves, supporting an imprinting explanation rather than a self-referential phenotype matching explanation. Additionally, there was greater similarity between women's adoptive fathers and the women's husbands for women who reported receiving more emotional support from their adoptive fathers, echoing Wiszewska et al.'s (2007) finding that the quality of the father–daughter relationship moderates the impact of early attachment experiences on later preferences.

Lykken and Tellegen (1993) noted that although spouses tend to be similar on many variables, the model of selecting a partner based on self-similarity has not been shown to account for actual partner choice from a pool of candidates. They suggest that the observed correlations between spouses could be observed if people simply avoided partnering with 50% of the population who are least similar to the self.

In our own research (Heffernan and Fraley 2014), we found that participants who had a nanny when growing up rated faces of the nanny's ethnicity as more attractive than faces of other ethnicities, even if the participant was not the same ethnicity as the nanny. Self-referential phenotype matching cannot account for this finding because people were more attracted to the nanny's ethnicity than other races, including their own ethnicity.

Nonetheless, there is some support for self-referential phenotype matching. DeBruine (2002) showed participants photographs of strangers with whom they would be playing a trust game. Using digital morphing techniques, strangers' faces were morphed with participant's own face, or with the face of an unknown person. Participants trusted strangers whose faces had been morphed with the participant's face more than strangers whose faces had been morphed with an unknown person's face. This finding appears compatible with self-referential phenotype matching: people trusted faces that looked more like the self. In summary, there is mixed evidence regarding self-referential phenotype matching. Berezkei and colleagues' son-in-law study (Berezkei et al. 2004) provides preliminary evidence against the self-referential phenotype matching hypothesis and instead supports the hypothesis of a sexual imprinting-like process in the acquisition of mate preferences. However, other research has shown that people trust self-resembling others more than non-self-resembling others.

Mere Exposure or Familiarity

In addition to sexual imprinting, another mechanism that may explain the association between early attachment experiences and adult mate preferences is mere exposure or familiarity effects (Zajonc 1968). Social psychological research has established that people prefer familiar objects over less familiar objects (Kunst-Williams and Zajonc 1980). Thus, it is possible that people are attracted to individuals who resemble their caregivers because individuals who share features with one's caregiver may seem familiar and safe.

Indeed, the mere exposure effect has been demonstrated in the realm of interpersonal attraction. Moreland and Beach (1992) manipulated students' exposure to some of their classmates and found that greater exposure resulted in greater attraction. Specifically, students were more likely to be attracted to confederate "students" who had attended their class 15 times than confederates who had only attended their class 5 times.

One reason that familiarity might lead to greater liking and attraction is that familiar stimuli are easier to process, and ease of processing may be misattributed to liking. This phenomenon is called perceptual fluency (Bornstein and D'Agostino 1994). In a series of three studies, Reber et al. (1998) found that increased fluency resulted in greater liking. For instance, participants preferred drawings that were preceded by a processing-facilitating prime over those that were preceded by processing-inhibiting prime. Also, participants preferred images of shapes that had greater contrast with the background. These shapes were more perceptually fluent than those with less contrast. Finally, participants rated shapes more positively if they had been exposed to the shapes for longer because longer exposure increased perceptual fluency.

It stands to reason that perceptual fluency might contribute to observed similarities between individual's romantic partners and the people with whom the individuals were raised. Caregiver-resembling others may be easier to process and this enhanced perceptual fluency might be attributed to liking or attraction. Thus, the attraction generated by a more fluent individual may pave the way to relationship initiation and perhaps eventually the development of an attachment bond with the individual.

Although the mere exposure effect has amassed a considerable amount of support in psychological research, this explanation has not yet been tested specifically in the realm of early experiences and their influence on adult attraction and mate preferences. Additionally, this explanation leads to several other predictions that warrant examination. First, if exposure to caregivers influences mate preferences, it might be expected that the primary caregiver, the caregiver to whom one has the greatest exposure, might have a greater influence on adult mate preferences. Second, it is also possible that other figures such as teachers and nannies would influence mate preferences through mere exposure. Indeed, we have found that people are more attracted to faces of their nanny's race than other races (Heffernan and

Fraley 2014). Ultimately, the mere exposure explanation requires further testing in the realm of early experiences and adult mate preferences.

Optimal Outbreeding

Bateson's optimal outbreeding model (1983) provides a third explanation for why people may be attracted to the characteristics of individuals with whom they were raised, but not the specific individuals themselves. This model suggests that a learning process leads people to find attractive the features of the individuals with whom they were surrounded in early life. A second process, habituation, weakens the desire to mate with those specific individuals (sometimes referred to as "incest avoidance"; e.g., Lieberman and Symons 1998). In support of this model, Bateson (1980) has demonstrated that quail are more likely to mate with first cousins than siblings or unrelated individuals. Similarly, humans may be attracted to their parents' hair and eye coloring in others, but regard the parent as an inappropriate mate (Little et al. 2003). This dual process model suggests that, upon encountering a potential mate, if the mate is too similar to one's caregivers, habituation will dominate and the potential mate will not be sexually appealing. On the other hand, if the potential mate is drastically different from one's caregivers, he or she will not map onto one's search image, and again may not be sexually appealing. Sexual attraction would be greatest, therefore, when a newly encountered individual embodies an optimal level of similarity to one's caregivers and novelty.

Fraley and Marks (2010) have found support for the optimal outbreeding perspective in studies in which they subtly activate mental representations of people's caregivers and kin. In one study, the researchers used photographs of participants' opposite sex parent to subliminally prime mental representations of the parent. Participants exhibited increased sexual attraction to others after nonconscious activation of their opposite-sex parent mental representations compared with participants who had been primed with images of someone else's parent (yoked control). In another experiment, the researchers used computerized facial morphing techniques to subtly infuse an image of the participant with unfamiliar faces. Participants rated faces as more sexually attractive if they were morphed with an image of the self (a digital proxy for kin), and found the faces more attractive as the degree of morphing increased. In a third study, when participants were told that the images they were rating had been morphed with their own faces, participants found the faces less sexually attractive. From an optimal outbreeding perspective, these findings suggest that people find others more sexually attractive if they resemble or activate mental representations of kin, but if this resemblance is too obvious or is known, sexual attraction decreases dramatically. Attraction appears to be maximized when a potential partner is partly familiar and partly novel.

The optimal outbreeding model accounts for how people may develop mate preferences based on caregiver characteristics, and how these mate preferences function to increase people's attraction caregiver-similar (but not too similar) others. It

allows for other mechanisms such as sexual imprinting and mere exposure to play a role in the development of mate preferences. It also adds the idea of habituation to explain why people are not attracted to the individuals with whom they were raised. It would be useful for future research to examine habituation more closely. For instance, how much caregiver resemblance is too much? How similar to one's caregivers can an unknown target look, before they become unappealing?

Summary

Sexual imprinting, mere exposure, and optimal outbreeding provide potential mechanisms for the associations between early caregiving experiences and adult mate preferences that have been observed in numerous empirical studies. Next, we move beyond attraction and discuss how early experiences may play a more direct role in the formation of an attachment in adulthood.

Early Experiences and Attachment Formation

As we have discussed, early experiences are associated with attraction and mate preferences, which may potentiate the development of a relationship and an attachment bond. Early experiences may also be more directly associated with attachment formation. In this section we first review briefly some of the work that suggests that people prefer others who match their preexisting working models of attachment. Then we discuss how psychological transference may be a mechanism through which early experiences influence attachment formation. For instance, when people encounter strangers who resemble a significant other (e.g., caregivers), mental representations of caregivers may become activated and lead individuals to interact with and relate to strangers in ways that resemble preexisting relationships. In this way, it is possible that individuals transfer mental representations concerning their caregivers to potential romantic partners. Moreover, forming an attachment with a new romantic partner may be facilitated if that partner activates mental representations of already established attachment figures.

A great deal of research has suggested that people prefer partners with an attachment style similar to their own (see Holmes and Johnson 2009 for a review). Because one's own attachment models are based, in part, on early experiences with caregivers, this suggests that one may prefer others whose attachment models correspond with one's models of early caregivers. In a series of correlational and experimental studies, Frazier et al. (1996) found that individuals tended to be in relationships with partners who matched their attachment style (e.g., anxious individuals tended to be paired with anxious partners) and people were more attracted to hypothetical partners who had similar attachment styles to their own. Importantly, these researchers also found that participants' ratings of their mothers'

caregiving styles were associated with attachment preferences. Specifically, people who rated their mother as cold or ambivalent were less attracted to secure potential partners. Similarly, Collins and Read (1990) found that men who rated their mothers as cold and inconsistent were more likely to be dating women who were high in attachment-related anxiety. Taken together, these findings suggest that people are more romantically interested in others who have working models of attachment that are similar to one's own, and moreover, that this romantic interest leads people to be more likely to enter into relationships with others who share similar working models of attachment.

How might one's own attachment models come into play in the context attraction and attachment formation? The availability and accessibility of attachment models is a possible mechanism. For instance, Baldwin et al. (1996) asked participants to nominate individuals with whom they had a secure, avoidant, or anxious-ambivalent attachment relationship. Several days later, participants were primed with one of these relationships and subsequently asked to rate their interest in a potential dating partner. Participants generally reported greater interest in dating secure potential partners, but they also reported greater romantic interest in potential partners who possessed the attachment style with which they had just been primed. The authors suggested that the similarity of the targets to accessible working models facilitated romantic interest.

More broadly, we suggest that *psychological transference* may be one mechanism through which one's own attachment models, which are shaped, in part, by early caregivers, influence attraction to potential partners and attachment formation with a new partner. Transference is a process by which a person's mental representations concerning a significant other are activated and applied to another person (typically a stranger in experimental research; Andersen and Glassman 1996; Chen and Andersen 1999). Kraus and Chen (2010) have found that people transfer evaluations and inferences about a significant other to a stranger if the stranger physically resembles the significant other. Participants were shown a facial photograph of a stranger with whom they expected to have an interaction. In an earlier study session, participants rated 200 faces based on similarity to the participant's significant other (e.g., a person the participant selected whom they knew well, liked, and considered to be important). In the experimental condition, the stranger in the photograph resembled the participant's significant other. In a yoked control condition, the stranger resembled someone else's significant other. Participants rated the stranger more positively if the face resembled their own significant other compared with yoked participants. Additionally, participants presented with the significant-other resembling face inferred that the stranger was more likely to possess attributes consistent with the significant other. The authors suggested that transference was responsible for this pattern of results.

Günaydin et al. (2012) objectively manipulated facial resemblance using digital techniques to morph photographs of strangers with a photograph of a participant's romantic partner, and with a yoked participant's partner. People rated partner-resembling faces more favorably than faces that did not resemble their partner. However, this effect was qualified by participant sex. Women, but not men, judged

partner-resembling faces more favorably. Additionally, for both men and women, greater relationship satisfaction was associated with more positive evaluations of the partner-resembling faces. The authors reasoned that evaluative transference triggered by partner-resembling faces was due to activation of partner-specific representations, rather than due to familiarity.

Brumbaugh and Fraley (2007) examined transference of both romantic partner representations and parental representations to novel targets. Participants rated how they thought they would feel in a friendship with an unknown target who had been idiographically described as similar to participants' romantic partners, parents, or controls. Their results suggested that participants applied their representations of partners only when they encountered the partner-similar target, whereas representations of parents were applied more generally (e.g., to both partner-similar and parent-similar targets). The authors suggested that the more general application of parental representations might be due to their developmental origins. If parental representations serve as the foundation upon which representations of new people are built (Bowlby 1969), then parental representations may be applied more broadly in a variety of contexts, rather than in a selective fashion. These researchers also found that people were more interested in dating unknown targets who descriptively resembled their former romantic partner than targets who did not resemble their former romantic partner (Brumbaugh and Fraley 2006). Participants provided a list of traits describing their former partners and the researchers used these lists to create descriptions of unknown targets (potential dating partners). Later, participants returned and rated unknown targets who idiographically resembled their former partner or another participant's former partner (yoked control). Participants transferred attachment representations of their former partners to the descriptively similar targets, and they expressed greater interest in dating these targets relative to control targets. Even participants who were relatively insecure in their past relationships were more interested in dating the target that was descriptively similar to their former partner, despite feeling more insecure with this target.

Up to this point we have highlighted research on people's attachment preferences suggesting that people may feel more romantically interested in partners who match their preexisting attachment representations, and we have explained how a social-cognitive process such as transference may account for these findings. However, there is also an emerging body of prospective research that indicates that early caregiving experiences can shape attachment-related dynamics in established romantic relationships. For example, Roisman et al. (2005) found that people who were securely attached to their mother in infancy were more likely to have a secure relationship with their romantic partner, as assessed with the Current Relationship Interview (CRI; Crowell and Owens 1996) at age 20. In addition, Dinero et al. (2008) found that adolescents who had more positive interactions with their parents at ages 15 and 16 were more likely to have positive interactions with their romantic partners at age 25, and were more likely to exhibit secure attachment, as assessed with self-report instruments, with their romantic partners at age 25. Finally, Zayas et al. (2011) found similar results using observers' coding of mothers' behavior toward their toddler-aged children in a semi-structured free play situation

and self-reports of attachment when the children reached adulthood. Specifically, self-reports of secure attachment to romantic partners at age 22 were associated with having a mother who provided supportive care when the individual was 18 months old.

In summary, there is some support for the idea that individuals are more romantically interested in others who share the same working models of attachment. Additionally, research suggests that people are more attracted to and more frequently date partners who share psychological (e.g., attachment) similarities to their parents. It stands to reason, then, that if a potential partner is psychologically similar to one's caregiver, this will facilitate attachment to that partner. We suggest that these effects may come about through a transference process. Fraley and Brumbaugh (2007) found that romantic partner representations were transferred to partner-similar unknown targets, but parental representations might be applied more broadly. Thus, parental representations appear to have a persistent influence on person perception. Finally, longitudinal research supports the idea that attachment experiences with early caregivers influence not only attachment preferences, but also people's attachment within established romantic relationships.

Closing Thoughts and Future Directions for Research

It is well established that individuals often end up attracted to and bonded with others who are physically and behaviorally similar to their caregivers. We have reviewed several explanations for this phenomenon. First, the sexual imprinting hypothesis suggests that people acquire sexual preferences through social experiences during a sensitive period in early life. Second, a mere exposure or familiarity explanation suggests that people may develop a preference for individuals who resemble their caregivers because the characteristics of those individuals are familiar and may be processed more fluently. Third, the optimal outbreeding explanation suggests that a learning process results in sexual attraction to the characteristics of those people with whom one was raised and a second process, habituation, reduces attraction to the specific individuals with whom one was raised. These mechanisms may result in increased attraction to caregiver-similar others, thus setting the stage for a romantic relationship and potentially an attachment bond to develop.

Furthermore, research suggests that early experiences may also play a role in attachment formation beyond the effects of physical attraction per se. Psychological transference may result in a preference for others who are similar to one's preexisting working models of attachment, which are, in part, based on caregiver representations developed in early life. Thus, it may be easier to develop an attachment bond with an individual who is more similar than dissimilar to one's caregivers. Finally, longitudinal research suggests that attachment security with early caregivers predicts attachment security with partners in established romantic relationships in adulthood.

Template Matching Hypothesis

One of the arguments we have been developing in recent years is that a template-matching process underlies the way in which people evaluate potential mates—an idea that brings together themes from both the sexual imprinting and attachment literatures. Specifically, on the basis of early caregiving experiences, individuals construct a mental representation of a prototypical person and this representation functions in part as a standard or template against which potential mates are evaluated. When a potential mate physically resembles the template, attraction is maximized. To the extent to which the target deviates from the template, attraction is diminished.

These dynamics can be represented with a rudimentary equation:

$$\text{Attraction} = C + B_1 \times U + B_2 \times (T - A)^2 + E$$

In this example we are considering attraction to targets that vary in a specific attribute—age. The basic dynamics of the equation, however, generalize to a variety of traits. The first term, C , is simply a constant that can potentially vary from one person to the next. U represents the normative effects of variation in the age of the targets in question, weighted by a coefficient, B_1 . In this example, B_1 is likely to be negative because, on average, men tend to find younger women more appealing than older women (Kenrick and Keefe 1992). Paired with this normative effect is an idiosyncratic one represented by $(T - A)^2$ and weighted by B_2 . This component suggests that attraction will be maximized when a target's age (A) resembles the person's template (T) for the attribute in question (e.g., age). E is an error term.

Figure 6.1 illustrates some of the dynamics of this model with respect to the attribute of age. The person represented in the upper panel has a T value of 20 (i.e., his template represents a person who is approximately 20 years of age). Notice that for the person described in the upper panel, he is generally attracted to targets who are younger instead of targets who are older (i.e., $B_1 \times U$ represents a negative linear slope for target age and attraction). But, despite this tendency, his attraction to targets is maximized when the targets are 20 years old. As targets exceed this age, his attraction to them begins to diminish.

In contrast, the person depicted in the lower panel has a T value of 30. Again, although this person is generally more attracted to younger targets than older ones due to the $B_1 \times U$ term, his attraction to targets is maximized when the targets are 30 years old.

Although this model is relatively simple, we believe that it can account for many of the empirical findings we have reviewed. For example, it is capable of explaining why it is that people born to older parents may be more attracted to older individuals than people born to younger parents (e.g., Perrett et al. 2002; Heffernan and Fraley 2013). The model is compatible with the sexual imprinting hypothesis, the mere exposure effect, and the learning process proposed in the optimal outbreeding perspective because each of these mechanisms could contribute to the formation of one's template. Moreover, the model is relatively robust to the kinds of alternative explanations that have been offered for imprinting-like effects. If the template is

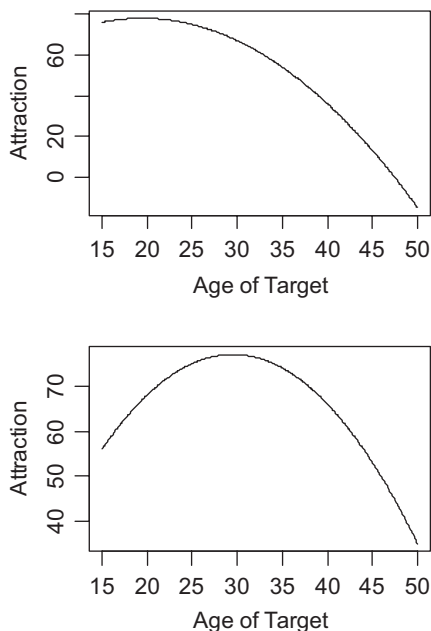


Fig. 6.1 A model for early experiences, attraction, and attachment. The first panel illustrates predicted attraction values for a person with a template value of 20. The model ($\text{Attraction} = 80 - 0.1 \times (\text{Age of Target}) - 0.1 \times (20 - [\text{Age of Target}])^2$) implies that the person would find younger people more attractive than older individuals, but attraction is maximized for targets who are 20 years of age. The second panel illustrates the predicted attraction values for a person with template value of 30. The model ($\text{Attraction} = 80 - 0.1 \times (\text{Age of Target}) - 0.1 \times (30 - [\text{Age of Target}])^2$) implies that attraction will be maximized for targets who are 30 years of age. The model also implies that, on average, younger targets will be rated more favorably than older targets

based, in part, on the physical characteristics of other individuals in the caregiving environment, that suggests that mate preferences are not necessarily inherited, nor are they necessarily the result of self-similarity.

The template-matching model can also explain incest avoidance. Recall that the optimal outbreeding perspective suggests that one reason why individuals may not mate with others who are too similar to their relatives is that a habituation process has the effect of making “too similar” others less appealing than they would be otherwise. We do not wish to suggest that habituation is not operative. But we think the template-matching approach can explain some of the incest avoidance data without necessarily requiring habituation. In this respect, it may offer a more parsimonious account of certain findings.

To elaborate, we find it helpful to consider the way templates or prototypes are constructed in the context of connectionist models (see Fraley 2007, for a discussion of connectionist models in the context of attachment dynamics). In connectionist models, networks are exposed to repeated exemplars over a period of trials. When those networks are then tested for their “memory” of the exemplars, they typically

perform well. However, when they are tested with a prototype—a statistical average of all the exemplars that had been previously presented—neural networks produce a stronger response than normal. Importantly, this is the case even when the network was never exposed to the prototype per se.

As an analogy, consider exam performance in the classroom. If students were to take 10 exams or quizzes over the course of a semester, psychometric theory and instructor intuition would suggest that the best predictor of a student's 11th exam grade would be the average of all his or her previous exam scores. We would not necessarily bet that his or her grade on exam 1 or exam 10 would be a better predictor than the *average* of his or her performance to date. Similarly, in a template-matching model, we would not necessarily expect attraction to be maximized when a target matches perfectly someone from an individual's early caregiving environment. (In other words, the model *does not* predict that individuals will find their parents or siblings the most attractive targets.) What the model predicts is that some kind of composite of all the features represented in the early caregiving environment will produce the maximum response. Therefore, the model predicts that an individual's sibling, for example, who is just one of the exemplars from the individual's early caregiving experiences, would be less attractive than someone who better represents the composite of people from the individual's developmental history. This also suggests that a target who somewhat resembles an individual's early caregivers should be evaluated as more attractive than they would be evaluated by other people, but they will not necessarily be evaluated as more attractive than every other possible target.

Thus far, we have explained how the template-matching model accounts for how early caregiving experience may shape adult mate preferences. Furthermore, we believe the template-matching model can also provide a way of understanding the dynamics of attachment. Indeed, attachment theorists commonly use the language of template-matching to describe attachment dynamics. For example, it is often assumed that people will be more likely to form an emotional attachment to someone in adulthood if that individual resembles the psychological qualities of their primary caregivers. In fact, John Bowlby (1973) noted that people often form attachment bonds with others who maximize the similarity between current attachment experiences and preexisting models of attachment.

The template-matching model produces potentially counterintuitive predictions in this context. For example, if someone were raised in an environment in which his or her caregivers were cold, distant, or rejecting, the individual should develop insecure working models of attachment. However, because the individual has also developed the expectation that close others are likely to be unsupportive and rejecting, he or she should be most likely to feel comfortable with a partner who is also unsupportive and rejecting because that partner confirms the working models that the individual already has (Swann et al. 1992).

To date, most research on attachment has focused on what might be best described as “main effects” of parental models on relationship functioning rather than the match or mismatch between working models and partner behavior. This work suggests that, in general, people are more likely to feel comfortable opening up to

and depending on others who are warm, responsive, and supportive. Indeed, in the realm of attraction research, Latty-Mann and Davis (1996) have referred to this as the “attachment-security hypothesis.” The implication of this kind of work is that people should not find rejecting or cold partners as desirable or likely to facilitate emotional bonding. Instead, people prioritize feeling security in their relationships, and thus secure partners are more desired over insecure partners, regardless of one’s own attachment models and expectations.

One interesting finding that is difficult to explain in the absence of the template-matching hypothesis comes from the transference study by Brumbaugh and Fraley (2006). Although people who were relatively insecure in their past relationship were also more likely to feel insecure with a potential partner who had some attributes of their former partner relative to potential partners who had attributes of another participant’s former partner (i.e., a transference effect), they also reported a greater interest in dating that particular individual relative to the yoked control. In other words, despite the fact that the familiar other made them feel more insecure, they were more interested in pursuing an intimate relationship with that person.

In short, potential dating partners who resembled people’s preexisting templates were the ones who roused the most romantic interest. The template-matching model predicts that the development of an attachment relationship will be maximized when the partner in question matches the individual’s template for an ideal partner—one that we think is shaped over the course of a person’s development. When a person’s prototype suggests that others are warm, responsive, and caring, the person will be most likely to develop an attachment to others who exhibit those qualities. When a person’s prototype suggests that others are cold, unresponsive, and unsupportive, the person will be most likely to develop an attachment to others who exhibit those qualities. However, in this particular case, that tendency exists in opposition to a “main effect” that leads supportive partners to be more desirable than unsupportive ones (e.g., Latty-Mann and Davis 1996), so the effect may only be observable in carefully controlled conditions.

Future Directions, Open Questions, and Conclusions

Sensitive Periods The sexual imprinting hypothesis suggests that mate preferences are acquired during a sensitive period. However, only one research study of which we are aware has examined this issue carefully in humans (Aronsson et al. 2011). Determining whether humans do indeed have a sensitive period for the acquisition of mate preferences, and if so, when the sensitive period occurs, is critical for the sexual imprinting hypothesis. For instance, it is possible that humans are more sensitive to caregiver characteristics in early childhood, and are less sensitive to caregiver characteristics that appear only in later adolescence and adulthood. This leads to the expectation that if one’s mother was a brunette for most of one’s early life, but began to dye her hair blonde in one’s adult life, the person’s mate preferences would be more closely associated with the mother’s brunette, rather than blonde

hair. Alternatively, it is possible that people are sensitive to caregiver characteristics throughout childhood and early adulthood.

Aronsson and colleagues' (Aronsson et al. 2011) study provided preliminary evidence for a sensitive period for acquiring sexual preferences. Maternal pregnancy and lactation was associated with preferences only if people had been exposed to maternal pregnancy between the ages of 1.5–5 years. Exposure after that developmental window was not associated with mate preferences. Determining whether there is a sensitive period for acquiring mate preferences is an important direction for future research and will help to understand whether something similar to sexual imprinting occurs in humans.

Quality of Caregiver–Child Relationship as a Moderator Some research has suggested a potential moderator of the association between people's caregivers and their mate preferences. Specifically, the quality of the caregiver–child relationship may function as a moderator such that people with positive relationships with their caregivers would be more likely to end up paired with and attracted to a person who resembles their caregiver. Several studies have supported this prediction (Berezkei et al. 2004; Wiszewska et al. 2007). For example, adopted women who had a more positive relationship with their adoptive fathers chose spouses who resembled their adoptive fathers more than adopted women who had less positive relationships with their adoptive fathers (Berezkei et al. 2004). Additionally, women who had more positive relationships with their fathers were attracted to faces that more closely resembled their fathers' face than women who had less positive relationships with their fathers (Wiszewska et al. 2007). If people have a more positive relationship with their caregivers, then encountering a stranger who resembles a caregiver may lead to increased liking and attraction. On the other hand, if people's relationship with their caregivers is more negative, encountering someone who resembles a caregiver may lead to decreased liking for and attraction to the stranger. In this case, people might be more likely to pair with others who are dissimilar to the caregiver.

We should note that this particular hypothesis, although theoretically compelling, is inconsistent with the predictions entailed by a template-matching hypothesis. Namely, a template-matching hypothesis leads to the prediction that attraction will be maximized when evaluating someone who resembles a caregiver regardless of whether one's relationship with that caregiver was positive or negative. Indeed, one of the potential benefits of the template-matching model is that it provides an explanation for why people might be attracted to individuals who possess attributes that most people would find unappealing (e.g., individuals who behave in cold or unresponsive ways). The "relationship quality moderator" hypothesis, in contrast, would suggest that the general dynamics we have reviewed in this chapter would be less relevant to explaining attraction and attachment among people with insecure relationships to their caregivers. We hope that future research will be able to clarify exactly where these two models converge and diverge in their predictions so they can be systematically evaluated.

Conclusion In closing, there are several potential explanations for why Alison is attracted to Mike, a man who is strikingly similar to Alison's father (who, perhaps

incidentally, is also named Mike). Alison's mate preferences may have developed through a specialized learning process akin to sexual imprinting and through mere exposure to her caregivers. In other words, Alison may have developed a template for a future mate that was based, in part, on her father. In adulthood, her mate preferences may have been expressed through a number of mechanisms that would have made it more likely that she end up paired with Mike. For instance, because Mike resembles Alison's father, he may have been more familiar and perceptually fluent, which would increase Alison's attraction to Mike. Additionally, she may have transferred her representation of her father to Mike, making Mike a more desirable dating partner and facilitating the formation of an attachment with him. In sum, the explanatory mechanisms that we have reviewed may be partially responsible for the associations between people's early caregiving experiences and adult mate preferences, and account for why people like Alison end up falling in love with partners who resemble their parents.

References

- Andersen, S. M., & Glassman, N. S. (1996). Responding to significant others when they are not there: Effects on interpersonal inference, motivation, and affect. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: Vol. 3. The interpersonal context* (pp. 262–321). New York: Guilford.
- Aronson, H. (2011). Sexual imprinting and fetishism: An evolutionary hypothesis. In P. R. Adriaens & A. De Block (Eds.), *Maladapting minds* (pp. 65–90). New York: Oxford University Press.
- Aronson, H., Lind, J., Ghirlanda, S., & Enquist, M. (2011). Parental influences on sexual preferences: The case of attraction to smoking. *Journal of Evolutionary Psychology*, *9*, 21–41.
- Baldwin, M. W., Keelan, J. P. R., Fehr, B., Enns, V., & Koh-Rangarajoo, E. (1996). Social-cognitive conceptualization of attachment working models: Availability and accessibility effects. *Journal of Personality and Social Psychology*, *71*(1), 94–109. doi: <http://dx.doi.org/10.1037/0022-3514.71.1.94>.
- Bateson, P. (1980). Optimal outbreeding and the development of sexual preferences in Japanese quail. *Zeitschrift für Tierpsychologie*, *53*, 231–244.
- Bateson, P. (1983). Optimal outbreeding. In P. Bateson (Ed.), *Mate choice* (pp. 257–277). Cambridge: Cambridge University Press.
- Berezkei, T., Gyuris, P., & Weisfeld, G. E. (2004). Sexual imprinting in human mate choice. *Proceedings of the Royal Society B*, *271*, 1129–1134.
- Bornstein, R. F., & D'Agostino, P. R. (1994). The attribution and discounting of perceptual fluency: Preliminary tests of perceptual fluency/attributional model of the mere exposure effect. *Social Cognition*, *12*, 103–128.
- Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation*. New York: Basic Books.
- Brumbaugh, C. C., & Fraley, R. C. (2006). Transference and attachment: How do attachment patterns get carried forward from one relationship to the next? *Personality and Social Psychology Bulletin*, *32*, 552–560.
- Brumbaugh, C. C., & Fraley, R. C. (2007). Transference of attachment patterns: How important relationships influence feelings toward novel people. *Personal Relationships*, *14*, 513–530.
- Chen, S., & Andersen, S. M. (1999). Relationships from the past in the present: Significant-other representations and transference in interpersonal life. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 31, pp. 123–190). San Diego: Academic.

- Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 58(4), 644–663. doi: <http://dx.doi.org/10.1037/0022-3514.58.4.644>.
- Crowell, J., & Owens, G. (1996). *Current relationship interview*. Unpublished manuscript, State University of New York at Stony Brook.
- DeBruine, L. M. (2002). Facial resemblance enhances trust. *Proceedings of the Royal Society London B*, 269, 1307–1312.
- Diamond, L. M. (2004). Emerging perspectives on distinctions between romantic love and sexual desire. *Current Directions in Psychological Science*, 13, 116–119.
- Dinero, R. E., Conger, R. D., Shaver, P. R., Widaman, K. F., & Larsen-Rife, D. (2008). Influence of family of origin and adult romantic partners on romantic attachment security. *Journal of Family Psychology*, 22, 622–632.
- Enquist, M., Aronsson, H., Ghirlanda, S., Jansson, L., & Jannini, E. A. (2011). Exposure to mother's pregnancy and lactation in infancy is associated with sexual attraction to pregnancy and lactation in adulthood. *Journal of Sexual Medicine*, 8, 140–147.
- Fraley, R. C. (2007). A connectionist approach to the organization and continuity of working models of attachment. *Journal of Personality*, 75, 1157–1180.
- Fraley, R. C., & Marks, M. J. (2010). Westermarck, Freud, and the incest taboo: Does familial resemblance activate sexual attraction? *Personality and Social Psychology Bulletin*, 36, 1202–1212.
- Frazier, P. A., Byer, A. L., Fischer, A. R., Wright, D. M., & DeBord, K. A. (1996). Adult attachment style and partner choice: Correlational and experimental findings. *Personal Relationships*, 3(2), 117–136. doi: <http://dx.doi.org/10.1111/j.1475-6811.1996.tb00107.x>.
- Günaydin, G., Zayas, V., Selcuk, E., & Hazan, C. (2012). I like you but I don't know why: Objective facial resemblance to significant others influences snap judgments. *Journal of Experimental Social Psychology*, 48, 350–353.
- Hazan, C., & Zeifman, D. (1994). Sex and the psychological tether. In D. Perlman & K. Bartholomew (Eds.), *Advances in personal relationships* (pp. 151–180). London: Sage.
- Heffernan, M. E., & Fraley, R. C. (2013). Do early caregiving experiences shape what people find attractive in adulthood? Evidence from a study on maternal age. *Journal of Research in Personality*, 47, 364–368.
- Heffernan, M. E., & Fraley, R. C. (2014). An examination of attraction in adulthood and early life experiences with race and culture. Unpublished manuscript.
- Holmes, B. M., & Johnson, K. R. (2009). Adult attachment and romantic partner preference: A review. *Journal of Social and Personal Relationships*, 26, 833–852. doi:10.1177/0265407509345653.
- Immelmann, K. (1969). Über den Einfluss frühkindlicher Erfahrungen auf die geschlechtliche Objektfixierung bei Estrildiden. *Zeitschrift für Tierpsychologie*, 26, 677–691.
- Jedlicka, D. (1980). A test of the psychoanalytic theory of mate selection. *The Journal of Social Psychology*, 112, 295–299.
- Kendrick, K. M., Hinton, R. M., Atkins, K., Haupt, M. A., & Skinner, J. D. (1998). Mothers determine sexual preferences. *Nature*, 395, 229–230.
- Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex-differences in reproductive strategies. *Behavioral Brain Science*, 15, 75–133.
- Kraus, M. W., & Chen, S. (2010). Facial-feature resemblance elicits the transference effect. *Psychological Science*, 21, 518–522.
- Kunst-Wilson, W. R., & Zajonc, R. B. (1980). Affective discrimination of stimuli that cannot be recognized. *Science*, 207, 557–558.
- Latty-Mann, H., & Davis, K. E. (1996). Attachment theory and partner choice: Preference and actuality. *Journal of Social and Personal Relationships*, 13, 5–23.
- Lieberman, D., & Symons, D. (1998). Sibling incest avoidance: From Westermarck to Wolf. *Quarterly Review of Biology*, 73, 463–466.
- Little, A. C., Penton-Voak, I. S., Burt, D. M., & Perrett, D. I. (2003). Investigating an imprinting-like phenomenon in humans: Partners and opposite-sex parents have similar hair and eye colour. *Evolution and Human Behavior*, 24, 43–51.

- Lorenz, K. Z. (1937). The companion in the bird's world. *The Auk*, *54*, 245–273.
- Lorenz, K. Z. (1970). *Studies in animal and human behavior* (Vol. 1). Cambridge: Harvard University Press.
- Lykken, D. T., & Tellegen, A. (1993). Is human mating adventitious or the result of lawful choice? A twin study of mate selection. *Journal of Personality and Social Psychology*, *65*, 56–68.
- Moreland, R. L., & Beach, S. R. (1992). Exposure effects in the classroom: The development of affinity among students. *Journal of Experimental Psychology*, *28*, 255–276.
- Morris, D. (1969). *The human zoo*. London: Jonathan Cape.
- Perrett, D. I., Penton-Voak, I. S., Little, A. C., Tiddeman, B. P., Burt, D. M., Schmidt, N., O'Leary, R., & Barrett, L. (2002). Facial attractiveness judgements reflect learning of parental age characteristics. *Proceedings of the Royal Society B*, *269*, 873–880.
- Perron, C. (2 Feb 2009). Why you're likely to marry your parent. CNN. http://articles.cnn.com/2009-02-11/living/lw.programmed.to.marry.parents_1_share-mom-parent?_s=PM:LIVING. Accessed 28 June 2012.
- Rantala, M. J., Polkki, M., & Rantala, L. M. (2010). Preference for human male body hair changes across the menstrual cycle and menopause. *Behavioral Ecology*, *21*, 419–423.
- Reber, R., Winkielman, W., & Schwarz, N. (1998). Effects of perceptual fluency on affective judgements. *Psychological Science*, *9*, 45–48.
- Roisman, G. I., Collins, W. A., Sroufe, L. A., & Egeland, B. (2005). Predictors of young adults' representations of and behavior in their current romantic relationship: Prospective tests of the prototype hypothesis. *Attachment and Human Development*, *7*, 105–121. doi:10.1080/14616730500134928.
- Rushton, J. P., & Bons, T. A. (2005). Mate choice and friendship in twins. *Psychological Science*, *16*, 555–559.
- Swann, W. B., Hixon, J. G., & de la Ronde, C. (1992). Embracing the bitter "truth": Negative self-concepts and marital commitment. *Psychological Science*, *3*(2), 118–121. doi: <http://dx.doi.org/10.1111/j.1467-9280.1992.tb00010.x>.
- ten Cate, C., & Bateson, P. (1989). Sexual imprinting and a preference for 'supernormal' partners in Japanese quail. *Animal Behavior*, *38*, 356–358.
- Wilson, G. D. (1987). An ethological approach to sexual deviation. In G. D. Wilson (Ed.), *Variant sexuality: Research and theory* (pp. 84–115). Baltimore: Johns Hopkins University Press.
- Wiszevska, A., Pawlowski, B., & Boothroyd, L. G. (2007). Father–daughter relationship as a moderator or sexual imprinting: A facial-metric study. *Evolution and Human Behavior*, *28*, 248–252.
- Witte, K., & Caspers, B. (2006). Sexual imprinting on a novel blue ornament in zebra finches. *Behavior*, *143*, 969–991.
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, *9*, 1–27.
- Zayas, V., Mischel, W., Shoda, Y., & Aber, J. L. (2011). Roots of adult attachment: Maternal caregiving at 18 months predicts adult peer and partner attachment. *Social Psychological and Personality Science*, *2*, 289–297. doi:10.1177/1948550610389822.