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Passion and compassion:

Psychology of kin relations within and beyond the family

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Abstract

Family is special. People avoid sexual contact with close relatives, but at the same time are highly beneficent toward them. Such discriminatory behavior is guided by a set of psychological mechanisms, heuristics that facilitate evolutionarily adaptive behavior most of the time but may lead to over-perception of kinship under specific circumstances. In this chapter, we describe psychological mechanisms of kin recognition in sexual and altruistic contexts, and we discuss the extent to which these mechanisms may influence close relationships between unrelated individuals, resulting in an experience of “psychological kinship.” We suggest that friendship may provide a context within which over-inclusive kin recognition is especially likely to occur, especially among women. We also identify questions for future research, including when men might be especially prone to over-perceiving kinship.

Keywords: altruism; family; friendship; incest avoidance; kin recognition; kinship

Introduction

In the American television series *Friends* (Crane et al., 1994–2004), the characters Joey and Rachel become infatuated with each other and attempt a romantic relationship after having been close friends for several years. Previously, two other characters – Chandler and Monica – had successfully gone from being friends to lovers. In the (anti)climactic episode (Buckner & Halvorson, 2003), Joey and Rachel reach the brink of sexual contact, only to hit a psychological wall: They find that the situation feels “weird” and “wrong.” Eventually they give up, disappointed and bewildered. Rachel asks, “I wonder how Monica and Chandler could do it?” Joey answers, “I guess they weren’t as good friends as we are.” The reasoning is not articulated; presumably, viewers understand why being such good friends should pose a problem. An earlier episode (Reich, Cohen, & Weiss, 2002) provides a hint: The character Ross, having difficulty picturing Joey and Rachel as a couple, says to his sister Monica, “I mean it’s... It’s like you and me going out, only weirder!” Perhaps what Joey and Rachel felt was a tinge (or more) of what a typical brother and sister would feel upon contemplating sex with each other.

To make interesting scientific discoveries, one must ask the right questions. A major benefit of adopting a functional–evolutionary perspective in psychology is that we are forced to go beyond the obvious, to pose what may at first seem like “dumb” questions. Why do we like the sight of beautiful faces? Why do we get upset when rejected by others? Why do we relish social acceptance? It is tempting to answer: We just do. Of course, when something just feels obvious, it is usually because the messy psychological details are enwrapped within human intuition and introspectively unavailable (James, 1890). As psychologists, these details are part of what we are trying to uncover; but being humans, our intuition often prevents us from recognizing the right questions in the first place (Cosmides & Tooby, 1994). A common

consequence is that there exist conspicuously under-explored patches of psychological terrain, especially (and ironically) in intuition-rich areas requiring particular research attention.

Within social psychology – the field that deals with people’s thoughts about and relations with other people – kinship represents one of those under-explored patches (Daly, Salmon, & Wilson, 1997). Despite the fact that thoughts about and relations with kin dominate social life, the social psychological literature has surprisingly little to say about kinship. A search of the database PsycINFO (in September, 2009) returned a total of 8711 articles in the leading empirical journal, the *Journal of Personality and Social Psychology (JPSP)*, going back to the year 1965. A search for articles containing the words “kin” or “kinship” in the title returned 2 articles (0.02% of the total). A search for titles containing the words “family” or “families” was more encouraging, turning up 38 additional articles (0.44% of the total), although only a handful of these were about family relations per se. These numbers don’t tell the whole story, of course, but perhaps the low profile of kinship is not surprising, given how fundamental it is. People have deep intuitions regarding kinship (Jones, 2003; Lieberman, Oum, & Kurzban, 2008), and social psychologists – being people – may not have felt the need to probe those intuitions. Consider the following questions: Why do parents favor their own children over others? Why don’t brothers and sisters have sex with each other? How do people know who their children, brothers, and sisters are? It is easy to dismiss such fundamental questions because they seem trivial: *of course*, parents favor their own children; *of course*, siblings don’t have sex; and we *just know* who our family members are.

In this chapter, we contemplate some of these questions and describe some of the psychological mechanisms underlying kin relations as revealed by empirical research. The emerging picture is not as clear-cut as one might think. For starters, the mind must rely on fairly simple – and fallible – heuristics to reckon genetic relatedness, and this may sometimes have

some odd downstream repercussions, as Joey and Rachel discovered. And although Joey and Rachel's feelings of unease appeared to be mutual, there are reasons to suspect that women may find the prospect of sex with close friends particularly aversive (in fact, it was Rachel who initiated the awkwardness by "unconsciously" slapping Joey's hand mid-courtship). As we describe below, women may be more likely to treat friends as though they were kin in a variety of nonsexual social contexts. We also explore whether there may be circumstances under which men may be especially likely to share kinship sentiments with others.

As there already exist clear descriptions of how humans detect different classes of actual genetic kin (e.g., Lieberman, 2007; Tal & Lieberman, 2007), the bulk of this chapter focuses on the extent to which these and associated mechanisms may extend to close relationships between nonkin (e.g., Ackerman, Kenrick, & Schaller, 2007; Park, Schaller, & Van Vugt, 2008). In particular, we explore the extent to which our understanding of friendship (between nonkin) may be illuminated by considering the psychology of kin relations. Ultimately, whether – and how powerfully – kinship psychology influences nonkin relations is an empirical matter. The answer is not straightforward because, although humans likely possess domain-specific relationship schemas, these are unlikely to be encapsulated and mutually exclusive (Barrett & Kurzban, 2006). Joey and Rachel, despite knowledge that they are unrelated, may have run into trouble because of a spillover effect of their incest-avoidance mechanisms.

<h1>Evolution and the psychology of kin relations

We first present a brief review of the psychological mechanisms underlying identification of kin within the contexts of sexual relations and helping behavior. Along the way, we attempt to

clarify some issues, especially some common misunderstandings of the psychological implications of a biological perspective on kinship.

<h2>Incest avoidance and the role of familiarity

People tend not to engage in sexual relations with biological relatives. This is not because individuals curb incestuous urges; most people find the mere thought of sex with close relatives emotionally disturbing (e.g., Park, 2008). This fact may seem self-evident, and it represents one of the many unexamined intuitions described above. Indeed, there are theoretical reasons to expect people to find family members especially desirable. Repeated in many social psychology textbooks is the notion that similarity and familiarity are among the key contributors to attraction (e.g., Aronson, Wilson, & Akert, 2005; Brehm, Kassir, & Fein, 2005) – and who is more similar and familiar to us than our genetically related family members? Families also tend to support each other, and we like people who are kind to us (Li, Bailey, Kenrick, & Linsenmeier, 2002). So, why aren't we interested in jumping into bed with our parents and siblings?

Westermarck (1891) was one of the first scholars to recognize the significance of incest-avoidance tendencies. In fact, he proposed one of the earliest evolutionary psychological hypotheses: that humans are innately predisposed to find incest aversive and that early-life coresidence – which most often occurs among close kin – is what inspires the aversion. (Animals are expected to evolve incest-avoidance tendencies, due to the harmful consequences of inbreeding; see Lieberman, 2007.)

From the perspective of contemporary psychology, Westermarck's (1891) key insight was not that humans are innately incest avoidant (although this idea was also significant, especially in the Freudian era), but that natural selection produces information-processing psychological

mechanisms designed to take input from the developmental context and produce some functional output that drives adaptive behavior. Although he did not use this terminology, he essentially made a distinction between *ultimate* and *proximate* explanations: that sexual aversion emerges between family members is a proximate account of behavior; that this serves the function of inbreeding avoidance is the ultimate explanation of the proximate process. Hence, it is not the case that humans have evolved motivations to avoid inbreeding per se; rather, humans – and many other organisms – have evolved simple heuristics that appear to be directed toward the goal of inbreeding avoidance, under most circumstances. But not under all circumstances; in fact, the presence of sexual aversion between *unrelated* people has served as key evidence for Westermarck's hypothesis (e.g., Wolf, 1966).

One critical developmental variable that feeds into the incest-avoidance mechanism seems to be the number of years one has coresided with another person (e.g., Lieberman, Tooby, & Cosmides, 2003). Longer periods of coresidence produce stronger sexual aversions. A large-scale study of arranged marriages in China showed that those arrangements in which infants are adopted into families and reared with their future mates are marked by lower birth rates and higher rates of adultery and divorce than other forms of marriage (Wolf, 1995). Thus it is not simply biological kin who can develop incest aversion, but unrelated people as well. Lieberman, Tooby, and Cosmides (2007) recently argued that duration of coresidence may be less important when more reliable information is available. Specifically, older siblings can observe the arrival of their younger siblings and can observe their mother caring for them. Lieberman et al. (2007) found that for such older siblings, aversion to incest is elevated regardless of coresidence duration; for younger siblings, who cannot observe their older siblings perinatally, coresidence duration is the best available cue and does reliably predict aversion to incest (see also Lieberman, 2009). Either way, it is a sense of familiarity that fuels sexual aversion (we should note that we

use the term *familiarity* to refer to felt closeness such as that typically experienced among family members, not to refer to simple knowledge of another person).

The role of familiarity as a sexual barrier is also apparent when genetically related individuals sometimes do engage in incestuous behavior. The fictional world has no shortage of stories of incest, and in many of these there is a lack of normal familial association between the relevant individuals (Oedipus and Jocasta being the most famous). This is no coincidence. Even if two people are fully aware of their relatedness, without the appropriate level of familiarity they may not experience the normal aversion. Empirical research supports this conjecture. One set of studies found that (nonfictional) genetic siblings who engage in procreative incest (as opposed to non-procreative incest) are more likely to have spent time apart during their childhood (Bevc & Silverman, 1993, 2000; according to these researchers, the incest-avoidance mechanism may have evolved to be highly domain specific, deterring not just sexual feelings in general, but reproductive attempts more specifically). Even in the rare situations in which familiar genetic siblings end up committing incest, their familiarity is at the very least a nuisance. In Eugenides's (2002) novel *Middlesex*, Desdemona and Lefty (sister and brother who grew up with each other) develop romantic feelings and get married incognito: "Their honeymoon proceeded in reverse. Instead of getting to know each other, becoming familiar with likes and dislikes, ticklish spots, pet peeves, Desdemona and Lefty tried to *defamiliarize* themselves with each other" (pp. 71–72, emphasis added).

Westermarck's (1891) hypothesis also implied something that we normally take for granted – that people are capable of identifying and remembering specific *individuals* across extended periods. Familiarity with a specific person implies forming a representation of that person as an abstraction, which persists even as tangible features of the person (facial features, vocal qualities) change over time. This means that psychological processes underlying familiarity

are likely to be distinct from processes typically studied by social cognition researchers, which mostly have to do with how individuals react to strangers under varying circumstances. Often within experimental settings, participants are presented with descriptions or photos of strangers, some key variables (e.g., gender, ethnicity, attractiveness) are manipulated, and some theoretically relevant responses are assessed. However, it is not feasible to experimentally manipulate long-term familiarity in order to assess its effects. Simply put, familiarity is not a “cue” in the same sense that those experimentally manipulable variables are cues. Rather, familiarity is what results when the relationship between two individuals – along with their mental representations – has been fundamentally altered as a result of experience. We stress this point because it has been common practice to employ the term “cue” to refer to familiarity as well as to other potential correlates of kinship – such as facial resemblance – that purportedly require no prior acquaintance. This practice may obscure psychologically distinct processes. In particular, confusion can arise when processes underlying identification of already-familiar individuals (e.g., identifying one’s child via odor cues) are incorrectly described as examples of “kin recognition.” (The ability to recognize an existing family member – based on some sensory cue – is not an instance of kin recognition because the underlying individual-identification mechanism is a domain-general capacity that is useful across social contexts. The same mechanism might be employed, for instance, to identify a well-known enemy.)

As Harris (2006) put it, humans possess a “people-information acquisition device”: Most of us know dozens – or hundreds – of people and have no difficulty telling them apart by the way they look and sound. Highly familiar individuals (such as family members) can indeed be identified by smell alone (e.g., Porter & Moore, 1981). The ability to individuate and to identify familiar persons by sight, sound, and smell are obviously useful components of an incest-

avoidance mechanism. This ability is important for other reasons as well – namely, determining to whom we should direct our altruistic efforts.

<h2>Kin selection and altruism

Consider the set of people closest to you – those you can rely on when in trouble and those you would help without hesitation. Often such people are family members. When it comes to investing our valuable resources (e.g., time, money), we are extremely partial, directing much of it to close kin. Why is this? And what psychological mechanisms underlie this tendency? Here, the conventional biologically informed answer is that individuals are driven to enhance their inclusive fitness, which is achieved by “helping those who share your genes”; and Hamilton (1964) is cited as the author of that idea. But this is a misunderstanding (for discussions and clarifications, see Daly et al., 1997; Dawkins, 1979; Park, 2007). The intuition that “blood is thicker than water” is so deeply ingrained that it can seem like a fundamental law of nature; and we easily translate “blood” into “genes.” However, genetic similarity per se is irrelevant to understanding what actually motivates altruistic behavior. What kin selection theory states is that genes underlying specific altruistic tendencies (e.g., being kind to one’s coresidents) *can* evolve under specific circumstances, not that organisms are genetically omniscient and direct their altruistic efforts accordingly. Kin selection theory is thus a guide for identifying proximate psychological mechanisms (analogous to the proximate coresidence-based mechanism identified by Westermarck); it does not constitute a prescriptive rule for behavior.

A common error is to treat Hamilton’s (1964) inequality ($C < Br$) itself as the proximate psychological mechanism, a decision rule that should guide behavior (see Park, 2007).

Consequently, animals are simply presumed to adjust their level of altruism according to degrees

of relatedness. For instance, because the degree of relatedness is .5 between siblings and .125 between cousins, a simplistic prediction is that individuals should be exactly four times more helpful to a sibling than a cousin. This is what led to Haldane's famous response when asked whether he would give his life to save a drowning brother: "No, but I would to save two brothers or eight cousins" (McElreath & Boyd, 2007, p.82). Hamilton's theory states only that such a tendency *can* evolve, not that it must or did. Because of this confusion, behavioral deviations from Hamilton's theory – which occur frequently – are sometimes incorrectly interpreted as evidence against kin selection theory.

Researchers who wish to apply kin selection theory to altruism must therefore tackle some important questions: What proximate psychological mechanisms actually evolved? Did evolution produce information-processing mechanisms that are finely attuned to degrees of relatedness, such as those between half-siblings, full siblings, and cousins? When we consider the empirical evidence, the picture is far from straightforward. Although humans and many nonhuman animals do tend to favor more closely related individuals (e.g., Chapais, Savard, & Gauthier, 2001; Judge & Hrdy, 1991; Stewart-Williams, 2007; Webster, 2003), evidence of sensitivity to precise degrees of relatedness is virtually nonexistent. But this should not be surprising, given that kin selection theory is not about the *psychology* of kin altruism (see Buss, 2008, p. 232). As with incest avoidance, what seem to have evolved are simple heuristics such as "if X grew up with me in the same nest/litter/home, then be responsive when X needs help." To expect organisms to behave strictly according to degrees of relatedness is to conflate the ultimate and proximate levels (just as humans do not possess motivations to avoid inbreeding per se, they do not possess motivations to be altruistic to genetic kin per se).

Empirical research indicates that the principal "kin-recognition" process underlying incest avoidance – familiarity with specific individuals – underlies kin altruism as well. Lieberman et al.

(2007) found that varying durations of coresidence with specific individuals calibrates altruistic tendencies toward those individuals (at least for altruistic tendencies toward older siblings; with respect to younger siblings, the experience of observing one's mother caring for them seems to suffice). The primacy of familiarity as a determinant of altruism is true in other primates as well (Goodall, 1986; Rendall, 2004). It would thus seem that mechanisms that allow individuals to recognize genetic relations without prior acquaintance are likely to play a relatively minor role, at least among primates. As Rendall (2004) noted, "mechanisms that actually identify and discriminate degrees of genetic relatedness (so-called true kin recognition mechanisms) appear rare" (p. 298). Rare, yes; but do they exist?

<h2>"True" kin-recognition mechanisms?

In the science fiction film *Back to the Future* (Canton et al., 1985), the protagonist Marty McFly travels 30 years into the past, just before his parents (were supposed to) meet each other. Marty is soon disturbed to discover that his mother, Lorraine, has become infatuated with him. In one memorable scene Lorraine passionately kisses Marty. But she immediately appears confused, saying, "This is all wrong. I don't know what it is, but when I'm kissing you, it's like I'm kissing my brother." The audience (and Marty, though too stunned to think clearly) knows why she feels this way. But the mechanism is not made explicit. How did she know that something wasn't right? Did something about Marty's phenotype (his appearance, voice, smell) tip off Lorraine's kin-recognition system?

If such a thing had really occurred (perhaps under a more realistic scenario of long-lost siblings unknowingly going on a date), it would indicate a different sort of kin-recognition capacity, one that does not involve extended familiarity with a specific person. There are

evolutionary reasons to expect such a capacity. Although familiarity is an eminently useful heuristic, it's less useful for close kin who do not share a home (e.g., half siblings). Familiarity is also a less-than-perfect indicator of relatedness for males with respect to offspring because of the problem of paternity uncertainty. If there is a chance that a man's partner has given birth to a child fathered by someone else (and this is common enough in people and other animals), the man cannot rely simply on the fact that he knows the child well. He needs more diagnostic information.

Indeed, there is evidence for what are known as *phenotype matching* mechanisms: Individuals attend to physical and behavioral characteristics that may connote genetic relatedness and react on the basis of those characteristics. Some of these mechanisms seem to be built upon the familiarity system whereby newly encountered individuals are compared to already-familiar kin. For instance, because I am familiar with my brother and his characteristics, if I encounter someone – even a stranger – who resembles my brother, this may then trigger kin-relevant responses. Thus, comparisons may be made between unfamiliar others and a general *kin prototype* (i.e., an evolved heuristic may be “if someone resembles familiar kin, treat that person as kin”). Fostering studies with nonhuman animals have shown that genetically unrelated nestmates/littermates may indeed use each other's features (vocalizations, smells) to serve as the standard of comparison when assessing newly encountered individuals (Sharp, McGowan, Wood, & Hatchwell, 2005; Yamazaki et al., 1988). Of course, in such cases, the phenotype matching mechanisms are no more diagnostic than the familiarity mechanism on which they are based. Are there more foolproof phenotype matching mechanisms? Yes: There is evidence for mechanisms that allow individuals to assess genetic relatedness more directly by comparing a target's features to their own (known as *self-referent* phenotype matching; Hauber & Sherman, 2001).

Unlike familiarity, phenotypic resemblance is a cue that can be experimentally introduced in the absence of existing relationships, making it amenable to laboratory research. In recent years, several studies have investigated the effects of experimentally manipulated facial resemblance. The typical procedure is to take a photograph of a participant's face and to digitally combine it with faces of unfamiliar strangers (for a description, see DeBruine, Jones, Little, & Perrett, 2008). The result is a person who facially resembles the participant, but not so blatantly that the participant consciously notices it. This method has been used to test whether facial resemblance exerts effects that one would expect of a kinship cue – that is, dampening sexual attraction while heightening altruistic reactions; evidence supports these expectations (e.g., DeBruine, 2005). The method has also been used to test whether men are more sensitive than are women to self-child facial resemblance, as one might expect given paternity uncertainty; this hypothesis has received mixed support (e.g., DeBruine, 2004; Platek, Burch, Panyavin, Wasserman, & Gallup, 2002). What may be occurring in these self-morph studies is kin prototype-based phenotype matching (rather than self-referent phenotype matching). The reason is that ancestral humans would have had far greater exposure to the appearance of their family members than to their own (mirrors and cameras being in short supply). Thus, the observed effects of self-morphs may be a consequence of the fact that participants' faces actually resemble those of their family members and thus serve as a proxy for their kin-based prototype. Perhaps these experimental effects would be even stronger if participants viewed photos of strangers manipulated to resemble a close family member.

This burgeoning literature indicates that while the picture is far from clear, people do respond in what appear to be functional ways to facial resemblance (see also DeBruine, Jones, & Perrett, 2005; Platek et al., 2003, 2004). Of course, these phenotype matching mechanisms can lead to errors as well, such as when the kin prototype is based on genetically unrelated

individuals (e.g., one's adopted family). More generally, these experiments are set up precisely to stimulate kinship-relevant responses in the absence of actual kinship. Thus, to the extent that the effects of manipulated facial resemblance actually recruit kin-recognition mechanisms, these findings further demonstrate that it is not only possible but fairly easy to elicit kin-relevant responses in the absence of actual kinship, even when perceivers are consciously aware that no true kinship exists.

Assuming that the effects of manipulated resemblance do pertain to kinship, one must ask how ecologically relevant such cues are, considering that, as noted above, familiarity seems to do much of the "kin-recognition" work. A handful of studies among actual family members have shown that resemblance cues do seem to matter. These studies focus on men's reactions to children, again highlighting the importance of paternity uncertainty. Burch and Gallup (2000) conducted a study among men convicted of spousal abuse, examining whether these men's beliefs about the resemblance between themselves and their children predicted various outcomes. The results showed that perceived resemblance was positively correlated with the quality of the men's relationships with their children, and negatively correlated with the frequency of spousal conflicts and the severity of the injuries suffered by their spouses. Another study found that men's perceived resemblance with their children was positively correlated with the level of investment in the children, operationalized as the amount of attention, time, and help devoted to the children (Apicella & Marlowe, 2004). Importantly, further research has found that actual resemblance (not just perceived resemblance) predicts emotional closeness between father and child, but not between mother and child (Alvergne, Faurie, & Raymond, 2010). A recent study tested men's and women's ability to identify their (purportedly biological) children by odor cues, and investigated their investment in the children (Dubas, Heijkoop, & van Aken, 2009). The results showed that 67.7% of the men and 79.4% of the women could identify their children by

smell. More interestingly, men showed a tendency to invest more in children who were identifiable by smell; women showed no such bias. Thus, the experimental effects reviewed earlier appear indicative of real-life outcomes.

Furthermore, although the evidence is preliminary, it appears that other kinds of similarities – such as attitudinal similarity – may also serve as kinship cues, at least under some circumstances (e.g., Mobbs et al., 2009). Many of us have experienced meeting a person who “reminds” us of a family member and thus draws out charitable feelings (or perhaps mild aversions, in sexual situations). One study found that people who tend to trust their intuitions tend to make stronger implicit associations between an attitudinally similar stranger and “family” concepts, but not the broader category of “pleasant” concepts (Park & Schaller, 2005). Social psychological studies have shown that people possess rich mental representations of significant individuals (e.g., parent, sibling, spouse), and when presented with a novel target who resembles a significant individual, information processing of the target is influenced by those existing representations (Andersen, Glassman, Chen, & Cole, 1995). For example, after meeting a person who reminds me of my brother, I might mistakenly remember that the person likes to watch science fiction films because my brother does.

Finally, we mentioned earlier that according to conventional social psychological wisdom, people are attracted to “similar” (and “familiar”) others. Does this contradict the view that familiarity and phenotypic resemblance should *reduce* attraction? Not at all. As it turns out, the social psychological literature on the impact of similarity/familiarity on “attraction” is not about sexual attraction, but about *liking* (see Park et al., 2008). That similarity promotes liking is fully consistent with the present perspective: Outside of sexual contexts, information connoting kinship is expected to increase affinity. This sort of divergent effect of similarity is consistent with other theoretical perspectives as well. Describing his Exotic Becomes Erotic theory, Bem

(1996) noted that “similarity may promote friendship, compatibility, and companionate love, but it is dissimilarity that sparks erotic/romantic attraction and passionate love” (p. 323). Familiarity has similar consequences: Westermarck’s (1891) theory implies that while familiarity may arouse compassion, it is novelty that fuels passion.

<h1>Psychology of kin relations beyond the family

In this section, we explain why the kin-recognition processes described above inevitably lead to situations in which nonkin are perceived as kin, and vice versa. As we describe below, the tendency to treat nonkin as kin may underlie – at least to some extent – relationships between unrelated individuals; moreover, based on evolutionary cost–benefit analysis, it is possible to predict who should be especially prone to treating nonkin as kin, and when.

<h2>Over-inclusive kin perception and sex differences

A key point concerning the kin-recognition systems described above is that although they are often effective (people who live with us and look like us are usually kin), they are not foolproof. Consider sibling relations. None of the kin-recognition systems seems capable of reliably identifying true genetic siblings under all circumstances. Familiarity becomes unreliable the moment someone is switched at birth (or, more realistically, is adopted, is brought into a step family, or is a half-sibling who grows up in a different household). And it is far from clear whether phenotype-matching mechanisms are sensitive enough to make fine distinctions such as those between a full sibling, half-sibling, and cousin. Even the self-referent phenotype matching process can be activated by a complete stranger who, by sheer coincidence, looks, sounds, smells,

and acts like we do. Thus, kin recognition presents a signal-detection problem, inevitably producing false-positive and false-negative errors. Unrelated coresidents who refuse each other as sexual partners commit a false-positive error (they infer kinship in its absence). Genetic siblings who engage in incest commit a false-negative error (they fail to infer kinship in its presence). Assuming that it's impossible to eliminate these kinds of errors, is there any reason to expect bias toward one type of error?

When engaging in scientific hypothesis testing, we are deliberately biased against false-positive errors (i.e., inferring effects in their absence) because we find them to be more costly for science. Within biological organisms, natural selection can produce psychological mechanisms with biases against the type of error that is more costly in terms of reproductive fitness; thus, people tend to over-perceive dangers, and men tend to over-perceive sexual interest in women, as under-perception in these particular contexts is more costly (Haselton & Nettle, 2006). Conversely, people tend to under-perceive individuating characteristics of outgroup faces (Ostrom & Sedikides, 1992), and women tend to under-perceive men's romantic commitment intentions, especially prior to the onset of sexual activity in relationships (Ackerman, Griskevicius, & Li, 2009). Assuming a degree of ambiguity regarding genetic relatedness, is it more costly to over-perceive or under-perceive kinship?

Within the contexts of sexual relations and altruism, respectively, the consequences of false-negative errors are incest and failing to provide aid to real kin, whereas the consequences of false-positive errors are refusing a genetically suitable mate and providing aid to nonkin. Whether a bias toward one type of error is more adaptive will clearly depend on several factors, such as the sheer number of close kin in one's environment (Park et al., 2008). For instance, if most people you encounter happen to be kin (because you come from a big family in a small village),

the odds of committing false-positive errors are low, so it may be more adaptive to be biased toward such errors.

One important variable that may modulate these kin-recognition biases is one's sex (Ackerman et al., 2007). Inbreeding is costly, but it is more costly for females than males (as any unfit reproduction is more costly for mammalian females; Trivers, 1972). So, women are expected to harbor a stronger bias toward false-positive errors (i.e., a tendency to infer kinship in its absence) in the context of sexual relations than men. Indeed, women do seem to find the prospect of incest more aversive than do men under some circumstances (Fessler & Navarrete, 2004). More importantly, there should be a particularly large sex difference in aversion toward sex with close but unrelated individuals – instances in which women, but not men, (unconsciously) perceive the target as kin. Likewise, providing gratuitous aid to nonkin is costly (though admirable), but it may be relatively less costly for females than for males. Female nonkin relationships tend to be more communal than men's, marked by tight connections and socio-emotional bonds (Baumeister & Sommer, 1997; Geary & Flinn, 2002; Kashima et al., 1995), and the types of support provided in these relationships mirrors the altruism within families – given without strong expectation of reciprocity (Ackerman & Kenrick, 2008; Clark, Mills, & Powell, 1986). There is also historical evidence to suggest that humans were ancestrally patrilocal (i.e., at marriage, women moved into men's families and not the converse; Pasternak, Ember, & Ember, 1997), which may have created pressure for women to form supportive social alliances by over-perceiving kinship. In contrast, men's nonkin relationships tend to be more hierarchical and task-oriented, with support following a reciprocal, exchange-based format. Within such situations, women's accidental altruism toward nonkin is likely to build social relationships, but men's altruism is less likely to do so. In fact, male altruism may even upset established or anticipated social hierarchies (e.g., consider two men fighting over who will pay the dinner bill). This is not

to say that men never treat unrelated others like family, but simply that within the contexts of sexual or altruistic interaction, women are more likely to benefit from over-perceiving kinship.

Psychological kinship

As reviewed above, it is not genetic relatedness per se that underlies kinship-relevant behavior; what matters is the extent to which a particular person is perceived as “kin” – what Lieberman et al. (2007) referred to as the *kinship index*. The perception of kinship encompasses propositional knowledge that a particular person is a sibling, cousin, etc.; familiarity that one feels with respect to those persons; and implicit detection of other kinship cues. So, even if a person is genetically unrelated to us, we may consciously categorize that person as kin (e.g., as a “sibling,” if there has been a history of coresidence) and/or we may experience cognitive and emotional reactions normally directed towards kin (such as dampened passion and heightened compassion) in interactions with this person. Wolf (1966) relates a girl’s reply when asked why she refused to marry a boy whose family she had joined as a child: “I just couldn’t do it. It was too embarrassing. Imagine marrying your brother!” (p. 893). Pinker (1997) referred to such erroneous perceptions as “kinship illusions.” More generally, the perception and experience of kinship – erroneous or not – has been referred to as “psychological kinship” (Bailey, 1988).

A handful of social psychological studies have attempted to investigate psychological kinship – that is, the specific cognitive and emotional mediators of kin-directed behavior (Korchmaros & Kenny, 2001; Kruger, 2003; Maner & Gailliot, 2007; Neyer & Lang, 2003; Park & Schaller, 2005). These have all focused on mediators of altruism, and they have revealed that emotional closeness – and more specifically empathic concern – may be among the key mediators. Cognitive mediators such as perceived self–other overlap have been shown to predict

helping behaviors as well (Maner et al., 2002). Park and Schaller (2005) found that, while an attitudinally similar stranger implicitly activates both “family” and “pleasant” concepts, only the former concept predicts desire to assist the target individual. Thus, one component of psychological kinship appears to be cognitive activation of family-related concepts, rather than activation of positive concepts more broadly. The cognitive processing of psychological kin may therefore recruit the same psychological mechanisms devoted to the processing of real kin (Ackerman et al., 2007; Park et al., 2008).

An important implication is that when a person experiences psychological kinship with someone else, even an unrelated person, this may trigger sexual aversion and/or altruistic behaviors. Of course, the experience of psychological kinship is not all-or-nothing, and people may sometimes actively ignore certain pieces of kin-connoting information; thus, reactions in the real world will likely comprise a mixture of thoughts and feelings at varying degrees of strength. For example, a woman who has a brother who looks uncannily like her, and with whom she has coresided, may experience a robustly high level of psychological kinship with him. On the other hand, a man who meets a woman who shares his attitudes and interests may experience a low level of psychological kinship, which may decrease to zero if he is romantically inclined towards her. Most instances of psychological kinship will fall within these extremes, thus emphasizing the importance of relationship context for modulating the perception of kinship. Below, we discuss some of these contexts, focusing our discussion explicitly on relationships and interactions between genetically unrelated individuals. Many of these have traditionally been studied as unique, independent relationship domains. Our perspective suggests instead that our understanding and treatment of people within a wide variety of relationships is influenced by mechanisms designed for the processing of kin, at least to a greater extent than we may recognize.

<h2>Friendship

We know that the key antecedents of psychological kinship are high levels of familiarity and perceived similarity, and that emotional closeness and empathy are key affective reactions. Are there nonkin relationships that are characterized by high familiarity, similarity, emotional closeness, and empathy? Yes: friendships.

Next to family members, friends seem to occupy an especially important place in most people's social networks. In some ways, friendship connotes a level of closeness that even exceeds what is typically experienced between siblings, as revealed by the intelligible statement "my sister and I are so close, we are practically best friends." (Of course, the blurring of relationship boundaries in the opposite direction occurs as well: "My friend and I are so close, we're like sisters.") As with kinship, the psychology of friendship seems to have received relatively little attention in social psychology (the same *JPSP* search returned 44 articles with "friend," "friends," or "friendship" in the title, representing 0.55% of the total; and only a subset of these articles appeared to be about friendship per se). What is friendship? How is it psychologically distinct from kinship? And under what circumstances might psychological kinship underlie friendship?

Objectively, kinship and friendship (among unrelated individuals) are different. Kin are genetically related; friends are not. With many kin, a large chunk of childhood is spent living in the same household; this is rarely the case for friends. Friends do not suffer genetic fitness costs from engaging in sexual activity. Altruism towards friends also nominally falls outside the domain of kin selection. By default, then, helping between friends would seem to be best explained by reciprocal altruism (Trivers, 1971) – the other major theory of the evolution of

altruism, which explains the tendency to help as dependent on future opportunities to have that help repaid. On the surface this seems sensible, as friendship does involve give and take. However, theory and research in the social sciences – as well as our intuitions regarding friendship – tell a different story.

A common categorization of human relationships distinguishes between *communal* and *exchange* relationships (e.g., Clark & Mills, 1979; Fiske, 1992). Communal relationships are defined in part by a tendency for individuals to provide assistance to each other largely unconditionally; exchange relationships, on the other hand, are defined by the norms of reciprocal exchange. Interestingly, early theorists simply assumed that both friends and family fall within the communal category. More importantly, research has shown that friendship does indeed follow the communal pattern (Clark, Mills, & Corcoran, 1989), implying that people think of friendships as relationships that should not be governed explicitly by reciprocal exchange (see also Stewart-Williams, 2007). Indeed, a good way to nip a budding friendship is to return favors blatantly or to refuse them in the first place. Such considerations suggest a commonality between kinship and friendship. However, there are important differences as well. For example, people preferentially give help to kin or to friends under different circumstances. People provide more low-cost help to friends than to siblings, but more high-cost help to siblings than to friends (Stewart-Williams, 2007). Evidence also suggests that people prefer providing instrumental support to kin and emotional support to friends (Felton & Berry, 1992; Taylor & Chatters, 1986). Furthermore, despite similarities in the communal nature of the relationships, kinships may be more impervious to relationship threats. Even in those cases where friends psychologically feel like kin, a long-term lack of reciprocity can lead to the dissolution of friendships (Ackerman & Kenrick, 2008; Argyle & Henderson, 1984). Kinship, on the other hand, is for life.

These considerations suggest that friendship is conceptually distinct from other relationships, that altruism towards friends is fully explained by neither kin selection nor reciprocal altruism. Indeed, evolutionary psychologists have proposed that friendship develops via alternative routes, such as positive feedback of mutual valuation (Tooby & Cosmides, 1996) and alliance formation (DeScioli & Kurzban, 2009). From the present perspective, one theoretical possibility is that friendships develop along a rather independent trajectory from that of kinships, but over time adopt many of the same psychological mechanisms. For instance, many newly formed alliances involve heightened sensitivity to reciprocal exchange and the overall equality that is maintained in the relationship (e.g., Clark & Mills, 1979). Over time, reciprocity becomes less important and communal (familial) feelings grow (Lydon, Jamieson, & Holmes, 1997). The costs of false-positive kinship-perception errors also drop as friendships develop (e.g., the risks of being cheated are lower within more established friendships). Thus, in many situations, and for many people, friends may become psychological kin.

Recent research reveals that the tendency to experience friendship as being akin to kinship may be more pronounced for some people than for others. We considered above why women might be more inclined to treat unrelated others as family members (i.e., because of the norms of female relationships, the higher costs of inbreeding, and ancestral patrilocality). Importantly, this does not mean women should treat *all* others as kin. The potential costs of responding to unfamiliar people as though they were family – from physical and economic harm to the loss of mating opportunities – can be quite high. Friends, however, represent an ideal combination of closeness and familiarity to encourage signal-detection errors among women.

Ackerman and colleagues tested this idea in several studies that examined emotional and behavioral reactions to three types of relationships – siblings, friends, and strangers. Two studies asked men and women to imagine either kissing (Study 1) or having sex with (Study 2) an

opposite-sex person from one of the three relationship categories, and then to indicate the extent of various emotions they felt while imagining these scenarios (Study 2 is reported in Ackerman et al., 2007). Both studies revealed similar patterns (though kissing did not elicit as strongly negative or positive reactions as did sex). The thought of making out or having sex with a sibling was quite upsetting for most people: Men and women reported high levels of disgust and low levels of positive affect. The opposite was true for imagined strangers: Emotional responses were uniformly positive (presumably these were not undesirable imaginary strangers). However, reactions to friends were more complex: Men were as positive to romance with friends as they were to romance with strangers; women, on the other hand, were more negative to romantic thoughts about friends, and they felt especially strong disgust, an emotion tied to sexual aversion (e.g., Lieberman et al., 2007; Tybur, Lieberman, & Griskevicius, 2009). Consistent with this finding, in a study conducted by Park (2008), women reported greater disgust than did men when instructed to imagine having sex with a close friend, whereas men and women reported equally high levels of disgust when instructed to imagine having sex with close kin.

In another study, Ackerman et al. (2007) investigated the role of biological sex and relationship type on altruistic behavior. Here, people took part in an online quiz task in which they worked on logic questions in two-person team environments consisting of real kin (parents, children, and siblings), friends, and strangers. Each person attempted to complete as many questions as possible within a limited time. At the end, the total team score was calculated and provided to the participants (no individual performance feedback was given). Unbeknownst to participants, every team received the same score: 93% correct. Each person then judged which team member was most responsible for the outcome. As in the earlier studies, women and men responded identically within the kin and stranger pairings: Everyone gave credit to their family members and took credit from strangers. Thus, people were more altruistic with family than with

unrelated others. However, with friends, judgments again diverged. Men treated their friends like strangers, taking credit for the successful outcome. Women treated their friends like kin, giving credit for success to their friends. These patterns indicate more than people simply being nicer to women than to men; the team partners were an equal mix of men and women in all conditions. Instead, a cogent explanation is that women treated their friends more like family members than did men, both in sexual and altruistic contexts.

These studies are consistent with the idea that women use psychological mechanisms associated with kinship to process friendship, at least more so than do men, but they also raise a number of intriguing questions. For instance, how might kin-relevant psychological mechanisms be activated? One possibility is that some implicit process is triggered during friendship formation, akin to a critical period in which friends are imprinted into women's kinship networks. Another possibility is that the cognitive and behavioral strategies women use when interacting with friends exploit kinship indicators such as familiarity and similarity. We have already mentioned female-biased interaction norms of cooperation and socio-emotional connection. Other behaviors, such as mutual grooming and dressing alike, may also produce familial feelings. Finally, such norms and behaviors may facilitate cognitively taking the perspective of friends, an ability more indicative of biological than nonbiological relationships. If so, this might suggest that psychological kinship can be elicited through repeatedly simulating the mental perspective of others. These types of mechanisms are relevant to men as well, of course, but may be activated primarily under specific conditions. One of these specific conditions may be the presence of intergroup competition.

<h2>Intergroup competition and male bonding

Why might intergroup competition lead men to treat their friends as though they were kin? Competition between individuals and groups, from families to teams to nations, is a central feature of humans' evolutionary history (Ackerman & Kenrick, 2008; Baumeister & Leary, 1995). The potential for social conflict may in fact be the primary motivator of non-genetic, non-romantic social bonding. However, across societies and primate species, one subset of individuals participates in and is responsive to intergroup conflict more than any other – males. In humans, men have historically been the soldiers in warfare and the players in team sports. This is not simply because men are more aggressive than are women. The mere suggestion of competition between groups triggers ingroup male-bonding mechanisms. For example, telling people that researchers are studying the relative performance of groups leads male members of those groups, but not female members, to engage in costly ingroup cooperation (Van Vugt, De Cremer, & Janssen, 2007). In fact, this relatively minor intergroup threat also increases men's identification with their ingroup. Van Vugt and colleagues (2007; Van Vugt & Park, 2010) have proposed that such findings, and those from studies in many other cultures (e.g., Chagnon, 1988; Keegan, 1994), are evidence for a *male warrior hypothesis*. This hypothesis states that the behaviors and cognitions of men are more oriented toward between-group interactions than are those of women. The reason for this sex difference is that men stand to gain relatively more status and reproductive benefits through group-level competition.

The presence of intergroup threat thus motivates both ingroup solidarity and, potentially, improved ingroup performance. Sports teams may excel and gain fervent fan followings by emphasizing competition with close rivals, and the same is true for religious sects, nations, and even newly formed “minimal” groups (Ackerman, Shapiro, & Maner, in press; Campbell, 1965; Hammond & Axelrod, 2006; Sherif, Harvey, White, Hood, & Sherif, 1961). Male bonding is especially likely to increase as a result of outgroup-threat signals. Under such conditions, men

may begin to over-perceive kinship among their friends and associates. If so, this suggests that intergroup competition will lead men not only to behave more altruistically toward their friends, but also to respond less positively toward suggestions of romantic relations with opposite-sex friends. Anecdotal and experimental evidence supports the former possibility (e.g., self-sacrificial behavior to save fellow soldiers during wartime; also see the above citations), though less is known about the latter possibility. Although designed to test somewhat different hypotheses, Ackerman and Kenrick (2009) conducted a series of studies on intragroup and intergroup romance that have implications both for altruistic behavior and for the prospect of decreased male attraction toward female friends.

“The Mating Game” refers to the social and competitive process of forming romantic relationships. People playing this game (i.e., attempting to attract a mate) must navigate murky romantic waters by convincing potential mates that they are desirable selections and by besting competitors for those mates. Therefore, for heterosexual individuals, romantic relationship formation involves a game of “intergroup competition” between men and women. Sometimes, though, this mating game is a team sport. That is, people may help each other to find, evaluate, and attract romantic partners. Historically, and at present in many cultures, these “teammates” consist of family members (see Kenrick & Keefe, 1992; Park, Dubbs, & Buunk, 2009). For example, parents or other kin may broker the selection of marriage partners (Apostolou, 2007), or people may simply try to influence the mating behavior of their relatives (Faulkner & Schaller, 2007). In relatively more mobile, Western cultures, friends may act as psychological kin for similar purposes.

In a series of studies investigating cooperative courtship behaviors, Ackerman and Kenrick (2009) tested the possibility that friends would help each other to achieve romantic goals. The studies revealed that men and women in the U.S. did help their friends in ways akin to

the help given by kin in other cultures. For instance, in many such societies (especially polygynous ones), it is the woman's family which attempts to negotiate a high threshold for a husband, whereas the man relies on his family to help pay an adequate bride-price (Anderson, 2007; Geary & Flinn, 2001). This pattern is indicative of differing romantic motivations that males and females hold as a result of evolved parental investment pressures. That is, the relatively higher potential costs borne by females from investing in offspring (e.g., pregnancy) lead women to be more romantically choosy than men. Thus, women are more likely to set up romantic thresholds for men to overcome by demonstrating their quality as a mate. Indeed, the studies showed that women were more likely to help each other build barriers to unwanted romance and even test the value of desirable males, whereas men were more likely to help each other break down those barriers (Ackerman & Kenrick, 2009). Interestingly, opposite-sex friends adjusted the type of help they gave in order to meet their friends' romantic goals. People even used counterfeit romantic partners to build and break down barriers. These behaviors carry high potential costs (e.g., helpers may "cheat" by attempting to attract a desirable target rather than aid a friend), and thus only people who share a high degree of trust and common fate make good teammates. We propose that the use of friends in these situations may signal that these friends feel a sense of psychological kinship. Further, the aid given by opposite-sex friends (e.g., women helping men attract other women, men helping women to block other men) may also suggest that these friends feel decreased romantic attraction towards each other. Regardless, the results of these studies indicate that both women *and* men can interact with friends much as they do kin. Women may generally be more likely to do so, but in the context of intergroup competition, men's friends may become more like family.

<h2>The use and misuse of kinship terms

The impact of psychological kinship may also be felt in our linguistic interactions. The wide array of terms used to identify kin highlights the importance of formally establishing rules of social relations and genetic heritage among family members. Kin can be distinguished by gender, lineage, degree of genetic overlap, and marriage, all to a fine degree. Contrast this with the far more imprecise identification of “friends.” Here, if a qualification is made, it is usually limited to “friends” versus “best friends.” An alternative way of identifying the closeness felt with such unrelated others is through the over-application of kinship terminology.

People use kin terms to regulate social connections within a number of nonbiological relationships. Among friends, people might refer to “blood brothers” or “blood sisters,” or label someone “a member of my family.” Through marriage, people may become step-siblings or cousins-in-law. Close friends of one’s parents might become “aunts,” “uncles,” or even “godparents.” Similar terminology is used within groups that share some common interest or distinguishing characteristic. Student coalitions like sororities and fraternities allow “sisters” and “brothers” to bond through shared activities and communal living. Social groups bound by race or ethnicity may adopt these terms as well. Businesses may label themselves “happy families,” even when their employees are unrelated. Organized criminal gangs, such as the Mafia or Yakuza, also profit from familial labels. Even nonhumans can benefit from the use of kinship terminology. Pets become “members of the family,” and many religions construe deities as “father- and mother-figures” (and the members as “children”). In fact, there is evidence that political speech is especially evocative when it employs these sorts of kin terms (Johnson, Ratwik, & Sawyer, 1987; Salmon, 1998).

This broad application of kin terms can help to ensure that the same benefits provided to genetic relatives can spread to unrelated others. Simulated relatedness promotes the exchange of

social support and encourages socialization within communities (Chatters, Taylor, & Jayakody, 1994). Fictive kinship can also kick start engagement in reciprocal relationships (e.g., Chatters et al., 1994). These relationships tend to involve more lenient reciprocation schedules than relationships with explicitly unrelated individuals, and thus overall cooperativeness is increased. Research suggests that those people who lack close kin and other sources of support may be most likely to form false familial relationships (MacRae, 1992). Interestingly, fictive kinship may sometimes be the result of donated social support, and not the elicitor of it (e.g., Karner, 1998).

<h1>Conclusions and future directions

In this chapter, we highlighted two major points about kin relations within and beyond the family. First, to understand kinship-relevant behavior, we must rigorously identify the underlying psychological mechanisms. Behavior cannot be simply assumed to follow normative, biologically derived expectations, because organisms have not necessarily evolved to accurately calculate genetic relatedness between themselves and others and to behave accordingly. What seem to have evolved are psychological heuristics, which promote adaptive behavior but are not immune to “kinship illusions.” The second important point is that the psychological processes underlying kin relations may exert influences within other social relationships; moreover, based on evolutionary cost–benefit analysis, we can predict when people’s kinship psychology may be especially likely to be over-applied. We reviewed research showing that across both sexual and altruistic contexts, women are especially likely to treat their friends as though they were kin. As we discussed above, however, men may treat their friends (or other close individuals) as though they were kin within the context of intergroup conflict.

Although our analysis of friendship does suggest that friendship is sometimes akin to kinship, we do not rule out the possibility that people possess distinct psychological mechanisms to process friendship. We are thus left with several important questions. To what extent do the observed effects (e.g., women reacting to friends as though they were kin) indicate activation of kin-processing psychological mechanisms? How distinct are the psychological mechanisms underlying kinship and friendship? More broadly, to what extent are kin- and other relationship-processing mechanism domain specific?

These kinds of questions are not merely academic. Research on the psychology of kin relations is being closely followed by legal scholars, who in turn are publishing writings that could potentially influence policy in areas such as foster care and adoption (e.g., Herring, 2003, 2009). Thus, another area for future research concerns applying knowledge of kinship psychology towards maximizing high-quality care among children placed in foster or adoptive care. Is a child better off when placed with parents whom the child physically resembles? If so, is it especially important for the child to resemble male parents? More broadly, how might the psychology of kinship influence people's subjective definition of kinship? In custody battles involving biological and adoptive parents, might some people be more inclined towards perceiving that the adoptive parents (with their high level of familiarity) are the "real parents"? People's definitions of and reactions to incest might also be influenced by these psychological mechanisms. Such questions demonstrate the fundamental and practical importance of expanding our knowledge base on issues of kin relations, both within and beyond the family. We have barely scratched the surface on such matters.

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