

Nepotistic nosiness: inclusive fitness and vigilance of kin members' romantic relationships[☆]

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Initial receipt 15 August 2006; final revision received 26 June 2007

Abstract

The logic of inclusive fitness suggests that people should be attentive to the mating relationships of their kin—especially their genetically closest kin. This logic further suggests that people will be especially attentive to close kin members' relationships when a greater indirect fitness benefit is at stake. Three studies tested implications of this analysis. The primary results were that (a) people maintain greater vigilance over (and attempt greater influence on) the romantic relationships of genetically closer kin; (b) this effect is largely mediated by feelings of emotional closeness and perceptions of physical similarity; (c) women are more vigilant than men over their kin members' relationships; (d) people are more vigilant over the relationships of female kin, as compared to male kin, but only under conditions with especially clear implications for indirect fitness; and (e) people are more vigilant over kin members' long-term committed relationships, as compared to their casual relationships. These results indicate that a subtle form of nepotism is manifest in people's concern with their kin members' romantic relationships.

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Keywords: Differential parental investment; Inclusive fitness; Kinship; Mate choice; Nepotism; Sex differences

“Human beings, wherever we meet them, display an almost obsessional interest in matters of sex and kinship. Presumably this has always been the case.”

(Edmund Leach, 1966, p. 41)

1. Introduction

People care about sex. For instance, they care about whom they have sex with. There is an enormous literature documenting the specific preferences that people have about their sexual partners—and the predictable ways in which preferences differ depending on gender, personality, and ecological circumstances (e.g., Buss, 1989; Gangestad, Haselton, & Buss, 2006; Gangestad & Simpson, 2001).

People care about kinship too. They care about the outcomes experienced by kin members—especially kin

members to whom they are most closely related. There is a substantial literature documenting the implications of these concerns on a wide range of cognitive, behavioral, and cultural phenomena (e.g., Burnstein, Crandall, & Kitayama, 1994; Daly & Wilson, 1988; Park & Schaller, 2005; Pollet, 2007; Stewart-Williams, 2007).

It is no surprise, then, that when matters of sex intersect with matters of kinship, people care a lot. This is evident most obviously in the fact that there exist incest taboos in virtually every human culture and that the very thought of incest precipitates disgust (Brown, 1991; Fessler & Navarrete, 2004; Lieberman, Tooby, & Cosmides, 2003). Even aside from specific objections to incest, people care a great deal about whom their kin take as mates. In many human cultures, marriages are arranged by parents, and parental influence regularly occurs even in cultures in which individuals are ostensibly free to choose their own mates (Sprecher & Felmlee, 1992). There appears to be a common inclination to exert influence over the mating relationships of our kin.

There is surprisingly little research on this topic, however. What research there is focuses on the preferences that parents have for their children's mates (Baber, 1936)

[☆] This research was supported by a Killam Predoctoral Fellowship awarded to Jason Faulkner and by a research grant awarded to Mark Schaller by the Social Sciences and Humanities Research Council of Canada. We deeply appreciate the financial support.

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or on the extent to which parents succeed in bringing about desired matchmaking outcomes (Driscoll, Davis, & Lipetz, 1972; Sprecher & Felmlee, 1992). These studies focus only on parental concerns and do not consider kin relations more broadly; neither does the existing literature consider fully the psychological considerations that likely precede any attempt to exert influence over kin members' mating relationships.

We report the results of a series of studies designed to help fill these gaps. These studies examine a phenomenon that has not previously received empirical attention: the extent to which people maintain some form of effortful vigilance over their kin members' mating relationships. These studies examine the predictive effects of a number of variables—including degree of genetic relatedness, kin member's sex, and the particular kind of mating relationship that the kin member is in. All hypotheses were deduced by applying the logic of inclusive fitness.

1.1. Implications of inclusive fitness

The logic of inclusive fitness sheds light on why people are nepotistic, expending valuable resources in favor of genetically closer kin. Individuals' total level of fitness depends not only on their own reproductive fitness (direct fitness) but also on the reproductive fitness of their kin (indirect fitness). When individuals expend effort or resources that benefit close kin, they gain an indirect fitness benefit themselves. When resources are expended on more distant kin, the indirect fitness benefit is reduced. Consistent with this logic, there is evidence of nepotism across a variety of behavioral domains in which potential fitness benefits must be weighed against the costs of resource allocation (e.g., Essock-Vitale & McGuire, 1980; Laham, Gonsalkorale, & von Hippel, 2005). The most obvious implication is in the realm of helping behavior. People more readily help genetically close kin than more distant kin, especially under circumstances in which fitness benefits most clearly outweigh costs (Burnstein et al., 1994).

This same logic helps us understand why people take an interest in—and sometimes attempt to exert an influence on—their kin members' mating relationships. If one's total inclusive fitness depends, in part, on the reproductive fitness of kin, one's fitness is maximized when kin members are themselves maximally reproductively fit. One's fitness is potentially reduced whenever kin members get involved in relationships with mates who seem unlikely to help those kin members produce reproductively viable offspring. This implication is greatest for genetically closer kin. The logical consequence is that people are likely to take an interest in exactly whom their kin members take as mates and to do so especially for genetically closer kin. Thus, on any variable assessing vigilant attention to (or attempts to exert influence on) kin members' romantic relationships, the typical pattern of nepotistic behavior is likely to be observed: People are expected to be more vigilant of (and to attempt more

influence over) the relationships of genetically close kin, as compared to more distant kin.

1.2. Sex differences

Genetic relatedness is not the only important consideration here. Sex matters too. The logic of differential parental investment implies that there may be sex differences in the extent to which people are vigilant over the mating relationships of their kin.

Women invest many more resources than men do in the production of offspring and can bear fewer offspring than a man can sire. Thus, any act of intercourse with a reproductively substandard mate has potential fitness costs that are much greater for a woman than for a man. [As a consequence, women tend to be more sexually cautious than men and tend to hold their mates to higher standards (Haselton & Buss, 2000; Kenrick, Sadalla, Groth, & Trost, 1990).] If one fails to attend to the mating activities of a female kin member, one potentially loses the opportunity to dissuade that female kin from spending one of her precious reproductive opportunities on a substandard mate—an act that can have indirect implications on one's own fitness as well. The mating activities of male kin have less consequential implications for one's own inclusive fitness. Thus, just as women are more vigilant than men are over the choice of their own mates, the logic of inclusive fitness suggests that people will exert greater vigilance over female kin members' relationships than over male kin members' relationships.

Another sex difference is implied by considering a trade-off between indirect and direct means of enhancing reproductive fitness. When greater resources (e.g., time and effort) are expended to enhance the reproductive success of one's kin, fewer resources may be available to expend on one's own reproductive success. This may be a more costly trade-off for men because of their greater capacity for enhancing reproductive fitness through direct means (i.e., through the production of offspring). Conversely, because women have greater constraints on their capacity to enhance reproductive fitness directly, they may be relatively more inclined toward indirect means of fitness enhancement. This reasoning accounts for the finding that women show stronger nepotistic tendencies than men do (e.g., Neyer & Lang, 2003; Salmon & Daly, 1996). The same reasoning also suggests the prediction that women may be more vigilant of their kin's relationships than men.

1.3. Relationship type

Not all romantic relationships are created equal. One important dimension along which they vary is the level of commitment involved: the extent to which the relationship is a casual fling or a more durable long-term relationship. Compared to casual relationships, longer-lasting relationships are more likely to produce offspring. [One consequence is that people—both men and women—are more discriminating when choosing partners for long-term

romantic relationships (Buunk, Dijkstra, Fetchenhauer, & Kenrick, 2002; Kenrick et al., 1990.) Thus, longer-lasting relationships typically have greater implications for the inclusive fitness of kin members. If, as we have suggested, vigilance over kin members' relationships is influenced by inclusive fitness considerations, it follows that this vigilance should be more pronounced for kin members' long-term committed relationships, as compared to their more casual relationships.

1.4. Overview of the three empirical studies

Across three studies, questionnaire methods were used to assess the extent to which people are vigilant of their kin member's romantic relationships. Study 1 assessed the extent to which participants were aware of and/or worried about specific kin members' romantic relationships. It tested the hypothesis that this form of relationship vigilance would be more pronounced for kin who are more closely genetically related. It also tested for the hypothesized sex differences. In Study 2, these same hypotheses were tested again using a revised methodology that assessed the extent that people perceived specific kin members to be vigilant of their own romantic relationships. Additional methods assessed the extent to which specific kin members actually attempted to behaviorally influence their romantic relationships. Study 2 also included methods that allowed us to explore proximal psychological variables that might mediate the relationship between genetic relatedness and relationship vigilance. Study 3 further extended this program of research by testing the extent to which specific kin members are perceived to be differentially vigilant over brief causal relationships versus more long-lasting committed relationships.

2. Study 1

Male and female participants completed a questionnaire assessing the extent that they were vigilant over the romantic relationships of genetically close kin (siblings, parents) and genetically distant kin (cousins).

2.1. Method

Participants were 123 University of British Columbia undergraduate students (92 women and 30 men; 1 additional participant failed to indicate sex). Mean age was 20.3 years. (Space constraints preclude a complete report of demographic characteristics, but the ethnic diversity that characterizes the participant samples is worth noting briefly: Across all three studies reported here, 53% of participants were of East Asian ethnic background, 30% were of European background, and 17% were of various other ethnic backgrounds.)

Participants were randomly assigned to answer a questionnaire about one of six kin members: brother, sister, father, mother, male cousin, or female cousin. (Some participants' families lacked the kin member about

whom they were initially assigned to answer a questionnaire. In these cases, participants were randomly reassigned to answer a questionnaire about another kin member.) Given that many participants' parents were involved in long-term relationships, participants answering questionnaires about a parent's romantic relationships were asked to imagine a scenario in which that parent has recently become single and is looking for a new romantic partner. Participants answering questionnaires about a sibling or cousin were instructed to respond about one who was at least 16 years old. The mean age of siblings and cousins was 21.4 and 22.6 years, respectively. The mean age of parents was 49.6 years.

All participants responded to three items assessing the extent to which they are vigilant of their kin member's romantic relationships: "I am usually aware of my [kin member's] romantic partners' good and bad qualities," "I am usually aware of how my [kin member's] romantic relationships are progressing," and "I often worry about how my [kin member's] romantic relationships are progressing." Participants rated their agreement with each statement on 9-point scales with endpoints labeled *strongly disagree* and *strongly agree*. Responses to these three items were positively correlated (r values $>.28$, p values $<.001$). We computed the mean ratings across these three items to serve as a composite index of vigilance (Cronbach's $\alpha=.68$).

2.2. Results and discussion

Preliminary analyses revealed that participants were about equally vigilant of sisters' relationships and mothers' relationships [means=6.46 and 6.70; $t(41)=0.55$, $p=.58$] and about equally vigilant of brothers' relationships and fathers' relationships [means=5.68 and 5.59; $t(38)=0.19$, $p=.85$]. We therefore pooled responses about same-sex siblings and parents to represent vigilance over "first-degree" kin and compared these pooled responses with responses about male and female cousins ("third-degree" kin).

We subjected scores on the composite vigilance index to a $2 \times 2 \times 2$ analysis of variance (ANOVA) to assess the effects of three predictor variables: sex of participant, sex of kin, and degree of genetic relatedness. There was a main effect of genetic relatedness [$\eta^2=.13$, $F(1,114)=16.90$, $p<.001$]. Participants were more vigilant of first-degree kin (mean=6.11) than they were of third-degree kin (mean=4.48). No clear evidence of sex differences emerged. Although female participants did indicate more vigilance than male participants did (means=5.64 and 5.39) and all participants indicated greater vigilance over the relationships of female kin, as compared to male kin (means=5.91 and 5.22), neither sex difference was statistically significant (both p values $>.20$). There was, however, an interaction between genetic relatedness and sex of kin [$\eta^2=.04$, $F(1,114)=4.58$, $p=.04$]. This interaction is depicted in Fig. 1: For first-degree kin, participants were substantially more vigilant of female kin than of male kin (means=6.57 and 5.61), but for third-degree

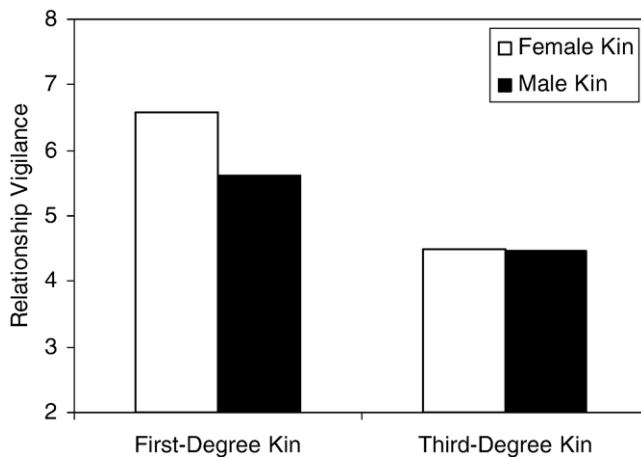


Fig. 1. Interactive effect of genetic relatedness and sex of kin in predicting vigilance over kin members' romantic relationships (Study 1).

kin, this sex difference was nonexistent (means=4.48 and 4.47).

These results provide clear support for one of the hypotheses derived from the logic of inclusive fitness: greater vigilance over the romantic relationships of closer kin. This effect indicates a sort of nepotistic nosiness, in that people are more willing to incur a direct cost to themselves (expenditure of the time and effort involved in maintaining vigilance over another person's romantic relationships) when that cost is more likely to be offset by an indirect benefit to their inclusive fitness.

Evidence in support of hypothesized sex differences was less robust. Women did indicate higher levels of vigilance than men did, as predicted, but this main effect was small and failed to meet conventional standards for statistical significance. In addition, participants were more vigilant of female kin than of male kin, but this effect was moderated by degree of relatedness. The sex difference emerged only for very close kin, not for more distant kin. This interaction makes some conceptual sense: To the extent that one may reap greater indirect fitness benefits from vigilance over female kin relationships than over male kin relationships, this would be the case especially for closer kin than for more distant kin.

3. Study 2

In Study 2, we employed a revised questionnaire method. Rather than rating the extent to which they are vigilant over kin members' relationships, participants rated the extent to which specific kin members are vigilant of their own relationships. We once again tested whether people are more vigilant over closer kin's relationships and also tested again for sex differences. Study 2 also included methods that allowed us to extend our inquiry in two important ways.

First, in addition to assessing vigilance, we also attempted to assess the extent to which different kin members were

perceived to actually interfere with or influence participants' romantic relationships.

Second, we tested the extent to which specific psychological variables mediated the relationship between genetic relatedness and relationship vigilance. Previous research reveals that inferences about kinship are often informed not by rational assessment of actual genetic relatedness but by fallible superficial cues. Among these cues are early-life coresidence, phenotypic similarity, and emotional closeness (DeBruine, 2004, 2005; Essock-Vitale & McGuire, 1985; Korchmaros & Kenny, 2001; Lieberman et al., 2003; Neyer & Lang, 2003; Park & Schaller, 2005). We assessed four such cues and tested the extent to which each cue accounts for the tendency to be more attentive to the romantic relationships of closer kin.

3.1. Method

Participants were 184 University of British Columbia undergraduate students (151 women and 33 men). Mean age was 20.0 years.

Participants were randomly assigned to answer a questionnaire about parents and siblings (first-degree kin), aunts and uncles (second-degree kin), or cousins (third-degree kin). (In a few instances, participants' families lacked the kin members about whom they were asked to respond and, thus, were randomly reassigned to consider a different category of kin.) We sought to ensure that each participant respond about at least one male kin member and at least one female kin member. (If participants' families were large enough, we asked that they respond about two male kin members and two female kin members.) Participants answering questionnaires about first-degree kin responded to items about both of their parents, one sister (if they had any sisters), and one brother (if they had any brothers). Participants answering questionnaires about aunts and uncles responded to items about those aunts and uncles closest in age to their parents. Participants answering questionnaires about cousins responded to items about those cousins closest in age to themselves. As in Study 1, we also asked participants to respond only about kin members who were at least 16 years old.

Participants responded to the same set of items for each kin member about whom they were questioned. Participants first responded to three items assessing the extent that a given kin member is vigilant of their romantic relationships: "My [kin member] is usually aware of my romantic partners' good and bad qualities," "My [kin member] is usually aware of how my romantic relationships are progressing," and "My [kin member] often worries about how my romantic relationships are progressing." Participants rated their agreement with each statement on 9-point scales with endpoints labeled *strongly disagree* and *strongly agree*. Responses to these items were highly correlated, and hence, we computed the mean of responses to these items to serve as a composite index of vigilance. For each participant, we

computed separate composite indices—one for the perceived vigilance of male kin and another for the perceived vigilance of female kin. (Cronbach's α values for these composite indices were .82 and .90, respectively.)

Participants also responded to two items assessing whether a given kin member had ever attempted to influence the outcome of their romantic relationships: "Has your [kin member] ever said or done anything to indicate that [he/she] encouraged or approved of you starting a romantic relationship with someone or continuing an existing relationship?" and "Has your [kin member] ever said or done anything to indicate that [he/she] discouraged or disapproved of you starting a romantic relationship with someone or continuing an existing relationship?" Participants responded to each item by circling "yes" or "no." For each participant, we computed indices indicating the proportions of male kin and female kin offering encouragement or approval ("positive influence") and the proportions of male kin and female kin offering discouragement or disapproval ("negative influence").

Finally, participants responded to four items assessing kinds of information that might be used as kinship cues. Participants rated their agreement with statements assessing similarity in physical appearance ("Other people think that I look like my [kin member]"), similarity in attitudes ("My [kin member]'s attitudes are similar to my own attitudes"), and feelings of emotional closeness ("I feel close to my [kin member]"). These three ratings were made on 9-point scales with endpoints labeled *strongly disagree* and *strongly agree*. A fourth item assessed coresidence: Participants indicated the number of years (if any) that they had lived in the same house as each kin member.

3.2. Results and discussion

Preliminary analyses revealed that participants' brothers and fathers were perceived to be approximately equally vigilant [means=4.54 and 4.89; $t(29)=0.99$, $p=.33$] and that their sisters and mothers were perceived to be approximately equally vigilant [means=6.10 and 6.17; $t(27)=0.16$, $p=.88$]. We pooled responses about siblings and parents to represent vigilance by first-degree kin. These responses were compared with participants' responses about vigilance by aunts and uncles (second-degree kin) and cousins (third-degree kin).

Composite vigilance ratings were subjected to a $2 \times 2 \times 3$ ANOVA to assess the effects of three predictor variables: sex of kin, sex of participant, and genetic relatedness of kin. (Sex of kin was a within-subjects factor; the other two predictors were between-subjects factors.) There was a main effect of genetic relatedness [$\eta^2=.21$, $F(2,174)=23.26$, $p<.001$]. Post hoc analyses revealed that the perceived vigilance of first-degree kin (mean=5.35) was greater than the perceived vigilance of either second-degree or third-degree kin (means=3.25 and 3.37, respectively; both p values $<.05$). There was also a main effect of kin sex [$\eta^2=.23$, $F(1,174)$

=53.13, $p<.001$]. Female kin were perceived to be more vigilant than male kin (means=4.14 and 3.24). No clear effects emerged involving sex of participant. Although, compared to male participants (mean=3.76), female participants indicated their kin to be somewhat more vigilant (mean=4.05), this main effect was not statistically significant; neither was there any significant higher-order interaction involving sex of participant.

In addition to reporting perceived vigilance by kin, participants also reported on actual attempts by kin members to influence their relationships, in either a positive manner (encouragement or approval) or a negative manner (discouragement or disapproval). Vigilance ratings were positively correlated with both positive and negative influence scores (r values $>.46$, p values $<.001$). A pair of $2 \times 2 \times 3$ ANOVAs assessed the effects of the three primary predictor variables (sex of kin, sex of participant, and genetic relatedness of kin) on positive and negative influence. On both measures, there were main effects for genetic relatedness (both p values $<.001$) and for sex of kin (both p values $<.03$). These effects are evident in the means that appear in Table 1. Compared to both second- and third-degree kin, first-degree kin were perceived to exert both more positive influence and more negative influence. In addition, compared to male kin, female kin were perceived to exert both more positive influence and more negative influence. (In addition, on the positive influence index, there was an interaction between sex of kin and sex of participant [$\eta^2=.03$, $F(1,174)=4.54$, $p=.03$]: Female participants perceived that their female kin exert more positive influence than did their male kin, whereas male participants perceived that female and male kin exert about equal amounts of positive influence.) There were no significant effects involving sex of participant.

The strong degree of correspondence between results on the vigilance index and results on the indices of behavioral influence is worth noting. This correspondence makes abundant sense (awareness of kin members' romantic relationships is typically a precondition to any attempt to influence the course of those relationships). Furthermore,

Table 1
Proportion of kin attempting influence over participants' romantic relationships (Study 2)

Category of kin	Proportion of kin attempting influence	
	Positive influence	Negative influence
First-degree kin		
Male kin	.48	.40
Female kin	.65	.48
Second-degree kin		
Male kin	.21	.08
Female kin	.30	.20
Third-degree kin		
Male kin	.14	.10
Female kin	.39	.23

these results help to validate the vigilance index as a useful indicator of effortful expenditure of resources in the service of potential indirect fitness benefits.

It is also notable that, while first-degree kin were perceived as substantially more vigilant (and influential) than either second- or third-degree kin, there was no difference in vigilance (or influence) between second- and third-degree kin. The lack of difference between second- and third-degree kin would appear to violate the logical implications of actual genetic relatedness. However, actual nepotistic behavior is typically influenced not by mathematical logic but rather by psychological processes—including recognition mechanisms through which individuals use fallible superficial cues to discriminate between kin and nonkin. We conducted an additional series of analyses to explore the extent to which four previously documented kinship cues (physical similarity, attitudinal similarity, emotional closeness, and coresidence) might account for the relationship between actual genetic relatedness and relationship vigilance. (For these analyses, we pooled participants' responses about their male and female kin.) All four variables were substantially correlated with relationship vigilance (all r values $>.52$, p values $<.001$). Also, compared to second- and third-degree kin, participants were more attitudinally and physically similar to their first-degree kin, were emotionally closer to their first-degree kin, and also spent many more years coresiding with their first-degree kin (all p values $<.001$). On none of these four variables was there any substantive difference between second- and third-degree kin (all p values $>.10$). We also conducted a regression analysis in which all four variables were entered, along with actual genetic relatedness, as predictors of relationship vigilance. Results indicated statistically significant unique effects for two of the predictor variables: physical similarity [$\beta=.27$; $t(177)=3.66$, $p<.001$] and emotional closeness [$\beta=.53$; $t(177)=7.89$, $p<.001$]. Attitudinal similarity and coresidence did not exert significant effects in this analysis; neither did actual genetic relatedness [$\beta=.13$; $t(177)=1.05$, $p=.30$], a result that stands in contrast to its substantial impact when not controlling for proximal kinship cues (see above). A Sobel test verified that the unique effects of physical similarity and emotional closeness, in combination, accounted for a significant drop in the relationship between genetic relatedness and vigilance ($p<.001$). In sum, the effect of actual kinship on relationship vigilance was substantially mediated by two proximal cues that are only imperfectly diagnostic of actual kinship.

Finally, we must remark upon sex differences that did, and did not, emerge. Recall that in Study 1, participants indicated that they were more vigilant of close female kin than of close male kin. In Study 2, the conceptually correspondent sex difference did not emerge (i.e., women were not significantly more likely than men to perceive vigilance, or influence attempts, by close kin). However, a different kind of sex difference was observed: Participants

indicated that their female kin were more vigilant than their male kin were. This latter finding is consistent with previous research indicating that women place greater importance on kin relations than do men and exhibit stronger nepotistic tendencies (Neyer & Lang, 2003; Salmon & Daly, 1996). Still, given that there are two conceptually distinct kinds of sex differences here and that each emerged in only one of two studies, we must remain cautious in our conclusions about sex differences until further evidence is considered.

4. Study 3

In a third study, we tested once again the hypotheses bearing on genetic relatedness and sex differences and extended our methodology to consider also the extent to which kin members' vigilance might differ depending on the nature of the relationship that a person is in. We employed a within-subjects design, in which all participants rated the extent to which specific kin members maintained vigilance over participants' long-lasting committed relationships and short casual relationships. This methodology allowed us to test the hypothesis that kin members are more vigilant of committed relationships (which are more likely to have indirect implications for kin members' own inclusive fitness). It also allowed us to explore the extent to which other effects (e.g., possible sex differences) might be moderated by relationship type.

4.1. Method

Participants were 83 University of British Columbia undergraduate students (68 women and 15 men). Mean age was 20.7 years.

All participants answered identical questionnaires assessing perceived relationship vigilance by both of their parents, one sister (if they had any sisters), one brother (if they had any brothers), a female cousin, and a male cousin. If participants had multiple siblings or cousins, they were instructed to provide responses about siblings and cousins closest in age to themselves. (As in previous studies, we also requested that participants only respond to items about kin members who were at least 16 years old.)

Participants were instructed to "think about occasions in which you have been involved in a serious and potentially long-lasting romantic relationship (e.g., you would consider marrying your romantic partner)" and to rate the extent that each kin member would be aware of and concerned about the progression of any such relationship. Participants were then instructed to "think about occasions in which you might have been dating someone for only a brief period of time (e.g., just a few dates)" and to rate the extent that each kin member would be aware of and concerned about the progression of any such relationship. Both ratings were made on 9-point scales, with endpoints labeled *not at all aware or concerned* and *very aware and concerned*.

4.2. Results and discussion

As in the previous studies, participants' responses about siblings and parents were combined to represent ratings of perceived vigilance by participants' first-degree kin.

Vigilance ratings were subjected to a $2 \times 2 \times 2$ ANOVA that tested the effects of one between-subjects variable (sex of participant) and three within-subjects variables: sex of kin, degree of relatedness (first- vs. third-degree kin), and relationship type.

Three statistically significant main effects emerged. There was a main effect for degree of relatedness [$\eta^2=.46$, $F(1,81)=69.87$, $p<.001$], indicating greater vigilance by first-degree kin than by third-degree kin (means=6.08 and 3.30). There was a main effect for sex of kin [$\eta^2=.27$, $F(1,81)=29.43$, $p<.001$], indicating greater vigilance by female kin than by male kin (means=5.20 and 4.17). In addition, there was a main effect for relationship type [$\eta^2=.38$, $F(1,81)=50.52$, $p<.001$]: Kin members were perceived to be more vigilant of long-term relationships than of short-term relationships (means=5.56 and 3.81).

There was no significant main effect for sex of participant, but there was a two-way interaction between sex of participant and relationship type [$\eta^2=.05$, $F(1,81)=3.90$, $p=.05$]. The predicted sex difference emerged within the context of long-term committed relationships (women reported more kin vigilance than men; means=5.69 and 4.97), but no such sex difference emerged within the context of short-term relationships (means=3.79 and 3.89 for female and male participants, respectively). At a conceptual level, this interaction bears some similarity to one of the results observed in Study 1, suggesting that kin members are more vigilant over the relationships of females than males but only under circumstances that have especially clear implications for kin members' inclusive fitness.

This interesting two-way interaction might itself be best understood within the context of an additional three-way interaction between relationship type, sex of participant, and sex of kin [$\eta^2=.06$, $F(1,81)=5.23$, $p=.03$]. This interaction is described by the means presented in Fig. 2. In the context of long-term relationships, women perceived greater vigilance than men did from both female kin and male kin (just as described above). However, in the context of short-term relationships, things were more complex. Whereas women (compared to men) perceived slightly greater vigilance from female kin, men (compared to women) perceived greater vigilance from male kin.

It is interesting that participants did not indicate especially high levels of vigilance over female kin within the context of short-term dating relationships—given that even a casual sexual liaison has potentially great investment consequences for women. It is possible that the results might have looked a bit different if, rather than suggesting the context of a short-term dating relationship, the methods had instead emphasized the context of a single sexual encounter.

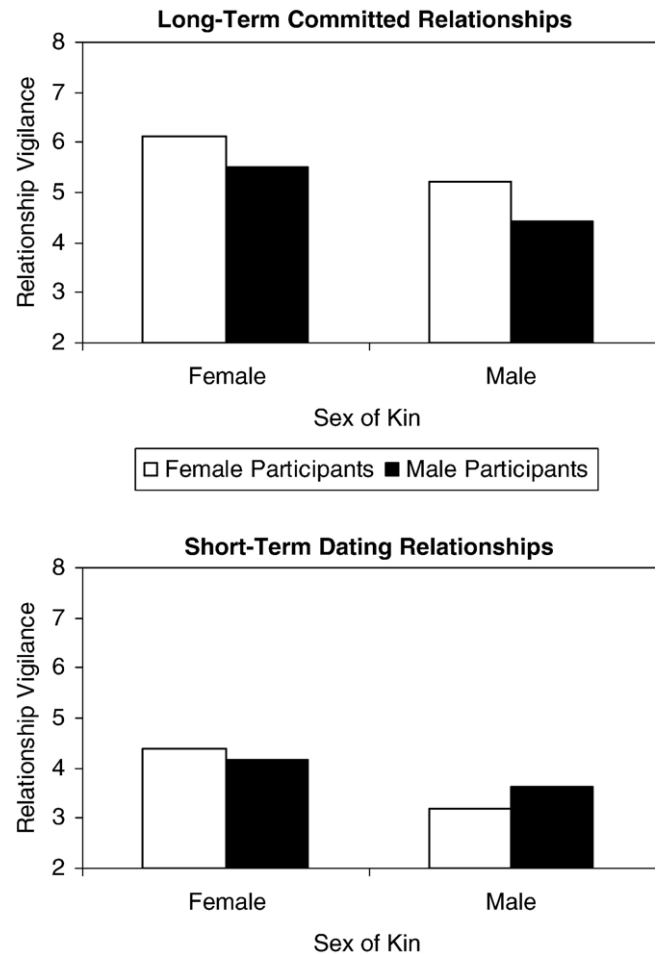


Fig. 2. Interactive effect of relationship type, sex of participant, and sex of kin in predicting perceived vigilance over participants' romantic relationships (Study 3).

There was one additional two-way interaction, between degree of relatedness and relationship type [$\eta^2=.12$, $F(1,81)=11.22$, $p=.001$]. The impact of relationship type on vigilance was especially powerful for first-degree kin (means were 7.21 and 4.94 for long- and short-term relationships, respectively), as compared to third-degree kin (means were 3.92 and 2.68 for long- and short-term relationships, respectively). This interaction did not substantially qualify interpretation of either main effect. It suggests simply that the substantial effect of each variable on vigilance is even more pronounced under circumstances that have especially clear implications for kin members' inclusive fitness.

5. Meta-analytic integration and general conclusions

Our conceptual analysis, informed by the logic of inclusive fitness, yielded hypotheses about four variables that may influence the extent to which people are vigilant of (and sometimes attempt to influence) their kin members' romantic relationships.

One hypothesis is that people are more attentive to the romantic relationships of genetically closer kin. This hypothesis was supported by the results of all three studies. Additional results revealed that the perception of kinship-connoting cues in others accounts for this tendency to nepotistically exert vigilance over kin's relationships. Two kinship cues in particular—physical similarity and emotional closeness—mediated the relationship between genetic relatedness and vigilance. (It is perhaps notable that another kinship cue—coresidence—exerted no unique mediating effect. This noneffect indicates that the effects associated with genetic relatedness cannot simply be attributed to a history of greater contact with close kin than with more distant kin.) More generally, these results suggest that vigilance over kin member's relationships depends not so much on rational assessments of genetic relatedness and its fitness implications but is instead—like other forms of nepotistic behavior—precipitated by the perception of kinship-connoting cues in others (Neyer & Lang, 2003; see also Haselton & Nettle, 2006, for a broader discussion of signal-detection biases in human social cognition).

A second hypothesis is that people are more vigilant of kin member's long-lasting committed relationships, as compared to casual dating relationships. One study tested this hypothesis, and the results provided unambiguous support. This effect occurred regardless of participants' sex or the sex of their kin, and it occurred among both close kin and more distant kin. It is notable, though, that the effect of relationship type was especially powerful among genetically closer kin. Both the main effect and the interaction with genetic relatedness imply that people are especially vigilant of kin member's romantic relationships when a greater indirect fitness benefit is at stake.

A third hypothesis is that women, as compared to men, are more vigilant of kin members' romantic relationships. Clear support for this hypothesis was found in Studies 2 and 3. Support was less clear in Study 1. Given this situation, we conducted a meta-analysis of these results, using Stouffer's method for combining p values. For the sake of completeness, we also included results from a fourth study, not reported above. (This additional study used procedures that essentially replicated those of Studies 2 and 3 to test for sex differences; the sample included 24 female and 10 male participants.) The result of this meta-analysis was unequivocal: Women exerted greater vigilance than men did over their kin members' romantic relationships (Stouffer $z=5.50$, $p<.001$).

Our conceptual analysis also suggested one additional hypothesis about sex differences: People may be especially vigilant of female kin members' relationships, as compared to those of male kin members. Mean differences were consistent with this hypothesis in all studies, but in none of the individual studies was this difference statistically significant. Given the limited statistical power associated with each study, we conducted another meta-analysis that

combined effects across all three studies, plus the additional replication sample. The result of this more statistically powerful meta-analysis revealed a significant sex difference: People exerted greater vigilance over female kin's relationships (Stouffer $z=2.13$, $p=.03$).

It is important to note, however, that this effect is relatively weak and is moderated by other variables. In Study 1, people reported greater vigilance over the relationships of female kin than of male kin but only for first-degree kin (there was no such sex difference for more distant kin). This interaction was confirmed by a meta-analysis that combined effects across the three studies reported above, plus the additional replication sample: Vigilance over close female kin was higher than vigilance over close male kin, but this sex difference was negligible among more distant kin (for this interaction effect, Stouffer $z=2.59$, $p=.01$). In Study 3, women were more likely than men to perceive vigilance from their kin but only in the context of long-term committed relationships (there was no such sex difference in the context of casual dating relationships). Although distinct in their details, these two interactions might both be interpreted similarly within the conceptual framework of inclusive fitness: The tendency for people to be more vigilant of female kin members' relationships is more pronounced under conditions in which a substantial indirect fitness benefit is more clearly at stake.

The logic of inclusive fitness helps to explain why people expend valuable resources on individuals who are close kin. This nepotism manifests most transparently in the transfer of material resources from which the recipient receives an obvious benefit. The same logic can be applied to the expenditure of other kinds of resources too, and our results suggest that the tendency to be vigilant of (and to exert influence on) the mating relationships of close kin also constitutes a form of nepotism. While this nepotistic nosiness may not always be welcomed by the actual recipients, it may nonetheless provide an indirect fitness benefit to those people who invest these resources.

By applying the logic of nepotism to the mating domain and pairing it with the logic of differential parental investment, our analysis has implications for understanding the processes that underlie sex differences in mate choices. Differential parental investment provides an ultimate explanation for the existence of these sex differences, but it remains necessary to articulate the proximal (e.g., psychological) mechanisms through which those sex differences actually emerge. Some of those mechanisms lie in the cognitive structures of the individuals directly involved in the mating relationships (Haselton & Buss, 2000; Schaller, Park, & Kenrick, 2007). Additional mechanisms appear to lie in the cognitions and behaviors of other people entirely—the close genetic relatives of those involved in the mating relationships. In order to understand a person's mating choices, it may be important to know not only that person's own inclinations but also the inclinations of kin members lurking behind the scenes.

This last point reminds us that in order to fully appreciate how individual human behavior results from ancient evolutionary pressures, we must consider not only the effects of evolution on individual-level cognition but also its effects on interpersonal communication and social influence (Schaller, 2006; Sundie, Cialdini, Griskevicius, & Kenrick, 2006). Individual thoughts and behaviors rarely occur in a social vacuum, and the influence of nepotistically nosy kin may be especially irresistible.

Acknowledgments

We thank Caelin White for his assistance in conducting these studies.

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